Algebra II Regents Bimodal Worksheets
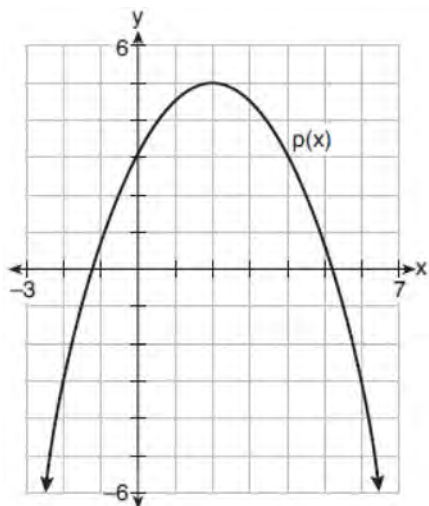
1   Consider $f(x) = 4x^2 + 6x - 3$, and $p(x)$ defined by the graph below.

The difference between the values of the maximum of p and minimum of f is

2   A 7-year lease for office space states that the annual rent is $85,000 for the first year and will increase by 6% each additional year of the lease. What will the total rent expense be for the entire 7-year lease?

3   For all values of x for which the expression is defined, $\dfrac{x^3 + 2x^2 - 9x - 18}{x^3 - x^2 - 6x}$, in simplest form, is equivalent to

4   The weights of bags of Graseck's Chocolate Candies are normally distributed with a mean of 4.3 ounces and a standard deviation of 0.05 ounces. What is the probability that a bag of these chocolate candies weighs less than 4.27 ounces?

5   The first term of a geometric sequence is 8 and the fourth term is 216. What is the sum of the first 12 terms of the corresponding series?

6   Consider the probability statements regarding events A and B below.
$$P(A \text{ or } B) = 0.3;$$
$$P(A \text{ and } B) = 0.2; \text{ and}$$
$$P(A \mid B) = 0.8$$
What is $P(B)$?

7   What is the solution set of the following system of equations?
$$y = 3x + 6$$
$$y = (x + 4)^2 - 10$$

8   Which expression is equivalent to
$\dfrac{2x^4 + 8x^3 - 25x^2 - 6x + 14}{x + 6}$?

9   The mean intelligence quotient (IQ) score is 100, with a standard deviation of 15, and the scores are normally distributed. Given this information, the approximate percentage of the population with an IQ greater than 130 is closest to

10   The solutions to the equation $5x^2 - 2x + 13 = 9$ are

11   Given $\cos\theta = \dfrac{7}{25}$, where θ is an angle in standard position terminating in quadrant IV, and $\sin^2\theta + \cos^2\theta = 1$, what is the value of $\tan\theta$?

12 What are the solution(s) to the system of equations shown below?

$$x^2 + y^2 = 5$$
$$y = 2x$$

13 The Fahrenheit temperature, $F(t)$, of a heated object at time t, in minutes, can be modeled by the function below. F_s is the surrounding temperature, F_0 is the initial temperature of the object, and k is a constant.

$$F(t) = F_s + (F_0 - F_s)e^{-kt}$$

Coffee at a temperature of 195°F is poured into a container. The room temperature is kept at a constant 68°F and $k = 0.05$. Coffee is safe to drink when its temperature is, at most, 120°F. To the *nearest minute*, how long will it take until the coffee is safe to drink?

14 If $f(x) = a^x$ where $a > 1$, then the inverse of the function is

15 What is the inverse of $f(x) = x^3 - 2$?

16 On average, college seniors graduating in 2012 could compute their growing student loan debt using the function $D(t) = 29,400(1.068)^t$, where t is time in years. Which expression is equivalent to $29,400(1.068)^t$ and could be used by students to identify an approximate daily interest rate on their loans?

17 Given $c(m) = m^3 - 2m^2 + 4m - 8$, the solution of $c(m) = 0$ is

18 What is the inverse of $f(x) = -6(x - 2)$?

19 The completely factored form of $n^4 - 9n^2 + 4n^3 - 36n - 12n^2 + 108$ is

20 The function $f(x) = a \cos bx + c$ is plotted on the graph shown below.
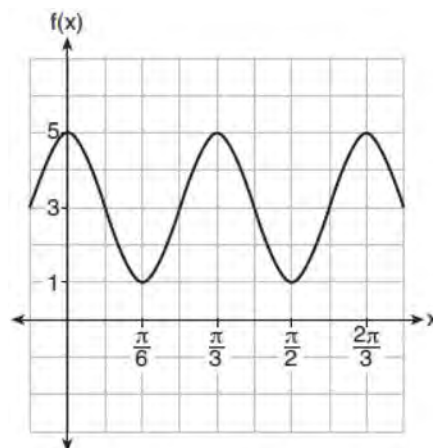
What are the values of a, b, and c?

21 The height above ground for a person riding a Ferris wheel after t seconds is modeled by

$$h(t) = 150\sin\left(\frac{\pi}{45}t + 67.5\right) + 160 \text{ feet. How many}$$

seconds does it take to go from the bottom of the wheel to the top of the wheel?

22 Brian deposited 1 cent into an empty non-interest bearing bank account on the first day of the month. He then additionally deposited 3 cents on the second day, 9 cents on the third day, and 27 cents on the fourth day. What would be the total amount of money in the account at the end of the 20th day if the pattern continued?

23 The populations of two small towns at the beginning of 2018 and their annual population growth rate are shown in the table below.

Town	Population	Annual Population Growth Rate
Jonesville	1240	6% increase
Williamstown	890	11% increase

Assuming the trend continues, approximately how many years after the beginning of 2018 will it take for the populations to be equal?

24 Perry invested in property that cost him $1500. Five years later it was worth $3000, and 10 years from his original purchase, it was worth $6000. Assuming the growth rate remains the same, which type of function could he create to find the value of his investment 30 years from his original purchase?

25 Stephanie found that the number of white-winged cross bills in an area can be represented by the formula $C = 550(1.08)^t$, where t represents the number of years since 2010. Which equation correctly represents the number of white-winged cross bills in terms of the monthly rate of population growth?

26 Where i is the imaginary unit, the expression $(x + 3i)^2 - (2x - 3i)^2$ is equivalent to

27 Given $f(x) = \frac{1}{2}x + 8$, which equation represents the inverse, $g(x)$?

28 If $f(x) = \log_3 x$ and $g(x)$ is the image of $f(x)$ after a translation five units to the left, which equation represents $g(x)$?

29 There are 440 students at Thomas Paine High School enrolled in U.S. History. On the April report card, the students' grades are approximately normally distributed with a mean of 79 and a standard deviation of 7. Students who earn a grade less than or equal to 64.9 must attend summer school. The number of students who must attend summer school for U.S. History is closest to

30 The graph of $y = \log_2 x$ is translated to the right 1 unit and down 1 unit. The coordinates of the x-intercept of the translated graph are

31 The terminal side of θ, an angle in standard position, intersects the unit circle at $P\left(-\frac{1}{3}, -\frac{\sqrt{8}}{3}\right)$. What is the value of $\sec \theta$?

32 The profit function, $p(x)$, for a company is the cost function, $c(x)$, subtracted from the revenue function, $r(x)$. The profit function for the Acme Corporation is $p(x) = -0.5x^2 + 250x - 300$ and the revenue function is $r(x) = -0.3x^2 + 150x$. The cost function for the Acme Corporation is

33 The graph below represents national and New York State average gas prices.
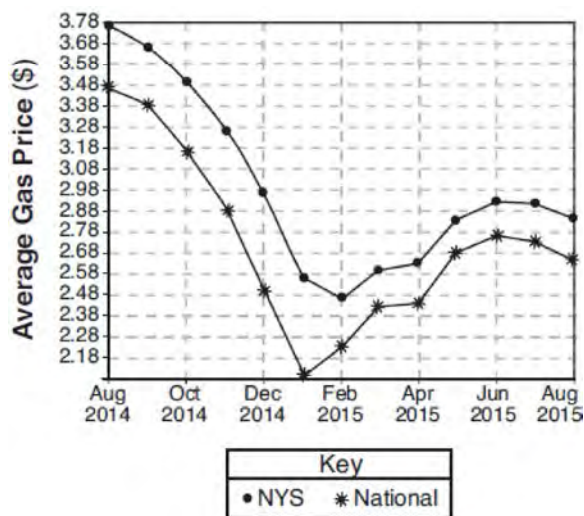
If New York State's gas prices are modeled by $G(x)$ and $C > 0$, which expression best approximates the national average x months from August 2014?

34 When factoring to reveal the roots of the equation $x^3 + 2x^2 - 9x - 18 = 0$, which equations can be used?

    I. $x^2(x + 2) - 9(x + 2) = 0$

    II. $x(x^2 - 9) + 2(x^2 - 9) = 0$

    III. $(x - 2)(x^2 - 9) = 0$

35 The expression $\dfrac{9x^2 - 2}{3x + 1}$ is equivalent to

36 If $\left(a^3 + 27\right) = (a + 3)\left(a^2 + ma + 9\right)$, then m equals

37 If $p(x) = 2\ln(x) - 1$ and $m(x) = \ln(x + 6)$, then what is the solution for $p(x) = m(x)$?

38 The roots of the equation $3x^2 + 2x = -7$ are

39 Judith puts $5000 into an investment account with interest compounded continuously. Which approximate annual rate is needed for the account to grow to $9110 after 30 years?

40 The function $N(t) = 100e^{-0.023t}$ models the number of grams in a sample of cesium-137 that remain after t years. On which interval is the sample's average rate of decay the fastest?

41 The depth of the water at a marker 20 feet from the shore in a bay is depicted in the graph below.
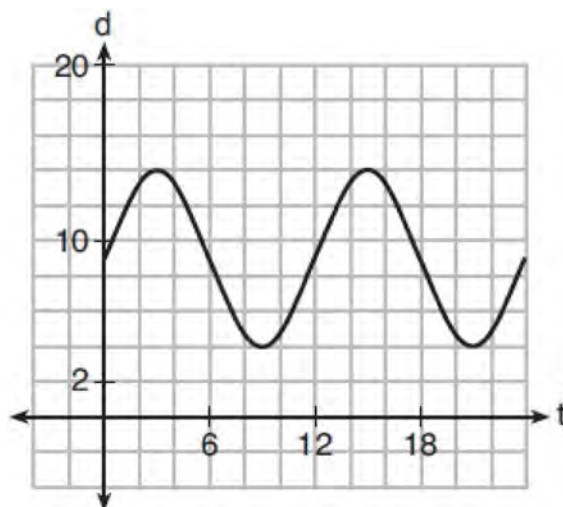
If the depth, d, is measured in feet and time, t, is measured in hours since midnight, what is an equation for the depth of the water at the marker?

42 The value(s) of x that satisfy
$$\sqrt{x^2 - 4x - 5} = 2x - 10 \text{ are}$$

43 After Roger's surgery, his doctor administered pain medication in the following amounts in milligrams over four days.

Day (n)	1	2	3	4
Dosage (m)	2000	1680	1411.2	1185.4

How can this sequence best be modeled recursively?

44 For $x > 0$, which expression is equivalent to
$$\frac{\sqrt[3]{x^2} \cdot \sqrt{x^5}}{\sqrt[6]{x}}?$$

45 How many solutions exist for
$$\frac{1}{1-x^2} = -|3x - 2| + 5?$$

46 A fast-food restaurant analyzes data to better serve its customers. After its analysis, it discovers that the events D, that a customer uses the drive-thru, and F, that a customer orders French fries, are independent. The following data are given in a report:
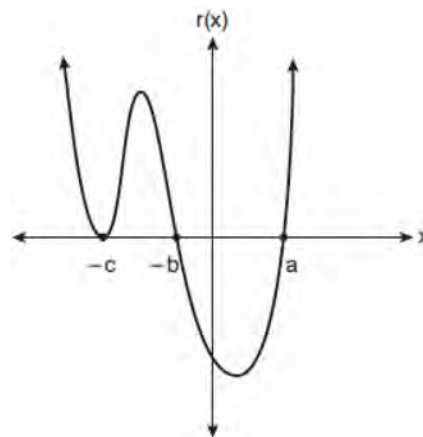
$$P(F) = 0.8$$

$$P(F \cap D) = 0.456$$

Given this information, $P(F|D)$ is

47 Written in simplest form, $\dfrac{c^2 - d^2}{d^2 + cd - 2c^2}$ where $c \neq d$, is equivalent to

48 What is the solution when the equation $wx^2 + w = 0$ is solved for x, where w is a positive integer?

49 What is the solution set of the equation
$$\frac{2}{x} - \frac{3x}{x+3} = \frac{x}{x+3}?$$

50 A sketch of $r(x)$ is shown below.

An equation for $r(x)$ could be

51 For which values of x, rounded to the *nearest hundredth*, will $\left|x^2 - 9\right| - 3 = \log_3 x$?

52 After examining the functions $f(x) = \ln(x + 2)$ and $g(x) = e^{x-1}$ over the interval $(-2, 3]$, Lexi determined that the correct number of solutions to the equation $f(x) = g(x)$ is

53 Sodium iodide-131, used to treat certain medical conditions, has a half-life of 1.8 hours. The data table below shows the amount of sodium iodide-131, rounded to the nearest thousandth, as the dose fades over time.

Number of Half Lives	1	2	3	4	5
Amount of Sodium Iodide-131	139.000	69.500	34.750	17.375	8.688

What approximate amount of sodium iodide-131 will remain in the body after 18 hours?

54 Julia deposits $2000 into a savings account that earns 4% interest per year. The exponential function that models this savings account is $y = 2000(1.04)^t$, where t is the time in years. Which equation correctly represents the amount of money in her savings account in terms of the monthly growth rate?

55 When a ball bounces, the heights of consecutive bounces form a geometric sequence. The height of the first bounce is 121 centimeters and the height of the third bounce is 64 centimeters. To the *nearest centimeter*, what is the height of the fifth bounce?

56 The solutions to $x + 3 - \dfrac{4}{x-1} = 5$ are

57 Kelly-Ann has $20,000 to invest. She puts half of the money into an account that grows at an annual rate of 0.9% compounded monthly. At the same time, she puts the other half of the money into an account that grows continuously at an annual rate of 0.8%. Which function represents the value of Kelly-Ann's investments after t years?

58 For the system shown below, what is the value of z?

$$y = -2x + 14$$
$$3x - 4z = 2$$
$$3x - y = 16$$

59 Camryn puts $400 into a savings account that earns 6% annually. The amount in her account can be modeled by $C(t) = 400(1.06)^t$ where t is the time in years. Which expression best approximates the amount of money in her account using a weekly growth rate?

60 What is the equation of the directrix for the parabola $-8(y - 3) = (x + 4)^2$?

61 If $5000 is put into a savings account that pays 3.5% interest compounded monthly, how much money, to the *nearest ten cents*, would be in that account after 6 years, assuming no money was added or withdrawn?

62 If $x - 1$ is a factor of $x^3 - kx^2 + 2x$, what is the value of k?

63 A group of students was trying to determine the proportion of candies in a bag that are blue. The company claims that 24% of candies in bags are blue. A simulation was run 100 times with a sample size of 50, based on the premise that 24% of the candies are blue. The approximately normal results of the simulation are shown in the dot plot below.
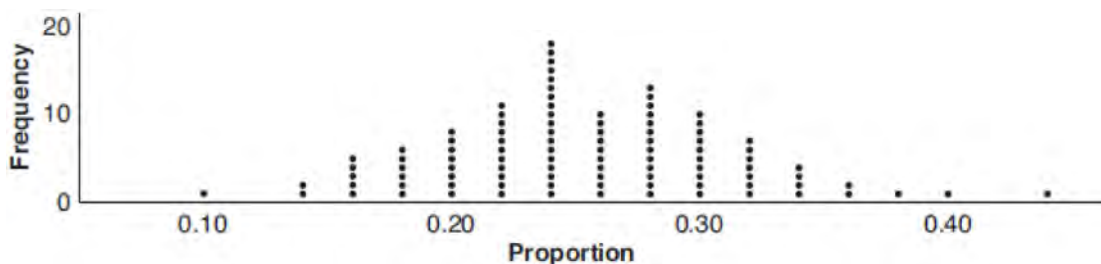
The simulation results in a mean of 0.254 and a standard deviation of 0.060. Based on this simulation, what is a plausible interval containing the middle 95% of the data?

64 A number, minus twenty times its reciprocal, equals eight. The number is

65 What is the solution set of the equation
$\frac{2}{3x+1} = \frac{1}{x} - \frac{6x}{3x+1}$?

66 If $p(x) = 2x^3 - 3x + 5$, what is the remainder of $p(x) \div (x-5)$?

67 Which expression is equivalent to $(2x - i)^2 - (2x - i)(2x + 3i)$ where i is the imaginary unit and x is a real number?

68 What is the inverse of the function $y = 4x + 5$?

69 The solution set for the equation $b = \sqrt{2b^2 - 64}$ is

70 Which expression(s) are equivalent to $\frac{x^2 - 4x}{2x}$, where $x \neq 0$?

I. $\frac{x}{2} - 2$ II. $\frac{x-4}{2}$ III. $\frac{x-1}{2} - \frac{3}{2}$

71 What is the solution set for x in the equation below?
$$\sqrt{x+1} - 1 = x$$

72 The hours of daylight, y, in Utica in days, x, from January 1, 2013 can be modeled by the equation $y = 3.06 \sin(0.017x - 1.40) + 12.23$. How many hours of daylight, to the *nearest tenth*, does this model predict for February 14, 2013?

73 On a given school day, the probability that Nick oversleeps is 48% and the probability he has a pop quiz is 25%. Assuming these two events are independent, what is the probability that Nick oversleeps and has a pop quiz on the same day?
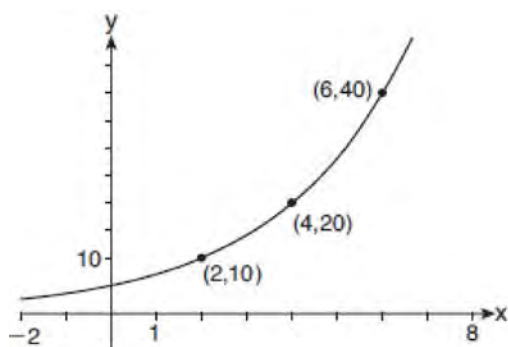
74   Selected values for the functions f and g are shown in the tables below.

x	f(x)		x	g(x)
−3.12	−4.88		−2.01	−1.01
0	−6		0	0.58
1.23	−4.77		8.52	2.53
8.52	2.53		13.11	3.01
9.01	3.01		16.52	3.29

A solution to the equation $f(x) = g(x)$ is

75   The graph of $y = f(x)$ is shown below.

(6,40)

(4,20)

10-

(2,10)

−2   1   8

Which expression defines $f(x)$?

76   For positive values of x, which expression is

equivalent to $\sqrt{16x^2} \bullet x^{\frac{2}{3}} + \sqrt[3]{8x^5}$

77   If $ae^{bt} = c$, where a, b, and c are positive, then t equals

78   What is the solution set of the equation
$\dfrac{10}{x^2 - 2x} + \dfrac{4}{x} = \dfrac{5}{x - 2}$?

79   Which equation represents a parabola with a focus of $(-2,5)$ and a directrix of $y = 9$?

80   The solution of $87e^{0.3x} = 5918$, to the *nearest thousandth*, is

81   The scores on a mathematics college-entry exam are normally distributed with a mean of 68 and standard deviation 7.2. Students scoring higher than one standard deviation above the mean will not be enrolled in the mathematics tutoring program. How many of the 750 incoming students can be expected to be enrolled in the tutoring program?

82   A study of black bears in the Adirondacks reveals that their population can be represented by the function $P(t) = 3500(1.025)^t$, where t is the number of years since the study began. Which function is correctly rewritten to reveal the monthly growth rate of the black bear population?
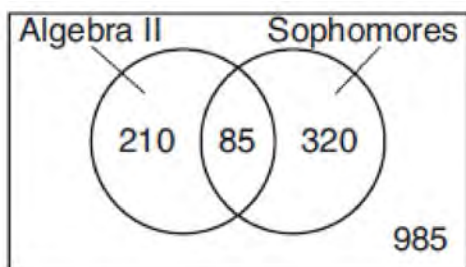
83   What is the quotient when $10x^3 - 3x^2 - 7x + 3$ is divided by $2x - 1$?

84 Which statement(s) are true for all real numbers?

    I $(x-y)^2 = x^2 + y^2$

    II $(x+y)^3 = x^3 + 3xy + y^3$

85 A 4th degree polynomial has zeros -5, 3, i, and $-i$. Which graph could represent the function defined by this polynomial?

86 Data for the students enrolled in a local high school are shown in the Venn diagram below.

If a student from the high school is selected at random, what is the probability that the student is a sophomore given that the student is enrolled in Algebra II?

87 The average depreciation rate of a new boat is approximately 8% per year. If a new boat is purchased at a price of $75,000, which model is a recursive formula representing the value of the boat n years after it was purchased?

88 The function below models the average price of gas in a small town since January 1st.

$G(t) = -0.0049t^4 + 0.0923t^3 - 0.56t^2 + 1.166t + 3.23,$

where $0 \le t \le 10$.

If $G(t)$ is the average price of gas in dollars and t represents the number of months since January 1st, the absolute maximum $G(t)$ reaches over the given domain is about

89 Evan graphed a cubic function, $f(x) = ax^3 + bx^2 + cx + d$, and determined the roots of $f(x)$ to be ± 1 and 2. What is the value of b, if $a = 1$?

90 The parabola described by the equation $y = \frac{1}{12}(x-2)^2 + 2$ has the directrix at $y = -1$. The focus of the parabola is

91 The half-life of iodine-131 is 8 days. The percent of the isotope left in the body d days after being introduced is $I = 100\left(\frac{1}{2}\right)^{\frac{d}{8}}$. When this equation is written in terms of the number e, the base of the natural logarithm, it is equivalent to $I = 100e^{kd}$. What is the approximate value of the constant, k?

92 If $\cos\theta = -\frac{3}{4}$ and θ is in Quadrant III, then $\sin\theta$ is equivalent to

93 The expression $6 - (3x - 2i)^2$ is equivalent to

94 At her job, Pat earns $25,000 the first year and receives a raise of $1000 each year. The explicit formula for the nth term of this sequence is $a_n = 25,000 + (n-1)1000$. Which rule best represents the equivalent recursive formula?

95 Which equation represents the equation of the parabola with focus $(-3, 3)$ and directrix $y = 7$?

96 The set of data in the table below shows the results of a survey on the number of messages that people of different ages text on their cell phones each month.

Text Messages per Month			
Age Group	0-10	11-50	Over 50
15-18	4	37	68
19-22	6	25	87
23-60	25	47	157

If a person from this survey is selected at random, what is the probability that the person texts over 50 messages per month given that the person is between the ages of 23 and 60?

97 There are 400 students in the senior class at Oak Creek High School. All of these students took the SAT. The distribution of their SAT scores is approximately normal. The number of students who scored within 2 standard deviations of the mean is approximately

98 What is the inverse of $f(x) = \dfrac{x}{x+2}$, where $x \neq -2$?

99 The temperature, in degrees Fahrenheit, in Times Square during a day in August can be predicted by the function $T(x) = 8\sin(0.3x - 3) + 74$, where x is the number of hours after midnight. According to this model, the predicted temperature, to the *nearest degree* Fahrenheit, at 7 P.M. is

100 A manufacturing plant produces two different-sized containers of peanuts. One container weighs x ounces and the other weighs y pounds. If a gift set can hold one of each size container, which expression represents the number of gift sets needed to hold 124 ounces?

101 When the expression $(x+2)^2 + 4(x+2) + 3$ is rewritten as the product of two binomials, the result is

102 If $A = -3 + 5i$, $B = 4 - 2i$, and $C = 1 + 6i$, where i is the imaginary unit, then $A - BC$ equals

103 A candidate for political office commissioned a poll. His staff received responses from 900 likely voters and 55% of them said they would vote for the candidate. The staff then conducted a simulation of 1000 more polls of 900 voters, assuming that 55% of voters would vote for their candidate. The output of the simulation is shown in the diagram below.
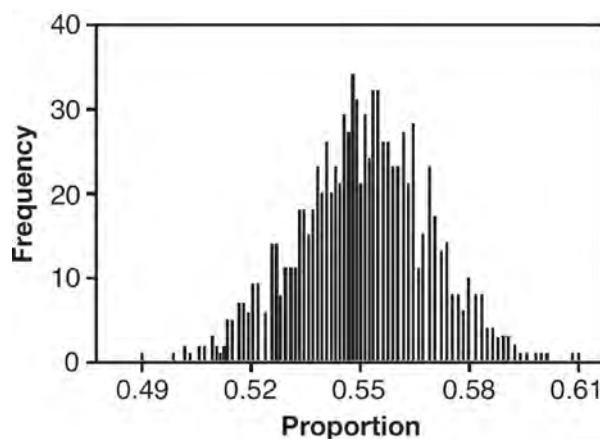
Given this output, and assuming a 95% confidence level, the margin of error for the poll is closest to

Name: _____

Algebra II Regents Bimodal Worksheets

104 What is the solution set of the equation
$\dfrac{3x+25}{x+7} - 5 = \dfrac{3}{x}$?

105 Relative to the graph of $y = 3\sin x$, what is the shift
of the graph of $y = 3\sin\left(x + \dfrac{\pi}{3}\right)$?

106 Monthly mortgage payments can be found using
the formula below, where M is the monthly
payment, P is the amount borrowed, r is the annual
interest rate, and n is the total number of monthly
payments.

$$M = \dfrac{P\left(\dfrac{r}{12}\right)\left(1 + \dfrac{r}{12}\right)^n}{\left(1 + \dfrac{r}{12}\right)^n - 1}$$

If Adam takes out a 15-year mortgage, borrowing
$240,000 at an annual interest rate of 4.5%, his
monthly payment will be

107 A rush-hour commuter train has arrived on time 64
of its first 80 days. As arrivals continue, which
equation can be used to find x, the number of
consecutive days that the train must arrive on
schedule to raise its on-time performance rate to
90%?

108 The solution set for the equation $\sqrt{56 - x} = x$ is

109 Which expression is equivalent to
$(x + 2)^2 - 5(x + 2) + 6$?

110 The expression $\dfrac{x^3 + 2x^2 + x + 6}{x + 2}$ is equivalent to

111 The expression $6xi^3(-4xi + 5)$ is equivalent to

112 In a group of 40 people, 20 have brown hair, 22
have blue eyes, and 15 have both brown hair and
blue eyes. How many people have neither brown
hair nor blue eyes?

113 The solution set for the equation
$\sqrt{x + 14} - \sqrt{2x + 5} = 1$ is

114 The Ferris wheel at the landmark Navy Pier in
Chicago takes 7 minutes to make one full rotation.
The height, H, in feet, above the ground of one of
the six-person cars can be modeled by
$H(t) = 70\sin\left(\dfrac{2\pi}{7}(t - 1.75)\right) + 80$, where t is time,
in minutes. Using $H(t)$ for one full rotation, this
car's minimum height, in feet, is

115 If $f(t) = 50(.5)^{\frac{t}{5715}}$ represents a mass, in grams, of
carbon-14 remaining after t years, which
statement(s) must be true?
    I. The mass of the carbon-14 is decreasing by
half each year.
    II. The mass of the original sample is 50 g.

116 The sequence $a_1 = 6$, $a_n = 3a_{n-1}$ can also be
written as

117   Consider the system of equations below?
$$x + 2y - z = 1$$
$$-x - 3y + 2z = 0$$
$$2x - 4y + z = 10$$
What is the solution to the given system of equations?

118   A manufacturing company has developed a cost model, $C(x) = 0.15x^3 + 0.01x^2 + 2x + 120$, where x is the number of items sold, in thousands. The sales price can be modeled by $S(x) = 30 - 0.01x$. Therefore, revenue is modeled by $R(x) = x \bullet S(x)$. The company's profit, $P(x) = R(x) - C(x)$, could be modeled by

119   For $x \neq 0$, which expressions are equivalent to one divided by the sixth root of x?

I. $\dfrac{\sqrt[6]{x}}{\sqrt[3]{x}}$ II. $\dfrac{x^{\frac{1}{6}}}{x^{\frac{1}{3}}}$ III. $x^{\frac{-1}{6}}$

120   Which equation has $1 - i$ as a solution?

121   For all real values of x, if $f(x) = (x - 3)^2$ and $g(x) = (x + 3)^2$, what is $f(x) - g(x)$?

122   Mallory wants to buy a new window air conditioning unit. The cost for the unit is $329.99. If she plans to run the unit three months out of the year for an annual operating cost of $108.78, which function models the cost per year over the lifetime of the unit, $C(n)$, in terms of the number of years, n, that she owns the air conditioner.

123   Julie averaged 85 on the first three tests of the semester in her mathematics class. If she scores 93 on each of the remaining tests, her average will be 90. Which equation could be used to determine how many tests, T, are left in the semester?

124   Given x and y are positive, which expressions are equivalent to $\dfrac{x^3}{y}$?

I. $\left(\dfrac{y}{x^3}\right)^{-1}$ II. $\sqrt[3]{x^9}\,(y^{-1})$ III. $\dfrac{x^6\sqrt[4]{y^8}}{x^3 y^3}$

125   The function $f(x) = \dfrac{x - 3}{x^2 + 2x - 8}$ is undefined when x equals

126   To the *nearest tenth*, the solution to the equation $4300e^{0.07x} - 123 = 5000$ is

127   A student studying public policy created a model for the population of Detroit, where the population decreased 25% over a decade. He used the model $P = 714(0.75)^d$, where P is the population, in thousands, d decades after 2010. Another student, Suzanne, wants to use a model that would predict the population after y years. Suzanne's model is best represented by

128   A ball is dropped from a height of 32 feet. It bounces and rebounds 80% of the height from which it was falling. What is the total downward distance, in feet, the ball traveled up to the 12th bounce?

129 What is the value of $\tan \theta$ when $\sin \theta = \dfrac{2}{5}$ and θ is in quadrant II?

130 A population is normally distributed with a mean of 23 and a standard deviation of 1.2. The percentage of the population that falls below 21, to the *nearest hundredth*, is

131 Marissa and Sydney are trying to determine if there is enough interest in their school to put on a senior musical. They randomly surveyed 100 members of the senior class and 43% of them said they would be interested in being in a senior musical. Marissa and Sydney then conducted a simulation of 500 more surveys, each of 100 seniors, assuming that 43% of the senior class would be interested in being in the musical. The output of the simulation is shown below.
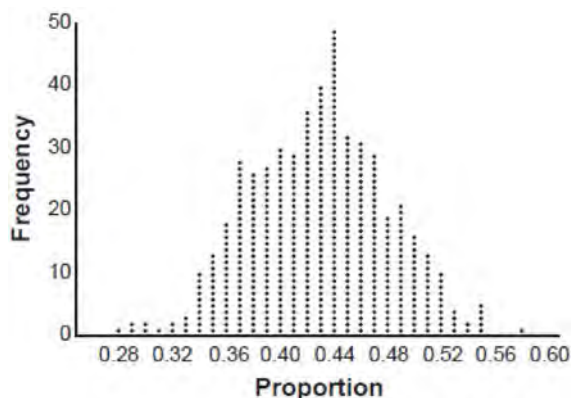
The standard deviation of the simulation is closest to

132 The voltage used by most households can be modeled by a sine function. The maximum voltage is 120 volts, and there are 60 cycles *every second*. Which equation best represents the value of the voltage as it flows through the electric wires, where *t* is time in seconds?

133 The focal length, *F*, of a camera's lens is related to the distance of the object from the lens, *J*, and the distance to the image area in the camera, *W*, by the formula below.

$$\frac{1}{J} + \frac{1}{W} = \frac{1}{F}$$

When this equation is solved for *J* in terms of *F* and *W*, *J* equals

134 The value of a new car depreciates over time. Greg purchased a new car in June 2011. The value, *V*, of his car after *t* years can be modeled by the equation $\log_{0.8}\left(\dfrac{V}{17000}\right) = t$. What is the average decreasing rate of change per year of the value of the car from June 2012 to June 2014, to the *nearest ten dollars per year*?

135 A local university has a current enrollment of 12,000 students. The enrollment is increasing continuously at a rate of 2.5% each year. Which logarithm is equal to the number of years it will take for the population to increase to 15,000 students?

136 Which expression is equivalent to $\dfrac{x^3 - 2}{x - 2}$?

137 The heights of the students at Central High School can be modeled by a normal distribution with a mean of 68.1 and a standard deviation of 3.4 inches. According to this model, approximately what percent of the students would have a height less than 60 inches or greater than 75 inches?

138   The loudness of sound is measured in units called decibels (dB). These units are measured by first assigning an
      intensity I_0 to a very soft sound that is called the threshold sound. The sound to be measured is assigned an
      intensity, I, and the decibel rating, d, of this sound is found using $d = 10\log\dfrac{I}{I_0}$. The threshold sound audible to
      the average person is 1.0×10^{-12} W/m² (watts per square meter). Consider the following sound level
      classifications:

Moderate	45-69 dB
Loud	70-89 dB
Very loud	90-109 dB
Deafening	>110 dB

      How would a sound with intensity 6.3×10^{-3} W/m² be classified?

139   An angle, θ, is rotated counterclockwise on the
      unit circle, with its terminal side in the second
      quadrant, as shown in the diagram below.
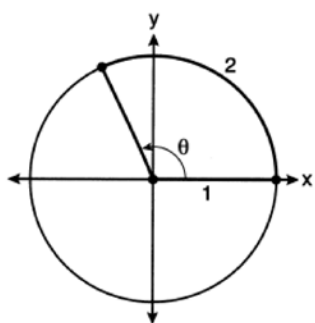
      Which value represents the radian measure of angle
      θ?

140   The solution to the equation $4x^2 + 98 = 0$ is

141   The element Americium has a half-life of 25
      minutes. Given an initial amount, A_0, which
      expression could be used to determine the amount
      of Americium remaining after t minutes?

142   Which equation represents a parabola with the
      focus at $(0,-1)$ and the directrix of $y = 1$?

143   What is the inverse of the function $y = \log_3 x$?

144   Luminescence is the emission of light that is not
      caused by heat. A luminescent substance decays
      according to the function below.

$$I = I_0 e^{3\left(-\frac{t}{0.6}\right)}$$

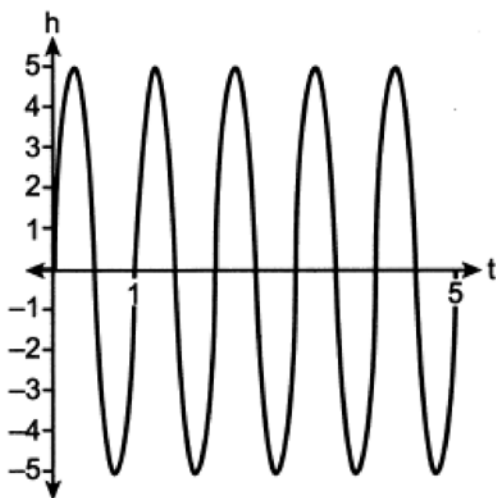   This function can be best approximated by

145   The expression $\dfrac{4x^3 + 5x + 10}{2x + 3}$ is equivalent to

146   Which graph has the following characteristics?
      • three real zeros
      • as $x \to -\infty$, $f(x) \to -\infty$
      • as $x \to \infty$, $f(x) \to \infty$

147 A cyclist pedals a bike at a rate of 60 revolutions per minute. The height, h, of a pedal at time t, in seconds, is plotted below.

The graph can be modeled by the function $h(t) = 5\sin(kt)$, where k is equal to

148 The function $N(x) = 90(0.86)^x + 69$ can be used to predict the temperature of a cup of hot chocolate in degrees Fahrenheit after x minutes. What is the approximate average rate of change of the temperature of the hot chocolate, in degrees per minute, over the interval $[0,6]$?

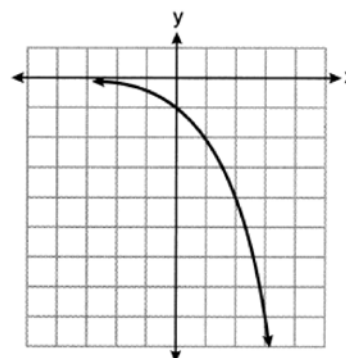149 A parabola has a directrix of $y = 3$ and a vertex at $(2,1)$. Which ordered pair is the focus of the parabola?

150 The roots of the equation $x^2 + 2x + 5 = 0$ are

151 What is the total number of points of intersection of the graphs of the equations $y = e^x$ and $xy = 20$?

152 Consider the function $y = h(x)$, defined by the graph below.
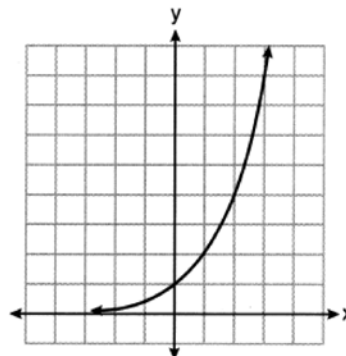
Which equation could be used to represent the graph shown below?

153 What is the solution to $8(2^{x+3}) = 48$?

154 Susan won $2,000 and invested it into an account with an annual interest rate of 3.2%. If her investment were compounded monthly, which expression best represents the value of her investment after t years?

155 What is the solution set of $x = \sqrt{3x + 40}$?

Name: _____

156 Given that $\sin^2\theta + \cos^2\theta = 1$ and $\sin\theta = -\dfrac{\sqrt{2}}{5}$, what is a possible value of $\cos\theta$?

157 Which expression is equivalent to $(3k - 2i)^2$, where i is the imaginary unit?

158 Expressed in simplest $a + bi$ form, $(7 - 3i) + (x - 2i)^2 - (4i + 2x^2)$ is

159 Written in simplest form, the fraction $\dfrac{x^3 - 9x}{9 - x^2}$, where $x \neq \pm 3$, is equivalent to

160 Which equation represents a parabola with a focus of $(0,4)$ and a directrix of $y = 2$?

161 What is the solution set of the equation $\dfrac{x+2}{x} + \dfrac{x}{3} = \dfrac{2x^2 + 6}{3x}$?

162 Which diagram represents an angle, α, measuring $\dfrac{13\pi}{20}$ radians drawn in standard position, and its reference angle, θ?

163 If the focus of a parabola is $(0,6)$ and the directrix is $y = 4$, what is an equation for the parabola?

164 The inverse of the function $f(x) = \dfrac{x+1}{x-2}$ is

165 The Rickerts decided to set up an account for their daughter to pay for her college education. The day their daughter was born, they deposited $1000 in an account that pays 1.8% compounded annually. Beginning with her first birthday, they deposit an additional $750 into the account on each of her birthdays. Which expression correctly represents the amount of money in the account n years after their daughter was born?

166 A parabola has its focus at $(1,2)$ and its directrix is $y = -2$. The equation of this parabola could be

167 Given $x \neq -3$, the expression $\dfrac{2x^3 + 7x^2 - 3x - 25}{x + 3}$ is equivalent to

168 A recursive formula for the sequence $40, 30, 22.5, \ldots$ is

169 How many real solutions exist for the system of equations below?
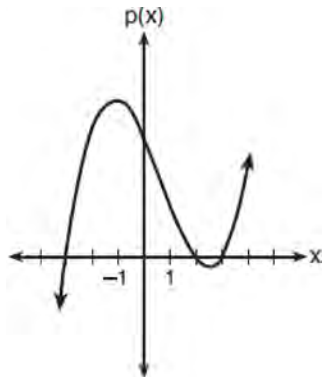$$y = \frac{1}{4}x - 8$$
$$y = \frac{1}{2}x^2 + 2x$$

170 If a solution of $2(2x - 1) = 5x^2$ is expressed in simplest $a + bi$ form, the value of b is

171 If $\sin^2(32°) + \cos^2(M) = 1$, then M equals

172 The solution to the equation $18x^2 - 24x + 87 = 0$ is

173 The graph of the function $p(x)$ is sketched below.

Which equation could represent $p(x)$?

174 What is the solution set of the equation

$$\frac{4}{k^2 - 8k + 12} = \frac{k}{k-2} + \frac{1}{k-6}?$$

175 The heights of women in the United States are normally distributed with a mean of 64 inches and a standard deviation of 2.75 inches. The percent of women whose heights are between 64 and 69.5 inches, to the *nearest whole percent*, is

176 Which expression is equivalent to $(x + yi)(x^2 - xyi - y^2)$, where i is the imaginary unit?

177 The zeros for $f(x) = x^4 - 4x^3 - 9x^2 + 36x$ are

178 Given that i is the imaginary unit, the expression $(x - 2i)^2$ is equivalent to

179 The inverse of $f(x) = -6x + \frac{1}{2}$ is

180 According to a pricing website, Indroid phones lose 58% of their cash value over 1.5 years. Which expression can be used to estimate the value of a $300 Indroid phone in 1.5 years?

181 What is the completely factored form of $k^4 - 4k^2 + 8k^3 - 32k + 12k^2 - 48$?

182 What is the solution to the system of equations $y = 3x - 2$ and $y = g(x)$ where $g(x)$ is defined by the function below?
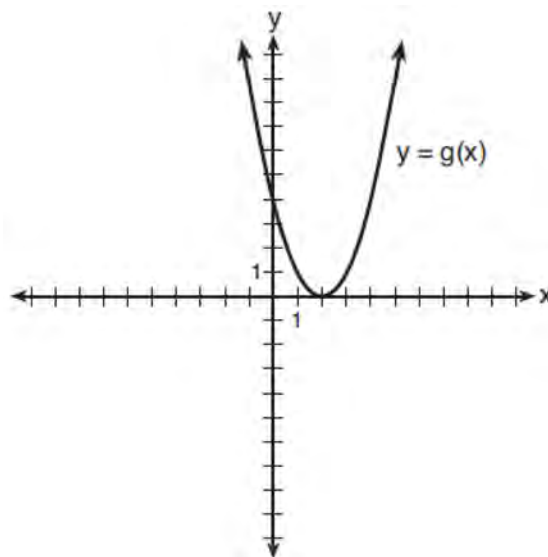
183 Which graph represents a cosine function with no horizontal shift, an amplitude of 2, and a period of $\frac{2\pi}{3}$?

184 lridium-192 is an isotope of iridium and has a half-life of 73.83 days. If a laboratory experiment begins with 100 grams of Iridium-192, the number of grams, A, of Iridium-192 present after t days would be $A = 100\left(\dfrac{1}{2}\right)^{\frac{t}{73.83}}$. Which equation approximates the amount of Iridium-192 present after t days?

185 If $p(x) = ab^x$ and $r(x) = cd^x$, then $p(x) \bullet r(x)$ equals

186 The distribution of the diameters of ball bearings made under a given manufacturing process is normally distributed with a mean of 4 cm and a standard deviation of 0.2 cm. What proportion of the ball bearings will have a diameter less than 3.7 cm?

187 Which equation has roots of $3 + i$ and $3 - i$?

188 The expression $\dfrac{6x^3 + 17x^2 + 10x + 2}{2x + 3}$ equals

189 The lifespan of a 60-watt lightbulb produced by a company is normally distributed with a mean of 1450 hours and a standard deviation of 8.5 hours. If a 60-watt lightbulb produced by this company is selected at random, what is the probability that its lifespan will be between 1440 and 1465 hours?

190 Which diagram shows an angle rotation of 1 radian on the unit circle?

191 The solutions to the equation $-\dfrac{1}{2}x^2 = -6x + 20$ are

192 The function $f(x) = 2^{-0.25x} \bullet \sin\left(\dfrac{\pi}{2}x\right)$ represents a damped sound wave function. What is the average rate of change for this function on the interval $[-7, 7]$, to the *nearest hundredth*?

193 The probability that Gary and Jane have a child with blue eyes is 0.25, and the probability that they have a child with blond hair is 0.5. The probability that they have a child with both blue eyes and blond hair is 0.125. Given this information, the events blue eyes and blond hair are
    I: dependent
    II: independent
    III: mutually exclusive

194 The expression $\dfrac{x^2 + 12}{x^2 + 3}$ can be rewritten as

195 A recursive formula for the sequence $64, 48, 36, \ldots$ is

196 Consider the following patterns:
    I. $16, -12, 9, -6.75, \ldots$
    II. $1, 4, 9, 16, \ldots$
    III. $6, 18, 30, 42, \ldots$
    IV. $\dfrac{1}{2}, \dfrac{2}{3}, \dfrac{3}{4}, \dfrac{4}{5}, \ldots$
Which pattern is geometric?

197 The expression $\dfrac{x^2 + 6}{x^2 + 4}$ is equivalent to

198 The sum of the first 20 terms of the series
$-2 + 6 - 18 + 54 - \ldots$ is

199 What is the solution, if any, of the equation
$\dfrac{2}{x+3} - \dfrac{3}{4-x} = \dfrac{2x-2}{x^2-x-12}$?

200 The amount of a substance, $A(t)$, that remains after
t days can be given by the equation
$A(t) = A_0(0.5)^{\frac{t}{0.0803}}$, where A_0 represents the initial
amount of the substance. An equivalent form of
this equation is

201 Stone Manufacturing has developed a cost model,
$C(x) = 0.18x^3 + 0.02x^2 + 4x + 180$, where x is the
number of sprockets sold, in thousands. The sales
price can be modeled by $S(x) = 95.4 - 6x$ and the
company's revenue by $R(x) = x \bullet S(x)$. The
company's profits, $R(x) - C(x)$, could be modeled
by

202 Which value, to the *nearest tenth*, is the *smallest*
solution of $f(x) = g(x)$ if $f(x) = 3\sin\left(\dfrac{1}{2}x\right) - 1$ and
$g(x) = x^3 - 2x + 1$?

203 Chet has \$1200 invested in a bank account modeled
by the function $P(n) = 1200(1.002)^n$, where $P(n)$ is
the value of his account, in dollars, after n months.
Chet's debt is modeled by the function
$Q(n) = 100n$, where $Q(n)$ is the value of debt, in
dollars, after n months. After n months, which
function represents Chet's net worth, $R(n)$?

204 Which equation is represented by the graph shown
below?
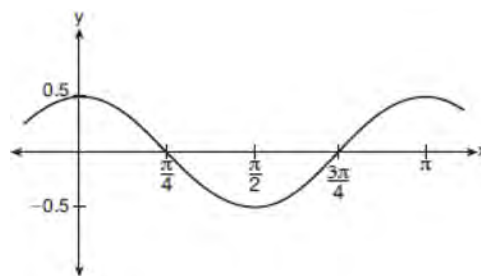
205 When factored completely, $m^5 + m^3 - 6m$ is
equivalent to

206 The expression $3i(ai - 6i^2)$ is equivalent to

207 The expression $\dfrac{x^4 - 5x^2 + 4x + 14}{x+2}$ is equivalent to

208 Pedro and Bobby each own an ant farm. Pedro
starts with 100 ants and says his farm is growing
exponentially at a rate of 15% per month. Bobby
starts with 350 ants and says his farm is steadily
decreasing by 5 ants per month. Assuming both
boys are accurate in describing the population of
their ant farms, after how many months will they
both have approximately the same number of ants?

209 Last year, the total revenue for Home Style, a
national restaurant chain, increased 5.25% over the
previous year. If this trend were to continue, which
expression could the company's chief financial
officer use to approximate their monthly percent
increase in revenue? [Let m represent months.]

210 Betty conducted a survey of her class to see if they like pizza. She gathered 200 responses and 65% of the voters said they did like pizza. Betty then ran a simulation of 400 more surveys, each with 200 responses, assuming that 65% of the voters would like pizza. The output of the simulation is shown below.
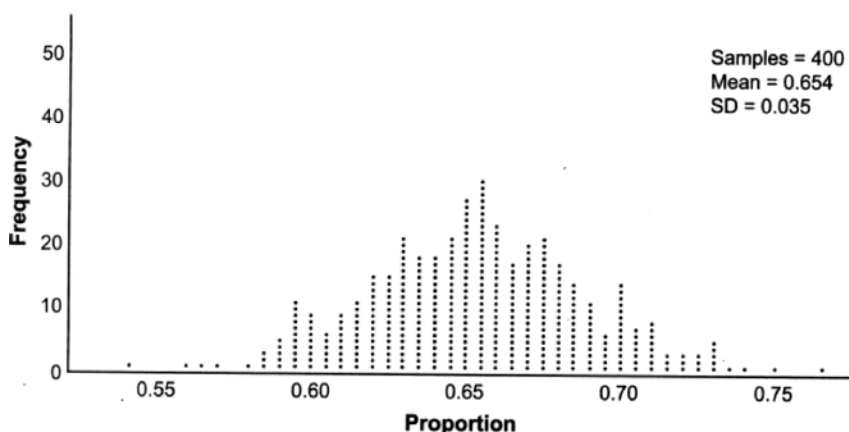
Considering the middle 95% of the data, what is the margin of error for the simulation?

211 How many equations below are identities?
- $x^2 + y^2 = (x^2 - y^2) + (2xy)^2$
- $x^3 + y^3 = (x - y) + (x^2 - xy + y^2)$
- $x^4 + y^4 = (x - y)(x - y)(x^2 + y^2)$

212 Audra is interested in studying the number of students entering kindergarten in the Ahlville Central School District over the next several years. Using data dating back to 2015, she determines that the number of kindergarteners is decreasing at an exponential rate. She creates a formula to model this situation $y = a(b)^x$, where x is the number of years since 2015 and y is the number of students entering kindergarten. If there were 105 students entering kindergarten in Ahlville in 2015, which statement about Audra's formula is true?

213 If $f(x) = \dfrac{1}{2}x + 2$, then the inverse function is

214 The function $p(t) = 110e^{0.03922t}$ models the population of a city, in millions, t years after 2010. As of today, consider the following two statements:
  I.   The current population is 110 million.
  II. The population increases continuously by approximately 3.9% per year.
This model supports

215 The expression $\left(a\sqrt[3]{2b^2} \right)\left(\sqrt[3]{4a^2 b} \right)$ is equivalent to

216 For all values of x for which the expression is defined, $\dfrac{x^2 + 3x}{x^2 + 5x + 6}$ is equivalent to

217 A parabola that has a vertex at $(2, 1)$ and a focus of $(2, -3)$ has an equation of

218 The graph of $p(x)$ is shown below.
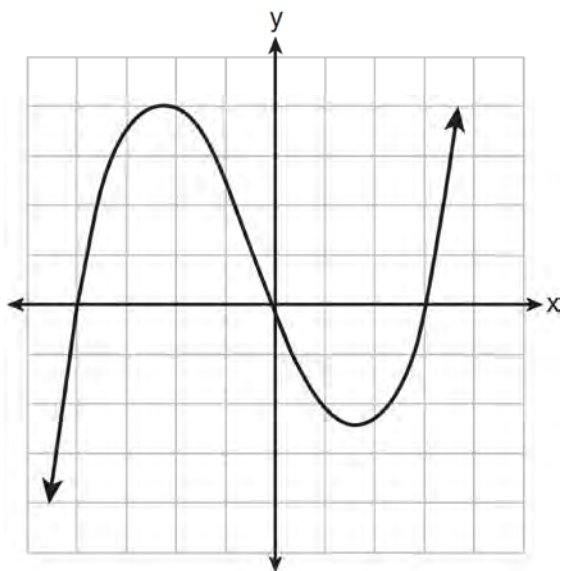
What is the remainder when $p(x)$ is divided by $x + 4$?

219 Which expression is equivalent to $\dfrac{2x^3 + 2x - 7}{2x + 4}$?

220 The equation below can be used to model the height of a tide in feet, $H(t)$, on a beach at t hours.

$$H(t) = 4.8\sin\left[\frac{\pi}{6}(t+3)\right] + 5.1$$

Using this function, the amplitude of the tide is

221 If θ is an angle in standard position whose terminal side passes through the point $(-2, -3)$, what is the numerical value of $\tan\theta$?

222 A recursive formula for the sequence $18, 9, 4.5, \ldots$ is

223 A retailer advertises that items will be discounted by 10% every Monday until they are sold. In how many weeks will an item costing $50 first be sold for under half price?

224 A polynomial equation of degree three, $p(x)$, is used to model the volume of a rectangular box. The graph of $p(x)$ has x intercepts at -2, 10, and 14. Which statements regarding $p(x)$ could be true?
A. The equation of $p(x) = (x-2)(x+10)(x+14)$.
B. The equation of $p(x) = -(x+2)(x-10)(x-14)$.
C. The maximum volume occurs when $x = 10$.
D. The maximum volume of the box is approximately 56.

225 Which expression is equivalent to $\dfrac{4x^3 + 9x - 5}{2x - 1}$, where $x \neq \dfrac{1}{2}$?

226 A study conducted in 2004 in New York City found that 212 out of 1334 participants had hypertension. Kim ran a simulation of 100 studies based on these data. The output of the simulation is shown in the diagram below.
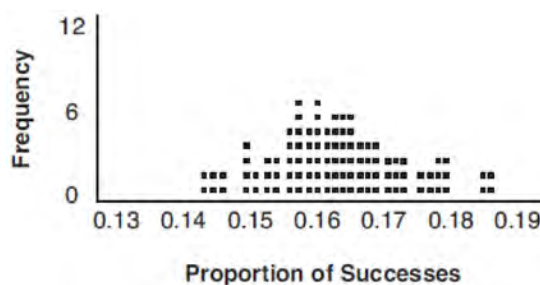
At a 95% confidence level, the proportion of New York City residents with hypertension and the margin of error are closest to

227 The table below shows the food preferences of sports fans whose favorite sport is football or baseball.

Favorite Food to Eat While Watching Sports

	Wings	Pizza	Hot Dogs
Football	14	20	6
Baseball	6	12	42

The probability that a fan prefers pizza given that the fan prefers football is

228 Given $f^{-1}(x) = -\dfrac{3}{4}x + 2$, which equation represents $f(x)$?

229 What is the solution for the system of equations below?

$$x + y + z = 2$$
$$x - 2y - z = -4$$
$$x - 9y + z = -18$$

230 The solution set for the equation $\sqrt{3(x+6)} = x$ is

231 Mia has a student loan that is in deferment, meaning that she does not need to make payments right now. The balance of her loan account during her deferment can be represented by the function $f(x) = 35,000(1.0325)^x$, where x is the number of years since the deferment began. If the bank decides to calculate her balance showing a monthly growth rate, an approximately equivalent function would be

232 When $g(x) = \dfrac{2}{x+2}$ and $h(x) = \log(x+1) + 3$ are graphed on the same set of axes, which coordinates best approximate their point of intersection?

233 Which equation best represents the graph below?
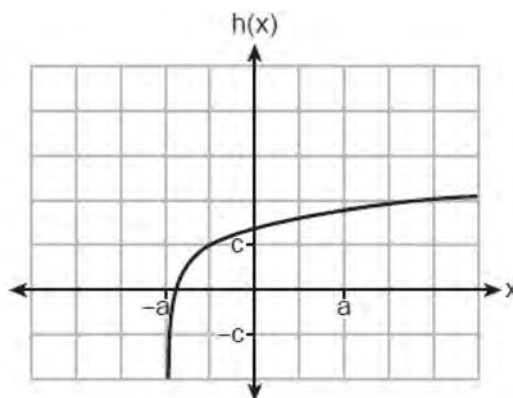
234 The George family would like to borrow $45,000 to purchase a new boat. They qualified for a loan with an annual interest rate of 6.75%. The monthly loan payment can be found using the formula below.

$$M = \frac{P\left(\dfrac{r}{12}\right)\left(1 + \dfrac{r}{12}\right)^n}{\left(1 + \dfrac{r}{12}\right)^n - 1}$$

$M = $ monthly payment
$P = $ amount borrowed
$r = $ annual interest rate
$n = $ number of monthly payments

What is the monthly payment if they would like to pay off the loan in five years?

Name: _____

235 A solution of the equation $2x^2 + 3x + 2 = 0$ is

236 The roots of the equation $x^2 - 4x = -13$ are

237 If $(6 - ki)^2 = 27 - 36i$, the value of k is

238 If $f(x) = (x^2 + 3x + 2)(x^2 - 4x + 3)$ and
$g(x) = x^2 - 9$, then how many real solutions are
there to the equation $f(x) = g(x)$?

239 A rabbit population doubles every 4 weeks. There
are currently five rabbits in a restricted area. If t
represents the time, in weeks, and $P(t)$ is the
population of rabbits with respect to time, about
how many rabbits will there be in 98 days?

240 Given $f(x) = x^4 - x^3 - 6x^2$, for what values of x
will $f(x) > 0$?

241 What are the zeros of
$s(x) = x^4 - 9x^2 + 3x^3 - 27x - 10x^2 + 90$?

242 A circle centered at the origin has a radius of 10
units. The terminal side of an angle, θ, intercepts
the circle in Quadrant II at point C. The
y-coordinate of point C is 8. What is the value of
$\cos \theta$?

243 Given $f(9) = -2$, which function can be used to
generate the sequence $-8, -7.25, -6.5, -5.75, \ldots$?

244 If the terminal side of angle θ, in standard position,
passes through point $(-4, 3)$, what is the numerical
value of $\sin \theta$?

245 The growth of a \$500 investment can be modeled
by the function $P(t) = 500(1.03)^t$, where t
represents time in years. In terms of the monthly
rate of growth, the value of the investment can be
best approximated by

246 The average monthly temperature, $T(m)$, in degrees
Fahrenheit, over a 12 month period, can be
modeled by $T(m) = -23\cos\left(\dfrac{\pi}{6} m\right) + 56$, where m is
in months. What is the range of temperatures, in
degrees Fahrenheit, of this function?

247 If a, b, and c are all positive real numbers, which
graph could represent the sketch of the graph of
$p(x) = -a(x + b)\left(x^2 - 2cx + c^2\right)$?

248 Given i is the imaginary unit, $(2 - yi)^2$ in simplest
form is

249 In 2013, approximately 1.6 million students took
the Critical Reading portion of the SAT exam. The
mean score, the modal score, and the standard
deviation were calculated to be 496, 430, and 115,
respectively. Which interval reflects 95% of the
Critical Reading scores?

250 If $\cos A = \dfrac{\sqrt{5}}{3}$ and $\tan A < 0$, what is the value of
$\sin A$?

251 Consider the data in the table below.

|	Right Handed	Left Handed
Male	87	13
Female	89	11

What is the probability that a randomly selected person is male given the person is left handed?

252 A popular celebrity tracks the number of people, in thousands, who have followed her on social media since January 1, 2015. A summary of the data she recorded is shown in the table below:

Number of Months Since January 2015	2	11	16	20	27	35	47	50	52
Number of Social Media Followers (thousands)	3.1	7.5	29.7	49.7	200.3	680.3	5200.3	8109.3	12,107.1

The celebrity uses an exponential regression equation to model the data. According to the model, about how many followers did she have on June 1, 2018?

253 The graph of a quadratic function is shown below.
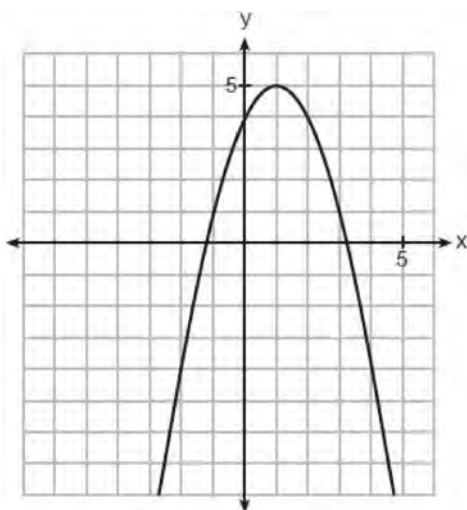
When the graph of $x + y = 4$ is drawn on the same axes, one solution to this system is

254 What are the zeros of $P(m) = (m^2 - 4)(m^2 + 1)$?

255 The heights of the 3300 students at Oceanview High School are approximately normally distributed with a mean of 65.5 inches and a standard deviation of 2.9 inches. The number of students at Oceanview who are between 64 and 68 inches tall is closest to

256 According to the USGS, an agency within the Department of Interior of the United States, the frog population in the U.S. is decreasing at the rate of 3.79% per year. A student created a model, $P = 12,150(0.962)^t$, to estimate the population in a pond after t years. The student then created a model that would predict the population after d decades. This model is best represented by

257 In a survey of people who recently bought a laptop, 45% said they were looking for a large screen, 31% said they were looking for a fast processor, and 58% said they wanted a large screen or a fast processor. If a survey respondent is selected at random, what is the probability that the respondent wanted both a large screen and a fast processor?

258 In the diagram of a unit circle below, point A, $\left(-\dfrac{\sqrt{3}}{2}, \dfrac{1}{2}\right)$, represents the point where the terminal side of θ intersects the unit circle.
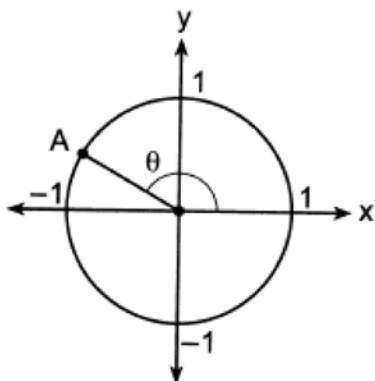

What is $m\angle\theta$?

259 The solution to the equation $5e^{x+2} = 7$ is

260 Mr. Farison gave his class the three mathematical rules shown below to either prove or disprove. Which rules can be proved for all real numbers?

   I $(m+p)^2 = m^2 + 2mp + p^2$
   II $(x+y)^3 = x^3 + 3xy + y^3$
   III $(a^2 + b^2)^2 = (a^2 - b^2)^2 + (2ab)^2$

261 Given the parent function $p(x) = \cos x$, which phrase best describes the transformation used to obtain the graph of $g(x) = \cos(x+a) - b$, if a and b are positive constants?

262 Which equation represents the set of points equidistant from line ℓ and point R shown on the graph below?
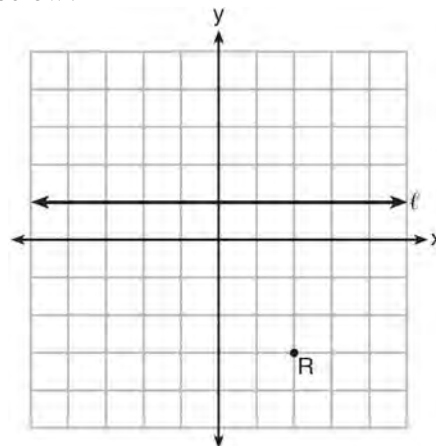

263 A study of the annual population of the red-winged blackbird in Ft. Mill, South Carolina, shows the population, $B(t)$, can be represented by the function $B(t) = 750(1.16)^t$, where the t represents the number of years since the study began. In terms of the monthly rate of growth, the population of red-winged blackbirds can be best approximated by the function

264 The solution set of $\dfrac{x+3}{x-5} + \dfrac{6}{x+2} = \dfrac{6+10x}{(x-5)(x+2)}$ is

265 Which equation represents a parabola with a focus of $(4,-3)$ and directrix of $y = 1$?

266 The completely factored form of
$2d^4 + 6d^3 - 18d^2 - 54d$ is

267 To the *nearest tenth*, the value of x that satisfies
$2^x = -2x + 11$ is

268 The population of Jamesburg for the years
2010-2013, respectively, was reported as follows:
250,000 250,937 251,878 252,822
How can this sequence be recursively modeled?

269 Given the inverse function $f^{-1}(x) = \dfrac{2}{3}x + \dfrac{1}{6}$,
which function represents $f(x)$?

270 A payday loan company makes loans between $100
and $1000 available to customers. Every 14 days,
customers are charged 30% interest with
compounding. In 2013, Remi took out a $300
payday loan. Which expression can be used to
calculate the amount she would owe, in dollars,
after one year if she did not make payments?

271 For which approximate value(s) of x will
$\log(x+5) = |x-1| - 3$?

272 A function is defined as $a_n = a_{n-1} + \log_{n+1}(n-1)$,
where $a_1 = 8$. What is the value of a_3?

273 If $f(x) = 12x - 4$, then the inverse function $f^{-1}(x)$ is

274 In 2010, the population of New York State was
approximately 19,378,000 with an annual growth
rate of 1.5%. Assuming the growth rate is
maintained for a large number of years, which
equation can be used to predict the population of
New York State t years after 2010?

275 The graph of a cubic polynomial function $p(x)$ is
shown below.
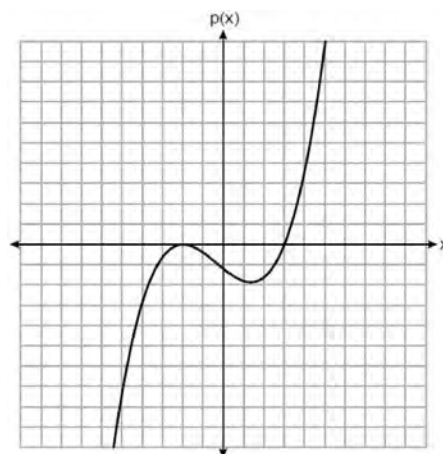
If $p(x)$ is written as a product of linear factors,
which factor would appear twice?

Algebra II Regents Bimodal Worksheets
Answer Section

1 ANS:
10.25

The maximum of p is 5. The minimum of f is $-\frac{21}{4}$ ($x = \frac{-6}{2(4)} = -\frac{3}{4}$)

$f\left(-\frac{3}{4}\right) = 4\left(-\frac{3}{4}\right)^2 + 6\left(-\frac{3}{4}\right) - 3 = 4\left(\frac{9}{16}\right) - \frac{18}{4} - \frac{12}{4} = -\frac{21}{4}$). $\frac{20}{4} - \left(-\frac{21}{4}\right) = \frac{41}{4} = 10.25$

PTS: 2   REF: 011922aii   TOP: Comparing Functions

2 ANS:
$713,476.20

$S_7 = \dfrac{85000 - 85000(1.06)^7}{1 - 1.06} \approx 713476.20$

PTS: 2   REF: 061905aii   TOP: Series   KEY: geometric

3 ANS:
$\dfrac{x+3}{x}$

$\dfrac{x^2(x+2) - 9(x+2)}{x\left(x^2 - x - 6\right)} = \dfrac{\left(x^2 - 9\right)(x+2)}{x(x-3)(x+2)} = \dfrac{(x+3)(x-3)}{x(x-3)} = \dfrac{x+3}{x}$

PTS: 2   REF: 061803aii   TOP: Rational Expressions
KEY: factoring

4 ANS:
0.2743

PTS: 2   REF: 061817aii   TOP: Normal Distributions
KEY: probability

5 ANS:
   2,125,760

   $8r^3 = 216$ $S_{12} = \dfrac{8 - 8(3)^{12}}{1 - 3} = 2125760$

   $r^3 = 27$

   $r = 3$

   PTS: 2 REF: 081902aii TOP: Series KEY: geometric

6 ANS:
   0.25
   $P(B) \cdot P(A|B) = P(A \text{ and } B)$

   $P(B) \cdot 0.8 = 0.2$

   $P(B) = 0.25$

   PTS: 2 REF: 081913aii TOP: Conditional Probability

7 ANS:
   $\{(0,6),(-5,-9)\}$

   $(x+4)^2 - 10 = 3x + 6$ $y = 3(-5) + 6 = -9$

   $x^2 + 8x + 16 - 10 = 3x + 6$ $y = 3(0) + 6 = 6$

   $x^2 + 5x = 0$

   $x(x+5) = 0$

   $x = -5, 0$

   PTS: 2 REF: 061903aii TOP: Quadratic-Linear Systems

8 ANS:
   $2x^3 - 4x^2 - x + \dfrac{14}{x+6}$

   $$
   \require{enclose}
   \begin{array}{r}
   2x^3 - 4x^2 - x + \dfrac{14}{x+6} \\[2pt]
   x+6 \enclose{longdiv}{2x^4 + 8x^3 - 25x^2 - 6x + 14} \\
   \underline{2x^4 + 12x^3} \\
   -4x^3 - 25x^2 \\
   \underline{-4x^3 - 24x^2} \\
   -x^2 - 6x \\
   \underline{-x^2 - 6x}
   \end{array}
   $$

   PTS: 2 REF: 081805aii TOP: Rational Expressions
   KEY: division

9 ANS:

2%

PTS: 2   REF: 081919aii   TOP: Normal Distributions
KEY: percent

10 ANS:

$$\frac{1}{5} \pm \frac{\sqrt{19}}{5}i$$

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(5)(4)}}{2(5)} = \frac{2 \pm \sqrt{-76}}{10} = \frac{2 \pm i\sqrt{4}\sqrt{19}}{10} = \frac{1}{5} \pm \frac{i\sqrt{19}}{5}$$

PTS: 2   REF: 011905aii   TOP: Solving Quadratics
KEY: complex solutions | quadratic formula

11 ANS:

$$-\frac{24}{7}$$

If $\cos\theta = \frac{7}{25}$, $\sin\theta = \pm\frac{24}{25}$, and $\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{-\frac{24}{25}}{\frac{7}{25}} = -\frac{24}{7}$

PTS: 2   REF: 081811aii   TOP: Determining Trigonometric Functions

12 ANS:

$(1,2)$ and $(-1,-2)$

$x^2 + (2x)^2 = 5$ $y = 2x = \pm 2$

  $x^2 + 4x^2 = 5$

     $5x^2 = 5$

        $x = \pm 1$

PTS: 2   REF: 081916aii   TOP: Quadratic-Linear Systems

13 ANS:
    18

$$120 = 68 + (195 - 68)e^{-0.05t}$$

$$52 = 127e^{-0.05t}$$

$$\ln\frac{52}{127} = \ln e^{-0.05t}$$

$$\ln\frac{52}{127} = -0.05t$$

$$\frac{\ln\dfrac{52}{127}}{-0.05} = t$$

$$18 \approx t$$

PTS: 2   REF: 081918aii   TOP: Exponential Decay

14 ANS:

$$f^{-1}(x) = \log_a x$$

PTS: 2   REF: 011917aii   TOP: Inverse of Functions
KEY: other

15 ANS:

$$f^{-1}(x) = \sqrt[3]{x+2}$$
$$y = x^3 - 2$$
$$x = y^3 - 2$$
$$x + 2 = y^3$$
$$\sqrt[3]{x+2} = y$$

PTS: 2   REF: 061815aii   TOP: Inverse of Functions
KEY: other

16 ANS:

$$29,400\left(1.068^{\frac{1}{365}}\right)^{365t}$$

1 year = 365 days

PTS: 2   REF: 061823aii   TOP: Modeling Exponential Functions

17 ANS:
$\pm 2i, 2$

$$m^3 - 2m^2 + 4m - 8 = 0$$

$$m^2(m-2) + 4(m-2) = 0$$

$$\left(m^2 + 4\right)(m-2) = 0$$

PTS: 2   REF: 081821aii   TOP: Solving Polynomial Equations

18 ANS:

$$f^{-1}(x) = 2 - \frac{x}{6}$$

$$x = -6(y - 2)$$

$$-\frac{x}{6} = y - 2$$

$$-\frac{x}{6} + 2 = y$$

PTS: 2   REF: 011821aii   TOP: Inverse of Functions
KEY: linear

19 ANS:
$(n+3)(n-3)(n+6)(n-2)$

$$n^2\left(n^2 - 9\right) + 4n\left(n^2 - 9\right) - 12\left(n^2 - 9\right)$$

$$\left(n^2 + 4n - 12\right)\left(n^2 - 9\right)$$

$$(n+6)(n-2)(n+3)(n-3)$$

PTS: 2   REF: 061911aii   TOP: Factoring Polynomials
KEY: factoring by grouping

20 ANS:
$a = 2, b = 6, c = 3$
The cosine function has been translated +3. Since the maximum is 5 and the minimum is 1, the amplitude is 2.

$$\frac{\pi}{3} = \frac{2\pi}{b}.$$

$$b = 6$$

PTS: 2   REF: 011913aii   TOP: Modeling Trigonometric Functions

21 ANS:
45

$$P = \frac{2\pi}{\frac{\pi}{45}} = 90$$

PTS: 2   REF: 081822aii   TOP: Graphing Trigonometric Functions
KEY: period

22 ANS:

$17,433,922.00

$$S_{20} = \frac{.01 - .01(3)^{20}}{1 - 3} = 17,433,922$$

PTS: 2   REF: 011822aii   TOP: Series   KEY: geometric

23 ANS:

7

$1240(1.06)^x = 890(1.11)^x$

$\qquad x \approx 7$

PTS: 2   REF: 061814aii   TOP: Other Systems

24 ANS:

exponential function

PTS: 2   REF: 081903aii   TOP: Families of Functions

25 ANS:

$C = 550(1.00643)^{12t}$

$1.00643^{12} \approx 1.08$

PTS: 2   REF: 081808aii   TOP: Modeling Exponential Functions

26 ANS:

$-3x^2 + 18xi$

$(x + 3i)^2 - (2x - 3i)^2 = x^2 + 6xi + 9i^2 - \left(4x^2 - 12xi + 9i^2\right) = -3x^2 + 18xi$

PTS: 2   REF: 061805aii   TOP: Operations with Complex Numbers

27 ANS:

$g(x) = 2x - 16$

$y = \frac{1}{2}x + 8 \quad x = \frac{1}{2}y + 8$

$\qquad\qquad 2x = y + 16$

$\qquad\qquad y = 2x - 16$

PTS: 2   REF: 081806aii   TOP: Inverse of Functions
KEY: linear

28 ANS:

$g(x) = \log_3(x + 5)$

PTS: 2   REF: 011902aii   TOP: Graphing Logarithmic Functions

29 ANS:

10

$440 \times 2.3\% \approx 10$

PTS: 2   REF: 011807aii   TOP: Normal Distributions
KEY: predict

30 ANS:
(3,0)

$\log_2(x-1) - 1 = 0$

$\log_2(x-1) = 1$

$x - 1 = 2^1$

$x = 3$

PTS: 2　　　　REF: 061819aii　　TOP: Graphing Logarithmic Functions

31 ANS:
−3

PTS: 2　　　　REF: 011815aii　　TOP: Unit Circle

32 ANS:
$c(x) = 0.2x^2 - 100x + 300$

$p(x) = r(x) - c(x)$

$-0.5x^2 + 250x - 300 = -0.3x^2 + 150x - c(x)$

$c(x) = 0.2x^2 - 100x + 300$

PTS: 2　　　　REF: 061813aii　　TOP: Operations with Functions

33 ANS:
$G(x) - C$

PTS: 2　　　　REF: 081817aii　　TOP: Transformations with Functions

34 ANS:
I and II, only

$x^3 + 2x^2 - 9x - 18 = 0$　　$x^3 - 9x + 2x^2 - 18 = 0$　　$x^3 - 9x + 2x^2 - 18 = 0$

$x^2(x+2) - 9(x+2) = 0$　$x(x^2-9) + 2(x^2-9) = 0$　$x(x^2-9) + 2(x^2-9) = 0$

$(x+2)(x^2-9) = 0$

PTS: 2　　　　REF: 011903aii　　TOP: Solving Polynomial Equations

35 ANS:

$$3x - 1 - \frac{1}{3x+1}$$

$$
\begin{array}{r}
3x - 1 \\
3x + 1 \overline{)\, 9x^2 + 0x - 2} \\
\underline{9x^2 + 3x} \\
-3x - 2 \\
\underline{-3x - 1} \\
-1
\end{array}
$$

PTS: 2   REF: 081910aii   TOP: Rational Expressions
KEY: division

36 ANS:
    -3

PTS: 2   REF: 081904aii   TOP: Factoring Polynomials
KEY: higher power

37 ANS:
    5.62

PTS: 2   REF: 081819aii   TOP: Other Systems

38 ANS:

$$-\frac{1}{3} \pm \frac{2i\sqrt{5}}{3}$$

$$x = \frac{-2 \pm \sqrt{2^2 - 4(3)(7)}}{2(3)} = \frac{-2 \pm \sqrt{-80}}{6} = \frac{-2 \pm i\sqrt{16}\sqrt{5}}{6} = -\frac{1}{3} \pm \frac{2i\sqrt{5}}{3}$$

PTS: 2   REF: 081809aii   TOP: Solving Quadratics
KEY: complex solutions | quadratic formula

39 ANS:
    2%

$$9110 = 5000e^{30r}$$

$$\ln\frac{911}{500} = \ln e^{30r}$$

$$\frac{\ln\dfrac{911}{500}}{30} = r$$

$$r \approx .02$$

PTS: 2   REF: 011810aii   TOP: Exponential Growth

40 ANS:

[1, 10]

$$\frac{N(10) - N(1)}{10 - 1} \approx -2.03, \frac{N(20) - N(10)}{20 - 10} \approx -1.63, \frac{N(25) - N(15)}{25 - 15} \approx -1.46, \frac{N(30) - N(1)}{30 - 1} \approx -1.64$$

PTS: 2 REF: 061807aii TOP: Rate of Change

41 ANS:

$$d = 5\sin\left(\frac{\pi}{6}t\right) + 9$$

$$a = \frac{14 - 4}{2} = 5, d = \frac{14 + 4}{2} = 9$$

PTS: 2 REF: 061810aii TOP: Modeling Trigonometric Functions

42 ANS:

$\{5,7\}$

$$x^2 - 4x - 5 = 4x^2 - 40x + 100$$

$$3x^2 - 36x + 105 = 0$$

$$x^2 - 12x + 35 = 0$$

$$(x - 7)(x - 5) = 0$$

$$x = 5, 7$$

PTS: 2 REF: 081807aii TOP: Solving Radicals

KEY: extraneous solutions

43 ANS:

$m_1 = 2000$

$m_n = (0.84)m_{n-1}$

PTS: 2 REF: 081909aii TOP: Sequences KEY: recursive

44 ANS:

x^3

$$\frac{x^{\frac{2}{3}} \bullet x^{\frac{5}{2}}}{x^{\frac{1}{6}}} = \frac{x^{\frac{4}{6}} \bullet x^{\frac{15}{6}}}{x^{\frac{1}{6}}} = x^{\frac{18}{6}} = x^3$$
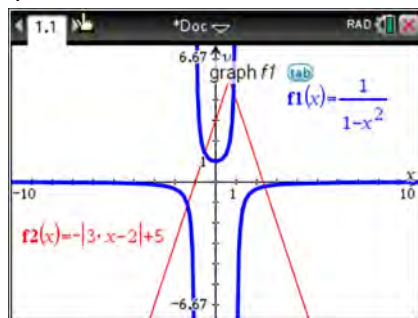
PTS: 2 REF: 081812aii TOP: Operations with Radicals

KEY: with variables, index > 2

45 ANS:
4

PTS: 2   REF: 011924aii   TOP: Other Systems

46 ANS:
0.8

PTS: 2   REF: 081824aii   TOP: Conditional Probability

47 ANS:

$$\dfrac{-c-d}{d+2c}$$

$$\dfrac{c^2-d^2}{d^2+cd-2c^2}=\dfrac{(c+d)(c-d)}{(d+2c)(d-c)}=\dfrac{-(c+d)}{d+2c}=\dfrac{-c-d}{d+2c}$$

PTS: 2   REF: 011818aii   TOP: Rational Expressions
KEY: factoring

48 ANS:
$\pm i$

$$wx^2 + w = 0$$

$$w(x^2+1)=0$$

$$x^2=-1$$

$$x=\pm i$$

PTS: 2   REF: 061912aii   TOP: Solving Quadratics
KEY: complex solutions | taking square roots

49 ANS:

$$\left\{-1, \frac{3}{2}\right\}$$

$$\frac{2}{x} = \frac{4x}{x+3}$$

$$2x + 6 = 4x^2$$

$$4x^2 - 2x - 6 = 0$$

$$2\left(2x^2 - x - 3\right) = 0$$

$$(2x - 3)(x + 1) = 0$$

$$x = \frac{3}{2}, -1$$

PTS: 2　　　　REF: 061809aii　　TOP: Solving Rationals

50 ANS:

$$r(x) = (x - a)(x + b)(x + c)^2$$

PTS: 2　　　　REF: 061921aii　　TOP: Graphing Polynomial Functions
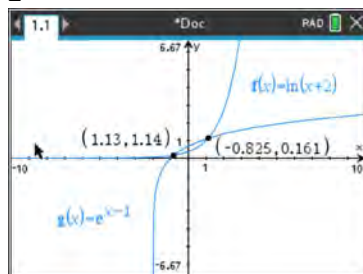
51 ANS:

2.29 and 3.63

PTS: 2　　　　REF: 011814aii　　TOP: Other Systems

52 ANS:

2

PTS: 2　　　　REF: 081920aii　　TOP: Other Systems

53 ANS:

0.271

$$y = 278(0.5)^{\frac{18}{1.8}} \approx 0.271$$

PTS: 2　　　　REF: 011920aii　　TOP: Modeling Exponential Functions

54 ANS:

$y = 2000(1.0032737)^{12t}$

$1.04^{\frac{1}{12}} \approx 1.0032737$

PTS: 2   REF: 011906aii   TOP: Modeling Exponential Functions

55 ANS:

34

$121(b)^2 = 64 \quad 64\left(\dfrac{8}{11}\right)^2 \approx 34$

$b = \dfrac{8}{11}$

PTS: 2   REF: 011904aii   TOP: Sequences   KEY: explicit

56 ANS:

$\dfrac{3}{2} \pm \dfrac{\sqrt{17}}{2}$

$x - \dfrac{4}{x-1} = 2 \qquad x = \dfrac{3 \pm \sqrt{(-3)^2 - 4(1)(-2)}}{2(1)} = \dfrac{3 \pm \sqrt{17}}{2}$

$x(x-1) - 4 = 2(x-1)$

$x^2 - x - 4 = 2x - 2$

$x^2 - 3x - 2 = 0$

PTS: 2   REF: 011812aii   TOP: Solving Rationals
KEY: rational solutions

57 ANS:

$f(t) = 10{,}000(1.00075)^{12t} + 10{,}000e^{0.008t}$

$1 + \dfrac{.009}{12} = 1.00075$

PTS: 2   REF: 011918aii   TOP: Modeling Exponential Functions

58 ANS:

4

$3x - (-2x + 14) = 16 \quad 3(6) - 4z = 2$

$\qquad\qquad\qquad 5x = 30 \qquad -4z = -16$

$\qquad\qquad\qquad x = 6 \qquad\quad z = 4$

PTS: 2   REF: 011803aii   TOP: Solving Linear Systems
KEY: three variables

59 ANS:

$400(1.001121184)^{52t}$

$1.06^{\frac{1}{52}}$

PTS: 2   REF: 061924aii   TOP: Modeling Exponential Functions

60 ANS:

$y = 5$

In vertex form, the parabola is $y = -\dfrac{1}{4(2)}(x+4)^2 + 3$. The vertex is $(-4,3)$ and $p = 2$. $3 + 2 = 5$

PTS: 2   REF: 011816aii   TOP: Graphing Quadratic Functions

61 ANS:

\$6166.50

$5000\left(1 + \dfrac{.035}{12}\right)^{12 \cdot 6} \approx 6166.50$

PTS: 2   REF: 081917aii   TOP: Modeling Exponential Functions

62 ANS:

3

$1^3 - k(1)^2 + 2(1) = 0$

$\qquad\qquad k = 3$

PTS: 2   REF: 061812aii   TOP: Remainder and Factor Theorems

63 ANS:

$(0.134, 0.374)$

$0.254 \pm 2(0.060) \rightarrow (0.134, 0.374)$

PTS: 2   REF: 061913aii   TOP: Analysis of Data

64 ANS:

10 or -2

$x - \dfrac{20}{x} = 8$

$x^2 - 8x - 20 = 0$

$(x - 10)(x + 2) = 0$

$\qquad x = 10, -2$

PTS: 2   REF: 061916aii   TOP: Modeling Rationals

65 ANS:

$$\left\{\frac{1}{2}\right\}$$

$$\frac{2}{3x+1} = \frac{1}{x} - \frac{6x}{3x+1} \quad -\frac{1}{3} \text{ is extraneous.}$$

$$\frac{6x+2}{3x+1} = \frac{1}{x}$$

$$6x^2 + 2x = 3x + 1$$

$$6x^2 - x - 1 = 0$$

$$(2x-1)(3x+1) = 0$$

$$x = \frac{1}{2}, -\frac{1}{3}$$

PTS: 2   REF: 011915aii   TOP: Solving Rationals

66 ANS:
240
$$p(5) = 2(5)^3 - 3(5) + 5 = 240$$

PTS: 2   REF: 011819aii   TOP: Remainder and Factor Theorems

67 ANS:
$-4 - 8xi$

$$(2x-i)^2 - (2x-i)(2x+3i)$$

$$(2x-i)[(2x-i) - (2x+3i)]$$

$$(2x-i)(-4i)$$

$$-8xi + 4i^2$$

$$-8xi - 4$$

PTS: 2   REF: 011911aii   TOP: Operations with Complex Numbers

68 ANS:

$$y = \frac{1}{4}x - \frac{5}{4}$$

$$x = 4y + 5$$

$$x - 5 = 4y$$

$$\frac{1}{4}x - \frac{5}{4} = y$$

PTS: 2   REF: 061909aii   TOP: Inverse of Functions
KEY: linear

69 ANS:
{8}

$b^2 = 2b^2 - 64$ −8 is extraneous.

$-b^2 = -64$

$b = \pm 8$

PTS: 2 REF: 061919aii TOP: Solving Radicals
KEY: extraneous solutions

70 ANS:
I, II, and III

$$\frac{x^2 - 4x}{2x} = \frac{x(x - 4)}{2x} = \frac{x - 4}{2} = \frac{x}{2} - 2 \quad \frac{x - 1}{2} - \frac{3}{2} = \frac{x - 1 - 3}{2} = \frac{x - 4}{2}$$

PTS: 2 REF: 011921aii TOP: Rational Expressions
KEY: factoring

71 ANS:
{−1,0}

$\sqrt{x + 1} = x + 1$

$x + 1 = x^2 + 2x + 1$

$0 = x^2 + x$

$0 = x(x + 1)$

$x = -1, 0$

PTS: 2 REF: 011802aii TOP: Solving Radicals
KEY: extraneous solutions

72 ANS:
10.4

PTS: 2 REF: 011804aii TOP: Determining Trigonometric Functions
KEY: radians

73 ANS:
12%
$0.48 \cdot 0.25 = 0.12$

PTS: 1 REF: 061811aii TOP: Probability of Compound Events
KEY: probability

74 ANS:
8.52

PTS: 2 REF: 061914aii TOP: Other Systems

75 ANS:

$5(2^{\frac{x}{2}})$

PTS: 2   REF: 061906aii   TOP: Families of Functions

76 ANS:

$6\sqrt[3]{x^5}$

$4x \bullet x^{\frac{2}{3}} + 2x^{\frac{5}{3}} = 4x^{\frac{5}{3}} + 2x^{\frac{5}{3}} = 6x^{\frac{5}{3}} = 6\sqrt[3]{x^5}$

PTS: 2   REF: 061820aii   TOP: Operations with Radicals
KEY: with variables, index > 2

77 ANS:

$\dfrac{\ln\left(\dfrac{c}{a}\right)}{b}$

$e^{bt} = \dfrac{c}{a}$

$\ln e^{bt} = \ln\dfrac{c}{a}$

$bt\ln e = \ln\dfrac{c}{a}$

$t = \dfrac{\ln\dfrac{c}{a}}{b}$

PTS: 2   REF: 011813aii   TOP: Exponential Equations
KEY: without common base

78 ANS:

{ }

$x(x-2)\left(\dfrac{10}{x^2-2x} + \dfrac{4}{x} = \dfrac{5}{x-2}\right)$ 2 is extraneous.

$10 + 4(x-2) = 5x$

$10 + 4x - 8 = 5x$

$2 = x$

PTS: 2   REF: 081915aii   TOP: Solving Rationals
KEY: rational solutions

79 ANS:

$(x+2)^2 = -8(y-7)$

$\dfrac{5+9}{2} = 7$, vertex: $(-2,7)$; $p = 7-9 = -2$, $y = \dfrac{1}{4(-2)}(x+2)^2 + 7$

$$y - 7 = \dfrac{1}{-8}(x+2)^2$$

$$-8(y-7) = (x+2)^2$$

PTS: 2   REF: 061821aii   TOP: Graphing Quadratic Functions

80 ANS:

14.066

$\ln e^{0.3x} = \ln \dfrac{5918}{87}$

$x = \dfrac{\ln \dfrac{5918}{87}}{0.3}$

PTS: 2   REF: 081801aii   TOP: Exponential Equations
KEY: without common base

81 ANS:

631

$84.1\% \times 750 \approx 631$

PTS: 2   REF: 011923aii   TOP: Normal Distributions
KEY: predict

82 ANS:

$P(t) = 3500(1.00206)^{12t}$

$1.025^{\frac{1}{12}} \approx 1.00206$

PTS: 2   REF: 081924aii   TOP: Modeling Exponential Functions

83 ANS:

$5x^2 + x - 3$

$$
\begin{array}{r}
5x^2 + x - 3 \\
2x-1 \overline{\smash{\big)}\ 10x^3 - 3x^2 - 7x + 3} \\
\underline{10x^3 - 5x^2} \\
2x^2 - 7x \\
\underline{2x^2 - x} \\
-6x + 3 \\
\underline{-6x + 3}
\end{array}
$$

PTS: 2   REF: 011809aii   TOP: Rational Expressions
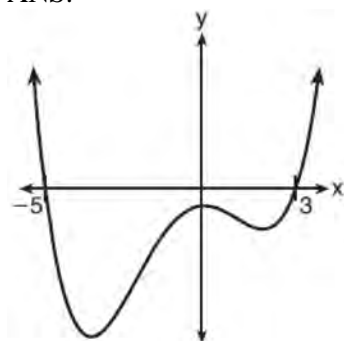KEY: division

84 ANS:

neither I nor II

$(x-y)^2 = x^2 - 2xy + y^2 \quad (x+y)^3 = x^3 + 3x^2 y + 3xy^2 + y^3$

PTS: 2   REF: 061902aii   TOP: Polynomial Identities

85 ANS:

PTS: 2   REF: 061816aii   TOP: Graphing Polynomial Functions
KEY: bimodalgraph

86 ANS:

$\dfrac{85}{295}$

$\dfrac{85}{210 + 85}$

PTS: 2   REF: 081818aii   TOP: Venn Diagrams
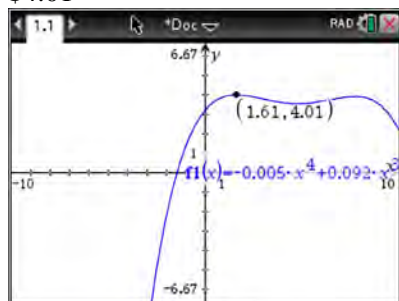
87 ANS:

$a_0 = 75,000$

$a_n = 0.92(a_{n-1})$

PTS: 2   REF: 081810aii   TOP: Sequences

88 ANS:

$4.01

PTS: 2   REF: 011817aii   TOP: Graphing Polynomial Functions

89 ANS:

−2

$f(x) = (x + 1)(x - 1)(x - 2) = (x^2 - 1)(x - 2) = x^3 - 2x^2 - x + 2$

PTS: 2   REF: 081921aii   TOP: Solving Polynomial Equations

90 ANS:

(2,5)

The vertex is $(2,2)$ and $p = 3$. $3 + 2 = 5$

PTS: 2   REF: 081823aii   TOP: Graphing Quadratic Functions

91 ANS:

−0.087

$$100\left(\frac{1}{2}\right)^{\frac{d}{8}} = 100e^{kd}$$

$$\left(\frac{1}{2}\right)^{\frac{1}{8}} = e^{k}$$

$$k \approx -0.087$$

PTS: 2   REF: 061818aii   TOP: Exponential Decay

92 ANS:

$$-\frac{\sqrt{7}}{4}$$

$$-\sqrt{1 - \left(-\frac{3}{4}\right)^2} = -\sqrt{\frac{16}{16} - \frac{9}{16}} = -\sqrt{\frac{7}{16}} = -\frac{\sqrt{7}}{4}$$

PTS: 2   REF: 081905aii   TOP: Determining Trigonometric Functions

93 ANS:
$-9x^2 + 12xi + 10$
$6 - (3x - 2i)(3x - 2i) = 6 - \left(9x^2 - 12xi + 4i^2\right) = 6 - 9x^2 + 12xi + 4 = -9x^2 + 12xi + 10$

PTS: 2   REF: 061915aii   TOP: Operations with Complex Numbers

94 ANS:
$a_1 = 25,000, a_n = a_{n-1} + 1000$

PTS: 2   REF: 011824aii   TOP: Sequences

95 ANS:
$y = -\dfrac{1}{8}(x+3)^2 + 5$

The vertex is $(-3,5)$ and $p = 2$. $y = \dfrac{-1}{4(2)}(x+3)^2 + 5$

PTS: 2   REF: 011914aii   TOP: Graphing Quadratic Functions

96 ANS:
$\dfrac{157}{229}$

$\dfrac{157}{25 + 47 + 157}$

PTS: 2   REF: 081607aii   TOP: Conditional Probability

97 ANS:
380
$400 \cdot .954 \approx 380$

PTS: 2   REF: 061918aii   TOP: Normal Distributions
KEY: predict

98 ANS:
$f^{-1}(x) = \dfrac{-2x}{x-1}$

$x = \dfrac{y}{y+2}$

$xy + 2x = y$

$xy - y = -2x$

$y(x-1) = -2x$

$y = \dfrac{-2x}{x-1}$

PTS: 2   REF: 081924aii   TOP: Inverse of Functions
KEY: other

99 ANS:
77
$T(19) = 8\sin(0.3(19) - 3) + 74 \approx 77$

PTS: 2   REF: 061922aii   TOP: Determining Trigonometric Functions
KEY: radians

100 ANS:
$\dfrac{124}{x + 16y}$

PTS: 2   REF: 061824aii   TOP: Modeling Rationals

101 ANS:
$(x + 5)(x + 3)$

$u = x + 2 \qquad u^2 + 4u + 3$

$\qquad\qquad (u + 3)(u + 1)$

$\qquad\quad (x + 2 + 3)(x + 2 + 1)$

$\qquad\qquad (x + 5)(x + 3)$

PTS: 2   REF: 081901aii   TOP: Factoring Polynomials
KEY: higher power

102 ANS:
$-19 - 17i$

$-3 + 5i - \left(4 + 24i - 2i - 12i^2\right) = -3 + 5i - (16 + 22i) = -19 - 17i$

PTS: 2   REF: 081815aii   TOP: Operations with Complex Numbers

103 ANS:
0.03

$ME = \left(z\sqrt{\dfrac{p(1 - p)}{n}}\right) = \left(1.96\sqrt{\dfrac{(0.55)(0.45)}{900}}\right) \approx 0.03 \text{ or } \dfrac{1}{\sqrt{900}} \approx 0.03$

PTS: 2   REF: 081612aii   TOP: Analysis of Data

Algebra II Regents Bimodal Worksheets
Answer Section

104 ANS:

$\left\{-\dfrac{7}{2}, -3\right\}$

$x(x+7)\left[\dfrac{3x+25}{x+7} - 5 = \dfrac{3}{x}\right]$

$x(3x+25) - 5x(x+7) = 3(x+7)$

$3x^2 + 25x - 5x^2 - 35x = 3x + 21$

$2x^2 + 13x + 21 = 0$

$(2x+7)(x+3) = 0$

$x = -\dfrac{7}{2}, -3$

PTS: 2   REF: fall1501aii   TOP: Solving Rationals
KEY: rational solutions

105 ANS:

$\dfrac{\pi}{3}$ left

PTS: 2   REF: 011701aii   TOP: Graphing Trigonometric Functions

106 ANS:
$1835.98

$M = \dfrac{240000\left(\dfrac{4.5\%}{12}\right)\left(1 + \dfrac{4.5\%}{12}\right)^{15 \times 12}}{\left(1 + \dfrac{4.5\%}{12}\right)^{15 \times 12} - 1} \approx 1835.98$

PTS: 2   REF: 062209aii   TOP: Evaluating Exponential Expressions

107 ANS:

$\dfrac{64+x}{80+x} = \dfrac{90}{100}$

PTS: 2   REF: 082222aii   TOP: Modeling Rationals

108 ANS:
{7}

$\sqrt{56-x} = x$ $\qquad$ -8 is extraneous.

$56 - x = x^2$

$0 = x^2 + x - 56$

$0 = (x+8)(x-7)$

$x = 7$

PTS: 2 $\qquad$ REF: 061605aii $\qquad$ TOP: Solving Radicals
KEY: extraneous solutions

109 ANS:
$x(x-1)$

$u = x+2$ $\qquad$ $u^2 - 5u + 6$

$(u-3)(u-2)$

$(x+2-3)(x+2-2)$

$(x-1)x$

PTS: 2 $\qquad$ REF: 012301aii $\qquad$ TOP: Factoring Polynomials
KEY: higher power

110 ANS:
$x^2 + 1 + \dfrac{4}{x+2}$

$$\begin{array}{r} x^2 + 0x + 1 \\ x+2 \overline{)\, x^3 + 2x^2 + x + 6} \end{array}$$

$\underline{x^3 + 2x^2}$

$0x^2 + x$

$\underline{0x^2 + 0x}$

$x + 6$

$\underline{x + 2}$

4

PTS: 2 $\qquad$ REF: 081611aii $\qquad$ TOP: Rational Expressions
KEY: division

111 ANS:
$-24x^2 - 30xi$

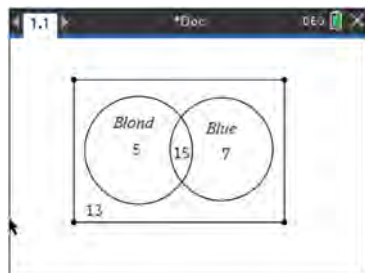$6xi^3(-4xi+5) = -24x^2 i^4 + 30xi^3 = -24x^2(1) + 30x(-1) = -24x^2 - 30xi$

PTS: 2 $\qquad$ REF: 061704aii $\qquad$ TOP: Operations with Complex Numbers

112 ANS:
13

$40 - (20 + 22 - 15) = 13$

PTS: 2   REF: 062204aii   TOP: Venn Diagrams

113 ANS:
{2}

$$\sqrt{x+14} = \sqrt{2x+5} + 1 \qquad\qquad \sqrt{22+14} - \sqrt{2(22)+5} = 1$$
$$x+14 = 2x+5+2\sqrt{2x+5}+1 \qquad\qquad 6-7 \neq 1$$
$$-x+8 = 2\sqrt{2x+5}$$
$$x^2 - 16x + 64 = 8x + 20$$
$$x^2 - 24x + 44 = 0$$
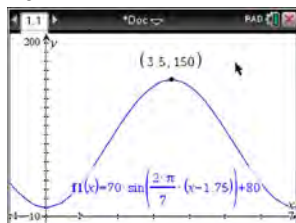$$(x-22)(x-2) = 0$$
$$x = 2, 22$$

PTS: 2   REF: 081704aii   TOP: Solving Radicals
KEY: advanced

114 ANS:
10

$H(t)$ is at a minimum at $70(-1) + 80 = 10$

PTS: 2   REF: 061613aii   TOP: Graphing Trigonometric Functions
KEY: maximum/minimum

115 ANS:
II, only
The mass of the carbon-14 is decreasing by half every 5715 years.

PTS: 2   REF: 062211aii   TOP: Modeling Exponential Functions

116 ANS:

$a_n = 2 \cdot 3^n$

PTS: 2   REF: 081618aii   TOP: Sequences   KEY: recursive

117 ANS:

$(3,-1,0)$

$2x + 4y - 2z = 2$	$-x - 3y + 2z = 0$	$x + y = 2$	$3 + 2y - z = 1$	$2y - z = -2$
$\underline{-x - 3y + 2z = 0}$	$\underline{4x - 8y + 2z = 20}$	$\underline{x - y = 4}$	$6 - 4y + z = 10$	$\underline{2(-1) - z = -2}$
$x + y = 2$	$5x - 5y = 20$	$2x = 6$	$2y - z = -2$	$z = 0$
	$x - y = 4$	$x = 3$	$\underline{-4y + z = 4}$	
			$-2y = 2$	
			$y = -1$	

PTS: 2   REF: 062208aii   TOP: Solving Linear Systems
KEY: three variables

118 ANS:

$-0.15x^3 - 0.02x^2 + 28x - 120$

$x(30 - 0.01x) - (0.15x^3 + 0.01x^2 + 2x + 120) = 30x - 0.01x^2 - 0.15x^3 - 0.01x^2 - 2x - 120$

$$= -0.15x^3 - 0.02x^2 + 28x - 120$$

PTS: 2   REF: 061709aii   TOP: Operations with Functions

119 ANS:

I, II, and III

PTS: 2   REF: 061716aii   TOP: Radicals and Rational Exponents
KEY: variables

120 ANS:

$x^2 - 2x + 2 = 0$

If $1 - i$ is one solution, the other is $1 + i$. $(x - (1 - i))(x - (1 + i)) = 0$

$$x^2 - x - ix - x + ix + (1 - i^2) = 0$$

$$x^2 - 2x + 2 = 0$$

PTS: 2   REF: 081601aii   TOP: Complex Conjugate Root Theorem

121 ANS:

$-12x$

$x^2 - 6x + 9 - \left(x^2 + 6x + 9\right) = -12x$

PTS: 2   REF: 062210aii   TOP: Operations with Functions

122 ANS:

$$C(n) = \frac{329.99 + 108.78n}{n}$$

PTS: 2 REF: 061722aii TOP: Modeling Rationals

123 ANS:

$$\frac{255 + 93T}{T + 3} = 90$$

PTS: 2 REF: 061602aii TOP: Modeling Rationals

124 ANS:
I, II, and III

I. $\left(\dfrac{y}{x^3}\right)^{-1} = \dfrac{x^3}{y}$; II. $\sqrt[3]{x^9}(y^{-1}) = \dfrac{x^{\frac{9}{3}}}{y} = \dfrac{x^3}{y}$; III. $\dfrac{x^6\sqrt[4]{y^8}}{x^3 y^3} = \dfrac{x^3 y^{\frac{8}{4}}}{y^3} = \dfrac{x^3}{y}$

PTS: 2 REF: 062320aii TOP: Radicals and Rational Exponents

125 ANS:
2 or -4

$$x^2 + 2x - 8 = 0$$

$$(x + 4)(x - 2) = 0$$

$$x = -4, 2$$

PTS: 2 REF: 081701aii TOP: Undefined Rationals

126 ANS:
2.5

$$4300e^{0.07x} = 5123$$

$$\ln e^{0.07x} = \ln \frac{5123}{4300}$$

$$0.07x = \ln \frac{5123}{4300}$$

$$x = \frac{\ln \frac{5123}{4300}}{0.07}$$

$$x \approx 2.5$$

PTS: 2 REF: 012302aii TOP: Exponential Equations
KEY: without common base

127 ANS:

$$P = 714(0.9716)^y$$

$$0.75^{\frac{1}{10}} \approx .9716$$

PTS: 2 REF: 061713aii TOP: Modeling Exponential Functions

128 ANS:
149

$$d = 32(.8)^{b-1} \quad S_n = \frac{32 - 32(.8)^{12}}{1 - .8} \approx 149$$

PTS: 2　　　　REF: 081721aii　　TOP: Series　　　KEY: geometric

129 ANS:

$$\frac{-2}{\sqrt{21}}$$

$$\frac{-2}{\sqrt{5^2 - 2^2}} = \frac{-2}{\sqrt{21}}$$

PTS: 2　　　　REF: 082312aii　　TOP: Determining Trigonometric Functions

130 ANS:
4.78

PTS: 2　　　　REF: 082313aii　　TOP: Normal Distributions
KEY: percent

131 ANS:
0.05
$.43 \pm 2(0.05)$ contains about 95% of the data.

PTS: 2　　　　REF: 062317aii　　TOP: Analysis of Data

132 ANS:
$V = 120 \sin(120\pi t)$

$$\text{period} = \frac{2\pi}{B}$$

$$\frac{1}{60} = \frac{2\pi}{B}$$

$$B = 120\pi$$

PTS: 2　　　　REF: 061624aii　　TOP: Modeling Trigonometric Functions

133 ANS:

$$\frac{FW}{W - F}$$

$$\frac{1}{J} = \frac{1}{F} - \frac{1}{W}$$

$$\frac{1}{J} = \frac{W - F}{FW}$$

$$J = \frac{FW}{W - F}$$

PTS: 2　　　　REF: 081617aii　　TOP: Solving Rationals
KEY: rational solutions

134 ANS:

2450

$$\log_{0.8}\left(\frac{V}{17000}\right) = t \qquad\qquad \frac{17,000(0.8)^3 - 17,000(0.8)^1}{3-1} \approx -2450$$

$$0.8^t = \frac{V}{17000}$$

$$V = 17000(0.8)^t$$

PTS: 2   REF: 081709aii   TOP: Rate of Change

135 ANS:

$$\frac{\ln 1.25}{0.025}$$

$$\frac{15000}{12000} = \frac{12000e^{.025t}}{12000}$$

$$1.25 = e^{.025t}$$

$$\ln 1.25 = \ln e^{.025t}$$
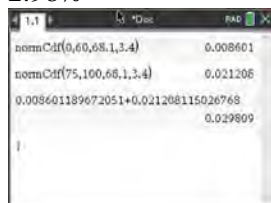
$$\ln 1.25 = .025t$$

$$\frac{\ln 1.25}{.025} = t$$

PTS: 2   REF: 082209aii   TOP: Exponential Growth

136 ANS:

$$x^2 + 2x + 4 + \frac{6}{x-2}$$

$$
\begin{array}{r}
x^2 + 2x + 4 \\
x-2 \overline{\smash{)}\, x^3 - 0x^2 + 0x - 2} \\
\underline{x^3 - 2x^2} \\
2x^2 + 0x \\
\underline{2x^2 - 4x} \\
4x - 2 \\
\underline{4x - 8} \\
6
\end{array}
$$

PTS: 2   REF: 082217aii   TOP: Rational Expressions

KEY: division

137 ANS:
2.98%

PTS: 2 REF: 062316aii TOP: Normal Distributions
KEY: percent
138 ANS:
very loud

$$d = 10\log \frac{6.3 \times 10^{-3}}{1.0 \times 10^{-12}} \approx 98$$

PTS: 2 REF: 011715aii TOP: Evaluating Logarithmic Expressions
139 ANS:
2

PTS: 2 REF: 062219aii TOP: Unit Circle
140 ANS:
$$\pm \frac{7i\sqrt{2}}{2}$$

$$4x^2 = -98$$

$$x^2 = -\frac{98}{4}$$

$$x^2 = -\frac{49}{2}$$

$$x = \pm\sqrt{-\frac{49}{2}} = \pm\frac{7i}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \pm\frac{7i\sqrt{2}}{2}$$

PTS: 2 REF: 061707aii TOP: Solving Quadratics
KEY: complex solutions | taking square roots
141 ANS:
$$A_0 \left(\frac{1}{2}\right)^{\frac{t}{25}}$$

PTS: 2 REF: 082309aii TOP: Modeling Exponential Functions

142 ANS:

$x^2 = -4y$

The vertex of the parabola is (0,0). The distance, p, between the vertex and the focus or the vertex and the

directrix is 1. $y = \dfrac{-1}{4p}(x-h)^2 + k$

$$y = \dfrac{-1}{4(1)}(x-0)^2 + 0$$

$$y = -\dfrac{1}{4}x^2$$

PTS: 2   REF: 081706aii   TOP: Graphing Quadratic Functions

143 ANS:

$y = 3^x$

PTS: 2   REF: 011708aii   TOP: Inverse of Functions

KEY: other

144 ANS:

$I = I_0(0.0067)^t$

$e^{\left(-\frac{3}{0.6}\right)} \approx 0.006738$

PTS: 2   REF: 062315aii   TOP: Modeling Exponential Functions

145 ANS:

$2x^2 - 3x + 7 - \dfrac{11}{2x+3}$

$$
\begin{array}{r}
2x^2 - 3x + 7 \\
2x+3{\overline{\smash{\big)}\,4x^3 + 0x^2 + 5x + 10}} \\
\underline{4x^3 + 6x^2} \\
-6x^2 + 5x \\
\underline{-6x^2 - 9x} \\
14x + 10 \\
\underline{14x + 21} \\
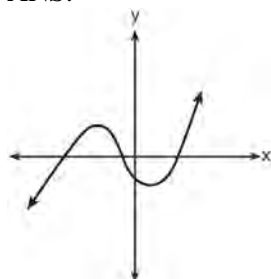-11
\end{array}
$$

PTS: 2   REF: 061614aii   TOP: Rational Expressions

KEY: division

146 ANS:

The graph shows three real zeros, and has end behavior matching the given end behavior.

PTS: 2 REF: 061604aii TOP: Graphing Polynomial Functions
KEY: bimodalgraph

147 ANS:
2π

$1 = \dfrac{2\pi}{k}$

$k = 2\pi$

PTS: 2 REF: 012313aii TOP: Modeling Trigonometric Functions

148 ANS:
-8.93

$\dfrac{N(6) - N(0)}{6 - 0} \approx -8.93$

PTS: 2 REF: 012012aii TOP: Rate of Change

149 ANS:
$(2, -1)$

The vertical distance from the directrix to the vertex, p, is 2. The vertical distance from the vertex to the focus must also be 2.

PTS: 2 REF: 062213aii TOP: Graphing Quadratic Functions

150 ANS:
$-1 + 2i$ and $-1 - 2i$
$x^2 + 2x + 1 = -5 + 1$

$(x + 1)^2 = -4$

$x + 1 = \pm 2i$

$x = -1 \pm 2i$

PTS: 2 REF: 081703aii TOP: Solving Quadratics
KEY: complex solutions | completing the square

151 ANS:
1
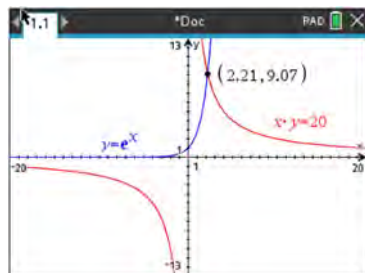
PTS: 2   REF: 082210aii   TOP: Other Systems

152 ANS:
$y = -h(x)$

PTS: 2   REF: 062205aii   TOP: Transformations with Functions

153 ANS:
$x = \dfrac{\ln 6}{\ln 2} - 3$

$8(2^{x+3}) = 48$

$2^{x+3} = 6$

$(x + 3)\ln 2 = \ln 6$

$x + 3 = \dfrac{\ln 6}{\ln 2}$

$x = \dfrac{\ln 6}{\ln 2} - 3$

PTS: 2   REF: 061702aii   TOP: Exponential Equations
KEY: without common base

154 ANS:
$2000(1.003)^{12t}$

$2000\left(1 + \dfrac{.032}{12}\right)^{12t} \approx 2000(1.003)^{12t}$

PTS: 2   REF: 012004aii   TOP: Modeling Exponential Functions

155 ANS:
{8}

$$x^2 = 3x + 40. \quad x = -5 \text{ is an extraneous solution.}$$

$$x^2 - 3x - 40 = 0$$

$$(x - 8)(x + 5) = 0$$

$$x = 8, -5$$

PTS: 2   REF: 012010aii   TOP: Solving Radicals
KEY: extraneous solutions

156 ANS:

$$\frac{\sqrt{23}}{5}$$

$$\cos\theta = \pm\sqrt{1 - \left(\frac{-\sqrt{2}}{5}\right)^2} = \pm\sqrt{\frac{25}{25} - \frac{2}{25}} = \pm\frac{\sqrt{23}}{5}$$

PTS: 2   REF: 061712aii   TOP: Determining Trigonometric Functions

157 ANS:

$$9k^2 - 12ki - 4$$
$$(3k - 2i)^2 = 9k^2 - 12ki + 4i^2 = 9k^2 - 12ki - 4$$

PTS: 2   REF: 081702aii   TOP: Operations with Complex Numbers

158 ANS:

$$(3 - x^2) - (4x + 7)i$$
$$7 - 3i + x^2 - 4xi + 4i^2 - 4i - 2x^2 = 7 - 7i - x^2 - 4xi - 4 = 3 - x^2 - 4xi - 7i = (3 - x^2) - (4x + 7)i$$

PTS: 2   REF: 012022aii   TOP: Operations with Complex Numbers
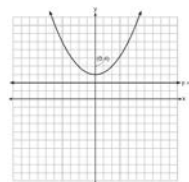
159 ANS:

$$-x$$

$$\frac{x(x^2 - 9)}{-(x^2 - 9)} = -x$$

PTS: 2   REF: 012023aii   TOP: Rational Expressions
KEY: factoring

160 ANS:

$$y = \frac{x^2}{4} + 3$$

A parabola with a focus of $(0,4)$ and a directrix of $y = 2$ is sketched as follows: By inspection, it is determined that the vertex of the parabola is $(0,3)$. It is also evident that the distance, p, between the vertex and the focus is 1. It is possible to use the formula $(x - h)^2 = 4p(y - k)$ to derive the equation of the parabola as follows: $(x - 0)^2 = 4(1)(y - 3)$

$$x^2 = 4y - 12$$

$$x^2 + 12 = 4y$$

$$\frac{x^2}{4} + 3 = y$$

or A point (x,y) on the parabola must be the same distance from the focus as it is from the directrix. For any such point (x,y), the distance to the focus is $\sqrt{(x - 0)^2 + (y - 4)^2}$ and the distance to the directrix is $y - 2$. Setting this equal leads to: $x^2 + y^2 - 8y + 16 = y^2 - 4y + 4$

$$x^2 + 16 = 4y + 4$$

$$\frac{x^2}{4} + 3 = y$$

PTS: 2   REF: spr1502aii   TOP: Graphing Quadratic Functions

161 ANS:

$\{3\}$

$\dfrac{x + 2}{x} + \dfrac{x}{3} = \dfrac{2x^2 + 6}{3x}$ 0 is extraneous.

$$\frac{x^2 + 3x + 6}{3x} = \frac{2x^2 + 6}{3x}$$

$$x^2 + 3x + 6 = 2x^2 + 6$$
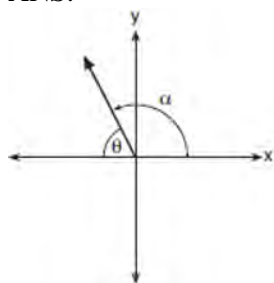
$$x^2 - 3x = 0$$

$$x(x - 3) = 0$$

$$x = 0, 3$$

PTS: 2   REF: 012309aii   TOP: Solving Rationals

162 ANS:

PTS: 2   REF: 081707aii   TOP: Reference Angles
KEY: bimodalgraph

163 ANS:

$x^2 = 4(y - 5)$

Since the distance from the focus to the directrix is 2, $p = 1$ and the vertex of the parabola is $(0,5)$.

$$y = \frac{1}{4p}(x - h)^2 + k$$

$$y = \frac{1}{4(1)}(x - 0)^2 + 5$$

$$y = \frac{1}{4}x^2 + 5$$

$$y - 5 = \frac{1}{4}x^2$$

$$4(y - 5) = x^2$$

PTS: 2   REF: 062323aii   TOP: Graphing Quadratic Functions

164 ANS:

$$f^{-1}(x) = \frac{2x + 1}{x - 1}$$

$$x = \frac{y + 1}{y - 2}$$

$$xy - 2x = y + 1$$

$$xy - y = 2x + 1$$

$$y(x - 1) = 2x + 1$$

$$y = \frac{2x + 1}{x - 1}$$

PTS: 2   REF: 081714aii   TOP: Inverse of Functions
KEY: other

165 ANS:

$a_0 = 1000$

$a_n = a_{n-1}(1.018) + 750$

PTS: 2 REF: 081724aii TOP: Sequences

166 ANS:

$y = \frac{1}{8}(x-1)^2$

The vertex is $(1,0)$ and $p = 2$. $y = \frac{1}{4(2)}(x-1)^2 + 0$

PTS: 2 REF: 061717aii TOP: Graphing Quadratic Functions

167 ANS:

$2x^2 + x - 6 - \frac{7}{x+3}$

$$
\begin{array}{r}
2x^2 + x - 6 \\
x+3 \overline{\smash{)} 2x^3 + 7x^2 - 3x - 25} \\
\underline{2x^3 + 6x^2} \\
x^2 - 3x \\
\underline{x^2 + 3x} \\
-6x - 25 \\
\underline{-6x - 18} \\
-7
\end{array}
$$

PTS: 2 REF: 062203aii TOP: Rational Expressions
KEY: division

168 ANS:

$g_1 = 40$

$g_n = \frac{3}{4} g_{n-1}$

(1) and (3) are not recursive

PTS: 2 REF: 012013aii TOP: Sequences KEY: recursive

169 ANS:

0

$\frac{1}{2}x^2 + 2x = \frac{1}{4}x - 8 \qquad b^2 - 4ac$

$2x^2 + 8x = x - 32 \qquad 7^2 - 4(2)(32) < 0$

$2x^2 + 7x + 32 = 0$

PTS: 2 REF: 012310aii TOP: Quadratic-Linear Systems

170 ANS:

$$\frac{\sqrt{6}}{5}$$

$$5x^2 - 4x + 2 = 0 \quad \frac{4 \pm \sqrt{(-4)^2 - 4(5)(2)}}{2(5)} = \frac{4 \pm \sqrt{-24}}{10} = \frac{4 \pm 2i\sqrt{6}}{10} = \frac{2 \pm i\sqrt{6}}{5}$$

PTS: 2   REF: 012020aii   TOP: Solving Quadratics
KEY: complex solutions | quadratic formula

171 ANS:
$32°$

PTS: 2   REF: 011704aii   TOP: Simplifying Trigonometric Expressions

172 ANS:

$$\frac{2}{3} \pm \frac{1}{6} i\sqrt{158}$$

$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(6)(29)}}{2(6)} = \frac{8 \pm \sqrt{-632}}{12} = \frac{8 \pm i\sqrt{4}\sqrt{158}}{12} = \frac{2}{3} \pm \frac{1}{6} i\sqrt{158}$$

PTS: 2   REF: 011711aii   TOP: Solving Quadratics
KEY: complex solutions | quadratic formula

173 ANS:

$$p(x) = (x^2 - 9)(x - 2)$$

PTS: 2   REF: 061701aii   TOP: Graphing Polynomial Functions

174 ANS:
$\{-1\}$

$$\frac{4}{k^2 - 8k + 12} = \frac{k(k - 6) + (k - 2)}{k^2 - 8k + 12} \quad k = 6 \text{ is extraneous}$$

$$4 = k^2 - 6k + k - 2$$

$$0 = k^2 - 5k - 6$$

$$0 = (k - 6)(k + 1)$$

$$k = 6, -1$$

PTS: 2   REF: 082218aii   TOP: Solving Rationals

175 ANS:
48

$\overline{x} + 2\sigma$ represents approximately 48% of the data.

PTS: 2   REF: 061609aii   TOP: Normal Distributions
KEY: percent

176 ANS:
$x^3 - y^3 i$
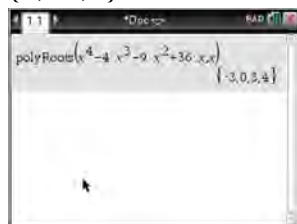$x^3 - x^2 yi - xy^2 + x^2 yi - xy^2 i^2 - y^3 i = x^3 - xy^2 - xy^2(-1) - y^3 i = x^3 - y^3 i$

PTS: 2   REF: 062223aii   TOP: Operations with Complex Numbers

177 ANS:
$\{0, \pm 3, 4\}$

$$x^4 - 4x^3 - 9x^2 + 36x = 0$$
$$x^3(x - 4) - 9x(x - 4) = 0$$
$$(x^3 - 9x)(x - 4) = 0$$
$$x(x^2 - 9)(x - 4) = 0$$
$$x(x + 3)(x - 3)(x - 4) = 0$$
$$x = 0, \pm 3, 4$$

PTS: 2   REF: 061606aii   TOP: Solving Polynomial Equations

178 ANS:
$x^2 - 4xi - 4$
$(x - 2i)(x - 2i) = x^2 - 4xi + 4i^2 = x^2 - 4xi - 4$

PTS: 2   REF: 082202aii   TOP: Operations with Complex Numbers

179 ANS:

$$f^{-1}(x) = -\frac{1}{6}x + \frac{1}{12}$$

$$y = -6x + \frac{1}{2}$$

$$x = -6y + \frac{1}{2}$$

$$x - \frac{1}{2} = -6y$$

$$-\frac{1}{6}\left(x - \frac{1}{2}\right) = y$$

PTS: 2   REF: 062217aii   TOP: Inverse of Functions
KEY: linear

180 ANS:

$300e^{-0.87}$

$$\frac{A}{P} = e^{rt}$$

$$0.42 = e^{rt}$$

$$\ln 0.42 = \ln e^{rt}$$

$$-0.87 \approx rt$$

PTS: 2   REF: 011723aii   TOP: Modeling Exponential Functions

181 ANS:

$(k + 2)(k - 2)(k + 6)(k + 2)$

$k^4 - 4k^2 + 8k^3 - 32k + 12k^2 - 48$

$k^2(k^2 - 4) + 8k(k^2 - 4) + 12(k^2 - 4)$

$(k^2 - 4)(k^2 + 8k + 12)$

$(k + 2)(k - 2)(k + 6)(k + 2)$

PTS: 2   REF: fall1505aii   TOP: Factoring Polynomials
KEY: factoring by grouping

182 ANS:

$\{(1,1),(6,16)\}$

$y = g(x) = (x-2)^2 \qquad (x-2)^2 = 3x - 2 \quad y = 3(6) - 2 = 16$

$$x^2 - 4x + 4 = 3x - 2 \quad y = 3(1) - 2 = 1$$
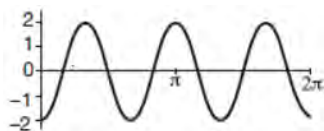
$$x^2 - 7x + 6 = 0$$

$$(x-6)(x-1) = 0$$

$$x = 6, 1$$

PTS: 2 REF: 011705aii TOP: Quadratic-Linear Systems

183 ANS:

(3) repeats 3 times over 2π.

PTS: 2 REF: 011722aii TOP: Graphing Trigonometric Functions
KEY: recognize | bimodalgraph

184 ANS:

$A = 100(0.990656)^t$

$\left(\dfrac{1}{2}\right)^{\frac{1}{73.83}} \approx 0.990656$

PTS: 2 REF: 081710aii TOP: Modeling Exponential Functions

185 ANS:

$ac(bd)^x$

PTS: 2 REF: 011710aii TOP: Operations with Functions

186 ANS:

0.0668

PTS: 2 REF: 081711aii TOP: Normal Distributions
KEY: percent

187 ANS:

$x^2 - 6x + 10 = 0$

The product of the roots equals $(3 + i)(3 - i) = 9 - i^2 = 10 = \dfrac{c}{a}$. OR

$(x - (3 + i))(x - (3 - i)) = 0$

$(x - 3 - i)(x - 3 + i) = 0$

$((x - 3) - i)((x - 3) + i) = 0$

$(x - 3)^2 - i^2 = 0$

$x^2 - 6x + 9 + 1 = 0$

$x^2 - 6x + 10 = 0$

PTS: 2   REF: 082208aii   TOP: Complex Conjugate Root Theorem

188 ANS:

$3x^2 + 4x - 1 + \dfrac{5}{2x + 3}$

$$2x + 3 \overline{)\, 6x^3 + 17x^2 + 10x + 2} \quad \big(3x^2 + 4x - 1\big)$$

$\underline{6x^3 + 9x^2}$

$8x^2 + 10x$

$\underline{8x^2 + 12x}$

$-2x + 2$

$\underline{-2x - 3}$

5

PTS: 2   REF: fall1503aii   TOP: Rational Expressions
KEY: division
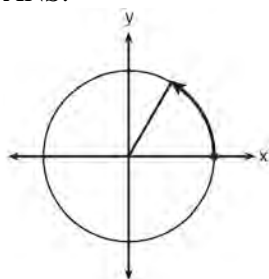
189 ANS:
0.8415

PTS: 2   REF: 081604aii   TOP: Normal Distributions
KEY: probability

ID: A

190 ANS:

PTS: 2   REF: 081616aii   TOP: Unit Circle   KEY: bimodalgraph

191 ANS:

$6 \pm 2i$

$$-2\left(-\frac{1}{2}x^2 = -6x + 20\right)$$

$$x^2 - 12x = -40$$

$$x^2 - 12x + 36 = -40 + 36$$

$$(x - 6)^2 = -4$$

$$x - 6 = \pm 2i$$

$$x = 6 \pm 2i$$

PTS: 2   REF: fall1504aii   TOP: Solving Quadratics
KEY: complex solutions | completing the square

192 ANS:

-0.26

$$\frac{f(7) - f(-7)}{7 - -7} = \frac{= 2^{-0.25(7)} \bullet \sin\left(\frac{\pi}{2}(7)\right) - 2^{-0.25(-7)} \bullet \sin\left(\frac{\pi}{2}(-7)\right)}{14} \approx -0.26$$

PTS: 2   REF: 061721aii   TOP: Rate of Change

193 ANS:

II, only

The events are independent because $P(A \text{ and } B) = P(A) \cdot P(B)$.

$$0.125 = 0.5 \cdot 0.25$$

If $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B) = 0.25 + 0.5 - .125 = 0.625$, then the events are not mutually exclusive because $P(A \text{ or } B) = P(A) + P(B)$

$$0.625 \neq 0.5 + 0.25$$

PTS: 2   REF: 061714aii   TOP: Theoretical Probability

194 ANS:

$$1 + \frac{9}{x^2 + 3}$$

$$\frac{x^2 + 12}{x^2 + 3} = \frac{x^2 + 3}{x^2 + 3} + \frac{9}{x^2 + 3} = 1 + \frac{9}{x^2 + 3}$$

PTS: 2　　　　　REF: 062218aii　　TOP: Addition and Subtraction of Rationals

195 ANS:

$$a_1 = 64$$

$$a_n = 0.75a_{n-1}$$

1) is a correct formula, but not recursive

PTS: 2　　　　　REF: 082216aii　　TOP: Sequences　　KEY: recursive

196 ANS:

I

$$\frac{-12}{16} = \frac{9}{-12} = \frac{-6.75}{9}$$

PTS: 2　　　　　REF: 012017aii　　TOP: Sequences　　KEY: difference or ratio

197 ANS:

$$1 + \frac{2}{x^2 + 4}$$

$$\frac{x^2 + 6}{x^2 + 4} = \frac{x^2 + 4}{x^2 + 4} + \frac{2}{x^2 + 4} = 1 + \frac{2}{x^2 + 4}$$

PTS: 2　　　　　REF: 082321aii　　TOP: Addition and Subtraction of Rationals

198 ANS:

1,743,392,200

$$S_{20} = \frac{-2 - (-2)(-3)^{20}}{1 - (-3)} = 1,743,392,200$$

PTS: 2　　　　　REF: 012306aii　　TOP: Series　　　　KEY: geometric

199 ANS:

−1

$$\frac{2(x-4)}{(x+3)(x-4)} + \frac{3(x+3)}{(x-4)(x+3)} = \frac{2x-2}{x^2 - x - 12}$$

$$2x - 8 + 3x + 9 = 2x - 2$$

$$3x = -3$$

$$x = -1$$

PTS: 2　　　　　REF: 011717aii　　TOP: Solving Rationals
KEY: rational solutions

200 ANS:

$A(t) = A_0(0.000178)^t$

$0.5^{\frac{1}{0.0803}} \approx 0.000178$

PTS: 2   REF: 082224aii   TOP: Modeling Exponential Functions

201 ANS:

$-0.18x^3 - 6.02x^2 + 91.4x - 180$

$95.4x - 6x^2 - (0.18x^3 + 0.02x^2 + 4x + 180)$
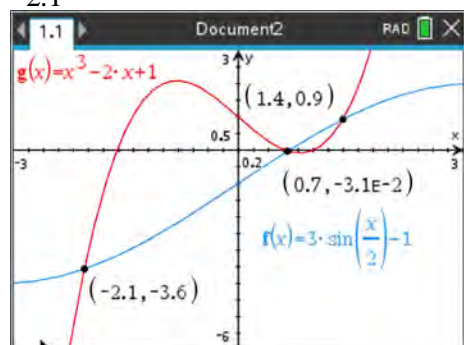
PTS: 2   REF: 082322aii   TOP: Operations with Functions

202 ANS:

−2.1

PTS: 2   REF: 012021aii   TOP: Other Systems

203 ANS:

$R(n) = 1200(1.002)^n - 100n$

PTS: 2   REF: 012002aii   TOP: Operations with Functions

204 ANS:

$y = \dfrac{1}{2}\cos 2x$

PTS: 2   REF: 061708aii   TOP: Modeling Trigonometric Functions

205 ANS:

$m(m^2 + 3)(m^2 - 2)$

$m^5 + m^3 - 6m = m(m^4 + m^2 - 6) = m(m^2 + 3)(m^2 - 2)$

PTS: 2   REF: 011703aii   TOP: Factoring Polynomials

KEY: higher power

206 ANS:

$-3a + 18i$

$3i(ai - 6i^2) = 3ai^2 - 18i^3 = -3a + 18i$

PTS: 2   REF: 062307aii   TOP: Operations with Complex Numbers

207 ANS:

$$x^3 - 2x^2 - x + 6 + \frac{2}{x+2}$$

$$\require{enclose}\begin{array}{r} x^3 - 2x^2 - x + 6 \\ x+2 \enclose{longdiv}{x^4 + 0x^3 - 5x^2 + 4x + 14} \end{array}$$

$$\underline{x^4 + 2x^3}$$

$$-2x^3 - 5x^2$$

$$\underline{-2x^3 - 4x^2}$$

$$-x^2 + 4x$$

$$\underline{-x^2 - 2x}$$

$$6x + 14$$

$$\underline{6x + 12}$$

$$2$$

PTS: 2   REF: 012305aii   TOP: Rational Expressions
KEY: division

208 ANS:
8
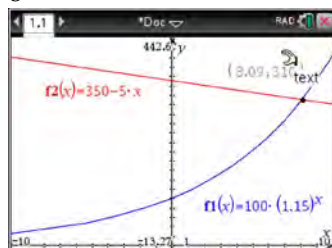
PTS: 2   REF: 011716aii   TOP: Other Systems

209 ANS:
$(1.00427)^m$

$1.0525^{\frac{1}{12}} \approx 1.00427$

PTS: 2   REF: 061621aii   TOP: Modeling Exponential Functions

210 ANS:
0.07

$$2 \times 0.035 = 0.07 \text{ or } ME = \left(z\sqrt{\frac{p(1-p)}{n}} \right) = \left(1.96\sqrt{\frac{(0.65)(0.35)}{200}} \right) \approx 0.07$$

PTS: 2   REF: 012319aii   TOP: Analysis of Data

211 ANS:

0

$(x^2 - y^2) + (2xy)^2 = x^2 + 4x^2y^2 - y^2$

$(x - y) + (x^2 - xy + y^2) = x^2 + x - y - xy + y^2$

$(x - y)(x - y)(x^2 + y^2) = (x^2 - 2xy + y^2)(x^2 + y^2) = x^4 - 2x^3y + x^2y^2 + x^2y^2 - 2xy^3 + y^4$

PTS: 2   REF: 062322aii   TOP: Polynomial Identities

212 ANS:

Both a and b are positive.

$a = 105, 0 < b < 1$

PTS: 2   REF: 082314aii   TOP: Modeling Exponential Functions

213 ANS:

$f^{-1}(x) = 2x - 4$

$x = \frac{1}{2}y + 2$

$2x = y + 4$

$y = 2x - 4$

PTS: 2   REF: 012315aii   TOP: Inverse of Functions
KEY: linear

214 ANS:

II, only

The 2010 population is 110 million.

PTS: 2   REF: 061718aii   TOP: Modeling Exponential Functions

215 ANS:

$2ab\sqrt[3]{a^2}$

$\left(a\sqrt[3]{2b^2}\right)\left(\sqrt[3]{4a^2b}\right) = a\sqrt[3]{8a^2b^3} = 2ab\sqrt[3]{a^2}$

PTS: 2   REF: 082213aii   TOP: Operations with Radicals
KEY: with variables, index > 2

216 ANS:

$\frac{x}{x+2}$

$\frac{x^2 + 3x}{x^2 + 5x + 6} = \frac{x(x+3)}{(x+2)(x+3)}$

PTS: 2   REF: 082215aii   TOP: Rational Expressions
KEY: factoring

217 ANS:

$$y = -\frac{1}{16}(x-2)^2 + 1$$

The distance from the vertex to the focus, p, is 4. Since the focus is below the vertex, p is negative.

$$y = -\frac{1}{4(4)}(x-2)^2 + 1$$

PTS: 2   REF: 082212aii   TOP: Graphing Quadratic Functions

218 ANS:

0

Since $x + 4$ is a factor of $p(x)$, there is no remainder.

PTS: 2   REF: 081621aii   TOP: Remainder and Factor Theorems

219 ANS:

$$x^2 - 2x + 5 - \frac{27}{2x+4}$$

$$
\require{enclose}
\begin{array}{r}
x^2 - 2x + 5 \\
2x+4 \enclose{longdiv}{2x^3 + 0x^2 + 2x - 7} \\
\underline{2x^3 + 4x^2} \\
-4x^2 + 2x \\
\underline{-4x^2 - 8x} \\
10x - 7 \\
\underline{10x + 20} \\
-27
\end{array}
$$

PTS: 2   REF: 062313aii   TOP: Rational Expressions
KEY: division

220 ANS:

4.8

PTS: 2   REF: 082203aii   TOP: Graphing Trigonometric Functions
KEY: amplitude

221 ANS:

$$\frac{3}{2}$$

$$\sqrt{(-2)^2 + (-3)^2} = \sqrt{13}; \quad \tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{\frac{-3}{\sqrt{13}}}{\frac{-2}{\sqrt{13}}} = \frac{3}{2}$$

PTS: 2   REF: 062304aii   TOP: Determining Trigonometric Functions
KEY: extension to reals

222 ANS:

$g_1 = 18$

$g_n = \dfrac{1}{2} g_{n-1}$

(2) is not recursive

PTS: 2   REF: 081608aii   TOP: Sequences   KEY: recursive

223 ANS:

7

$50(.9)^t = 25$

$\quad t \approx 6.57$

PTS: 2   REF: 082317aii   TOP: Modeling Exponential Functions

224 ANS:

B and *D*

The maximum volume of $p(x) = -(x+2)(x-10)(x-14)$ is about 56, at $x = 12.1$

PTS: 2   REF: 081712aii   TOP: Graphing Polynomial Functions

225 ANS:

$2x^2 + x + 5$

$$
\begin{array}{r}
2x^2 + x + 5 \\
2x-1\overline{\smash{)}\,4x^3 + 0x^2 + 9x - 5} \\
\underline{4x^3 - 2x^2} \\
2x^2 + 9x \\
\underline{2x^2 - x} \\
10x - 5 \\
\underline{10x - 5}
\end{array}
$$

PTS: 2   REF: 081713aii   TOP: Rational Expressions
KEY: division

226 ANS:

proportion $\approx .16$; margin of error $\approx .02$

$\dfrac{212}{1334} \approx .16 \ \ ME = \left(z\sqrt{\dfrac{p(1-p)}{n}} \right) = \left(1.96\sqrt{\dfrac{(0.16)(0.84)}{1334}} \right) \approx 0.02 \ \text{or} \ \dfrac{1}{\sqrt{1334}} \approx .027$

PTS: 2   REF: 081716aii   TOP: Analysis of Data

227 ANS:

$\dfrac{1}{2}$

$\dfrac{20}{14+20+6} = \dfrac{1}{2}$

PTS: 2   REF: 082303aii   TOP: Conditional Probability

228 ANS:

$f(x) = -\dfrac{4}{3}x + \dfrac{8}{3}$

$x = -\dfrac{3}{4}y + 2$

$-4x = 3y - 8$

$-4x + 8 = 3y$

$-\dfrac{4}{3}x + \dfrac{8}{3} = y$

PTS: 2   REF: 061616aii   TOP: Inverse of Functions
KEY: linear

229 ANS:

$(0, 2, 0)$

$x + y + z = 2$	$x - 2y - z = -4$	$2x - y = -2$	$x + 2 + z = 2$	$x + z = 0$	$0 + 2 + z = 2$
$x - 2y - z = -4$	$x - 9y + z = -18$	$2x - 11y = -22$	$x - 2(2) - z = -4$	$x - z = 0$	$z = 0$
$2x - y = -2$	$2x - 11y = -22$	$10y = 20$		$2x = 0$	
		$y = 2$		$x = 0$	

PTS: 2   REF: 062311aii   TOP: Solving Linear Systems
KEY: three variables

230 ANS:

$\{6\}$

$\sqrt{3x + 18} = x$ -3 is extraneous.

$3x + 18 = x^2$

$x^2 - 3x - 18 = 0$

$(x - 6)(x + 3) = 0$

$x = 6, -3$

PTS: 2   REF: 082315aii   TOP: Solving Radicals
KEY: extraneous solutions

231 ANS:

$f(x) = 35,000(1.0027)^{12x}$

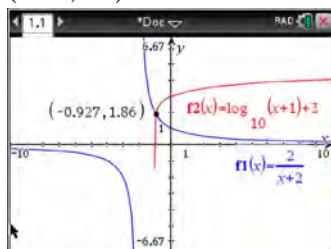$1.0325^{\frac{1}{12}} \approx 1.0027$

PTS: 2 REF: 012323aii TOP: Modeling Exponential Functions

232 ANS:

$(-0.9, 1.9)$

PTS: 2 REF: 011712aii TOP: Other Systems

233 ANS:

$h(x) = \log(x + a) + c$

PTS: 2 REF: 062308aii TOP: Graphing Logarithmic Functions

234 ANS:

\$885.76

$$M = \frac{45000\left(\dfrac{6.75\%}{12}\right)\left(1 + \dfrac{6.75\%}{12}\right)^{5 \times 12}}{\left(1 + \dfrac{6.75\%}{12}\right)^{5 \times 12} - 1} \approx 885.76$$

PTS: 2 REF: 082316aii TOP: Evaluating Exponential Expressions

235 ANS:

$-\dfrac{3}{4} + \dfrac{1}{4} i\sqrt{7}$

$$x = \frac{-3 \pm \sqrt{3^2 - 4(2)(2)}}{2(2)} = \frac{-3 \pm \sqrt{-7}}{4} = -\frac{3}{4} \pm \frac{i\sqrt{7}}{4}$$

PTS: 2 REF: 061612aii TOP: Solving Quadratics
KEY: complex solutions | quadratic formula

236 ANS:

$2 \pm 3i$

$x^2 - 4x + 4 = -13 + 4$

$(x - 2)^2 = -9$

$x - 2 = \pm 3i$

$x = 2 \pm 3i$

PTS: 2   REF: 062312aii   TOP: Solving Quadratics
KEY: complex solutions | completing the square

237 ANS:

3

$(6 - ki)^2 = 27 - 36i$

$36 - 12ki + k^2 i^2 = 27 - 36i$

$9 - k^2 - 12ki = -36i$

Set real part equal to real part: $9 - k^2 = 0$ Set imaginary part equal to imaginary part: $-12ki = -36i$
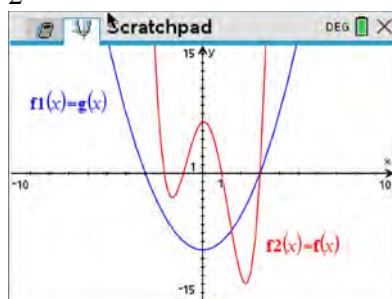
$k = \pm 3$

$$\frac{-12ki}{-12i} = \frac{-36i}{-12i}$$

$$k = 3$$

PTS: 2   REF: 012308aii   TOP: Operations with Complex Numbers

238 ANS:

2

PTS: 2   REF: 082319aii   TOP: Other Systems
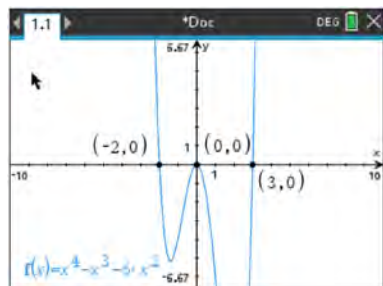
239 ANS:

56

$P(28) = 5(2)^{\frac{98}{28}} \approx 56$

PTS: 2   REF: 011702aii   TOP: Modeling Exponential Functions
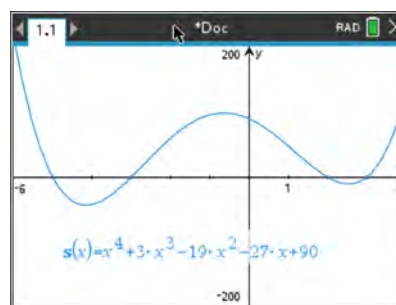
240 ANS:
$x < -2$ or $x > 3$

PTS: 2   REF: 012316aii   TOP: Graphing Polynomial Functions

241 ANS:
$\{-5, -3, 2, 3\}$

$s(x) = x^4 - 9x^2 + 3x^3 - 27x - 10x^2 + 90 = x^4 + 3x^3 - 19x^2 - 27x + 90$
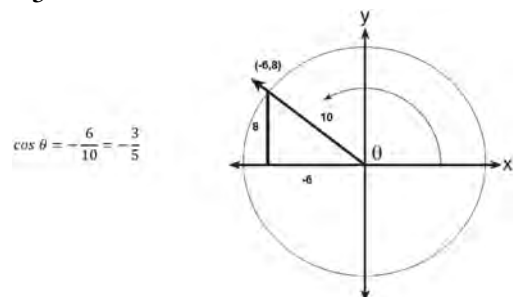
PTS: 2   REF: 062303aii   TOP: Solving Polynomial Equations

242 ANS:
$-\dfrac{3}{5}$

$\cos\theta = -\dfrac{6}{10} = -\dfrac{3}{5}$

PTS: 2   REF: 061617aii   TOP: Determining Trigonometric Functions
KEY: extension to reals

243 ANS:
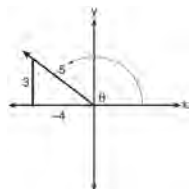$f(n) = -8.75 + 0.75n$

PTS: 2   REF: 061720aii   TOP: Sequences   KEY: explicit

244 ANS:

$\dfrac{3}{5}$

A reference triangle can be sketched using the coordinates $(-4,3)$ in the second quadrant to find the value of $\sin \theta$.

PTS: 2   REF: spr1503aii   TOP: Determining Trigonometric Functions
KEY: extension to reals

245 ANS:

$P(t) = 500(1.00247)^{12t}$

$\left(1.03^{\frac{1}{12}} \right)^{12t} \approx 1.00247^{12t}$

PTS: 2   REF: 062224aii   TOP: Modeling Exponential Functions

246 ANS:

[33,79]

$-23(1) + 56 = 33; \quad -23(-1) + 56 = 79$
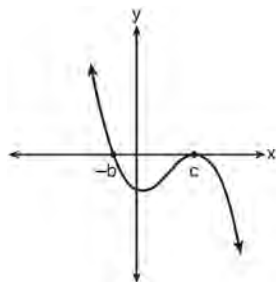
PTS: 2   REF: 062305aii   TOP: Domain and Range
KEY: real domain, trigonometric

247 ANS:

The zeros of the polynomial are at $-b$, and c. The sketch of a polynomial of degree 3 with a negative leading coefficient should have end behavior showing as x goes to negative infinity, $f(x)$ goes to positive infinity. The multiplicities of the roots are correctly represented in the graph.

PTS: 2   REF: spr1501aii   TOP: Graphing Polynomial Functions
KEY: bimodalgraph

248 ANS:

$-y^2 - 4yi + 4$

$(2 - yi)(2 - yi) = 4 - 4yi + y^2 i^2 = -y^2 - 4yi + 4$

PTS: 2   REF: 061603aii   TOP: Operations with Complex Numbers

249 ANS:
496 ± 230
$496 \pm 2(115)$

PTS: 2   REF: 011718aii   TOP: Normal Distributions
KEY: interval

250 ANS:
$-\dfrac{2}{3}$

$\sin^2 A + \left(\dfrac{\sqrt{5}}{3}\right)^2 = 1$ Since $\tan A < 0$, $\sin A = -\dfrac{2}{3}$

$\sin^2 A + \dfrac{5}{9} = \dfrac{9}{9}$

$\sin^2 A = \dfrac{4}{9}$

$\sin A = \pm\dfrac{2}{3}$

PTS: 2   REF: 012320aii   TOP: Determining Trigonometric Functions

251 ANS:
$\dfrac{13}{24}$

$\dfrac{13}{13+11} = \dfrac{13}{24}$

PTS: 2   REF: 012011aii   TOP: Conditional Probability

252 ANS:
1,850,000
$y = 1.77(1.18)^x$ $y(41) \approx 1,850,950$

PTS: 2   REF: 062314aii   TOP: Regression   KEY: exponential

253 ANS:
$(3,1)$

$y = -(x-1)^2 + 5$ $3 + y = 4$

$4 - x = -x^2 + 2x - 1 + 5$ $y = 1$

$x^2 - 3x = 0$

$x(x-3) = 0$

$x = 0, 3$

PTS: 2   REF: 082305aii   TOP: Quadratic-Linear Systems

254 ANS:
$2, -2, i$, and $-i$

PTS: 2   REF: 081708aii   TOP: Solving Polynomial Equations

255 ANS:
1660

PTS: 2   REF: 062214aii   TOP: Normal Distributions
KEY: predict

256 ANS:
$P = 12,150(0.679)^d$
$.962^{10} \approx .679$

PTS: 2   REF: 082311aii   TOP: Modeling Exponential Functions

257 ANS:
18%
$45\% + 31\% - 58\% = 18\%$

PTS: 2   REF: 082307aii   TOP: Theoretical Probability

258 ANS:
150º

PTS: 2   REF: 082205aii   TOP: Unit Circle

259 ANS:
$-2 + \ln\left(\dfrac{7}{5}\right)$

$$\ln e^{x+2} = \ln\frac{7}{5}$$
$$(x+2)\ln e = \ln\frac{7}{5}$$
$$x = -2 + \ln\frac{7}{5}$$

PTS: 2   REF: 062207aii   TOP: Exponential Equations
KEY: without common base

260 ANS:
I and III
$(x+y)^3 = x^3 + 3x^2y + 3xy^2 + y^3 \neq x^3 + 3xy + y^3$

PTS: 2   REF: 081620aii   TOP: Polynomial Identities

261 ANS:
left a units, down b units

PTS: 2   REF: 061706aii   TOP: Graphing Trigonometric Functions

262 ANS:

$y = -\dfrac{1}{8}(x-2)^2 - 1$

The vertex is $(2,-1)$ and $p = 2$. $\quad y = -\dfrac{1}{4(2)}(x-2)^2 - 1$

PTS: 2   REF: 081619aii   TOP: Graphing Quadratic Functions

263 ANS:

$B(t) = 750(1.012)^{12t}$

$B(t) = 750\left(1.16^{\frac{1}{12}}\right)^{12t} \approx 750(1.012)^{12t}$ $B(t) = 750\left(1 + \dfrac{0.16}{12}\right)^{12t}$ is wrong, because the growth is an annual rate

that is not compounded monthly.

PTS: 2   REF: spr1504aii   TOP: Modeling Exponential Functions

264 ANS:

$\{-6\}$

$\dfrac{(x+3)(x+2)}{(x-5)(x+2)} + \dfrac{6(x-5)}{(x+2)(x-5)} = \dfrac{6+10x}{(x-5)(x+2)}$ 5 is extraneous.

$$x^2 + 5x + 6 + 6x - 30 = 10x + 6$$

$$x^2 + x - 30 = 0$$

$$(x+6)(x-5) = 0$$

$$x = -6, 5$$

PTS: 2   REF: 062319aii   TOP: Solving Rationals

265 ANS:

$(x-4)^2 = -8(y+1)$

The distance between the focus and directrix is $1 - -3 = 4$. p is half this distance, or 2. The vertex of the parabola

is $(4,-1)$. Since the directrix is above the focus, the parabola faces downward. $\quad y = -\dfrac{1}{4p}(x-h)^2 + k$

$$y = -\dfrac{1}{4(2)}(x-4)^2 - 1$$

$$y + 1 = -\dfrac{1}{8}(x-4)^2$$

PTS: 2   REF: 012322aii   TOP: Graphing Quadratic Functions

266 ANS:

$2d(d + 3)^2 (d - 3)$

$2d(d^3 + 3d^2 - 9d - 27)$

$2d(d^2 (d + 3) - 9(d + 3))$

$2d(d^2 - 9)(d + 3)$

$2d(d + 3)(d - 3)(d + 3)$

$2d(d + 3)^2 (d - 3)$

PTS: 2　　　　REF: 081615aii　　TOP: Factoring Polynomials
KEY: factoring by grouping

267 ANS:
2.6

PTS: 2　　　　REF: 081603aii　　TOP: Other Systems

268 ANS:

$j_1 = 250,000$

$j_n = 1.00375 j_{n-1}$

PTS: 2　　　　REF: 061623aii　　TOP: Sequences

269 ANS:

$f(x) = \dfrac{3}{2} x - \dfrac{1}{4}$

$x = \dfrac{2}{3} y + \dfrac{1}{6}$

$6x = 4y + 1$

$4y = 6x - 1$

$y = \dfrac{6}{4} x - \dfrac{1}{4}$

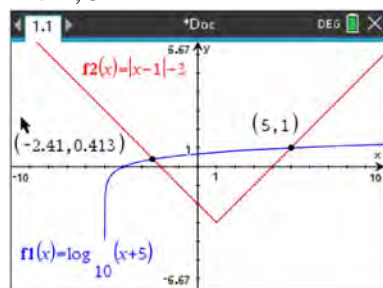PTS: 2　　　　REF: 062321aii　　TOP: Inverse of Functions
KEY: linear

270 ANS:

$300(1.30)^{\frac{365}{14}}$

PTS: 2　　　　REF: 081622aii　　TOP: Modeling Exponential Functions

271 ANS:
−2.41, 5

PTS: 2 REF: 012317aii TOP: Other Systems

272 ANS:
8.5

$a_2 = 8 + \log_{2+1} 1 = 8 + 0 = 8$

$a_3 = 8 + \log_{3+1} 2 = 8 + \dfrac{1}{2} = 8.5$

PTS: 2 REF: 062221aii TOP: Sequences

273 ANS:

$f^{-1}(x) = \dfrac{x+4}{12}$

$\quad x = 12y - 4$

$x + 4 = 12y$

$\dfrac{x+4}{12} = y$

PTS: 2 REF: 082304aii TOP: Inverse of Functions
KEY: linear

274 ANS:
$P_0 = 19,378,000$

$P_t = 1.015 P_{t-1}$

PTS: 2 REF: 081624aii TOP: Sequences

275 ANS:
$x + 2$

PTS: 2 REF: 082324aii TOP: Graphing Polynomial Functions