

fall09a2

1 The expression $(3 - 7i)^2$ is equivalent to

- 1) $-40 + 0i$
- 2) $-40 - 42i$
- 3) $58 + 0i$
- 4) $58 - 42i$

2 If $f(x) = \frac{1}{2}x - 3$ and $g(x) = 2x + 5$, what is the value of $(g \circ f)(4)$?

- 1) -13
- 2) 3.5
- 3) 3
- 4) 6

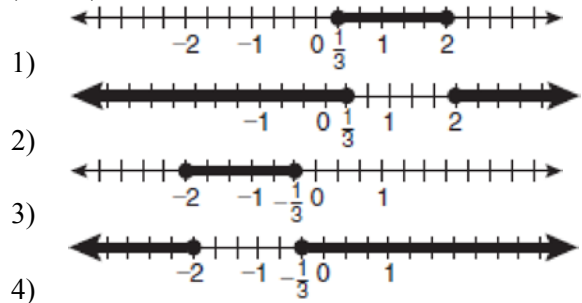
3 What are the values of θ in the interval $0^\circ \leq \theta < 360^\circ$ that satisfy the equation

- $$\tan \theta - \sqrt{3} = 0$$
- 1) $60^\circ, 240^\circ$
 - 2) $72^\circ, 252^\circ$
 - 3) $72^\circ, 108^\circ, 252^\circ, 288^\circ$
 - 4) $60^\circ, 120^\circ, 240^\circ, 300^\circ$

4 A survey completed at a large university asked 2,000 students to estimate the average number of hours they spend studying each week. Every tenth student entering the library was surveyed. The data showed that the mean number of hours that students spend studying was 15.7 per week. Which characteristic of the survey could create a bias in the results?

- 1) the size of the sample
- 2) the size of the population
- 3) the method of analyzing the data
- 4) the method of choosing the students who were surveyed

5 Which graph represents the solution set of $|6x - 7| \leq 5$?



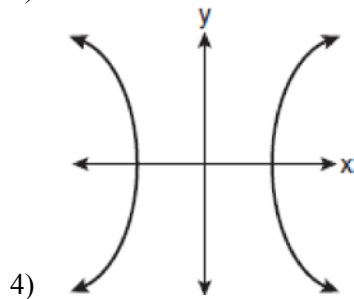
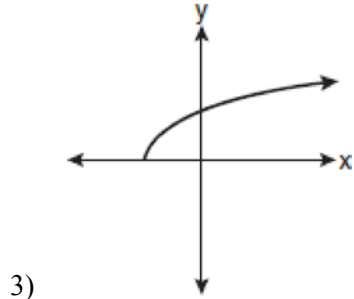
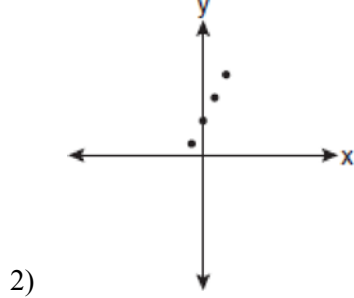
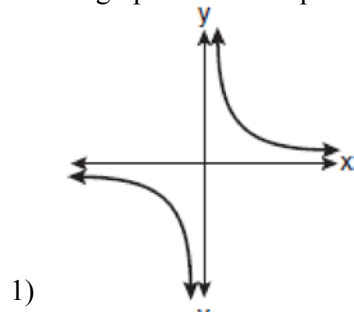
6 Which function is *not* one-to-one?

- 1) $\{(0, 1), (1, 2), (2, 3), (3, 4)\}$
- 2) $\{(0, 0), (1, 1), (2, 2), (3, 3)\}$
- 3) $\{(0, 1), (1, 0), (2, 3), (3, 2)\}$
- 4) $\{(0, 1), (1, 0), (2, 0), (3, 2)\}$

7 In $\triangle ABC$, $m\angle A = 120$, $b = 10$, and $c = 18$. What is the area of $\triangle ABC$ to the nearest square inch?

- 1) 52
- 2) 78
- 3) 90
- 4) 156

8 Which graph does *not* represent a function?



9 The expression $\log_8 64$ is equivalent to

- 1) 8
- 2) 2
- 3) $\frac{1}{2}$
- 4) $\frac{1}{8}$

10 The expression $\cos 4x \cos 3x + \sin 4x \sin 3x$ is equivalent to

- 1) $\sin x$
- 2) $\sin 7x$
- 3) $\cos x$
- 4) $\cos 7x$

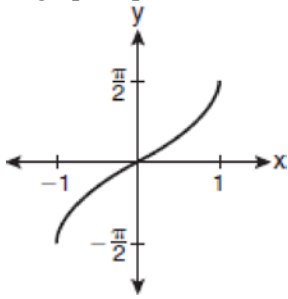
11 The value of the expression $2 \sum_{n=0}^2 (n^2 + 2^n)$ is

- 1) 12
- 2) 22
- 3) 24
- 4) 26

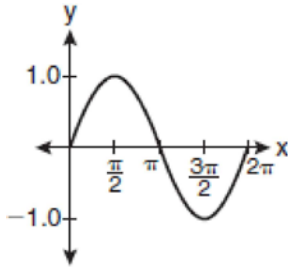
12 For which equation does the sum of the roots equal $\frac{3}{4}$ and the product of the roots equal -2 ?

- 1) $4x^2 - 8x + 3 = 0$
- 2) $4x^2 + 8x + 3 = 0$
- 3) $4x^2 - 3x - 8 = 0$
- 4) $4x^2 + 3x - 2 = 0$

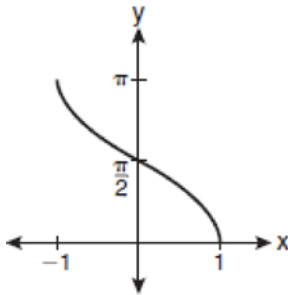
13 Which graph represents the equation $y = \cos^{-1}x$?



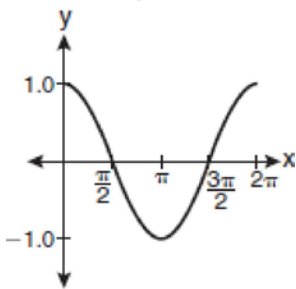
1)



2)



3)



4)

14 The expression $\frac{a^2b^{-3}}{a^{-4}b^2}$ is equivalent to

1) $\frac{a^6}{b^5}$

2) $\frac{b^5}{a^6}$

3) $\frac{a^2}{b}$

4) $a^{-2}b^{-1}$

15 The lengths of 100 pipes have a normal distribution with a mean of 102.4 inches and a standard deviation of 0.2 inch. If one of the pipes measures exactly 102.1 inches, its length lies

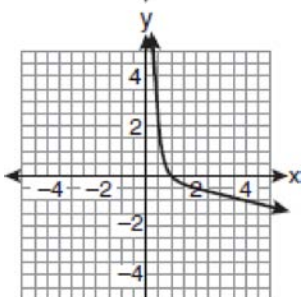
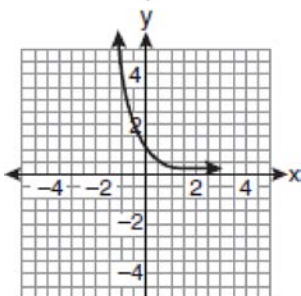
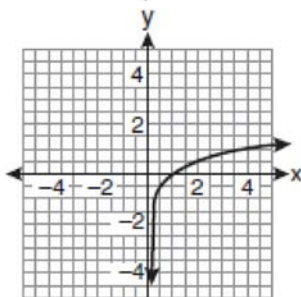
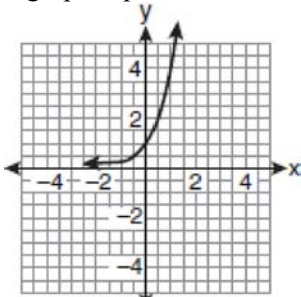
1) below the 16th percentile

2) between the 50th and 84th percentiles

3) between the 16th and 50th percentiles

4) above the 84th percentile

- 16 If a function is defined by the equation $f(x) = 4^x$, which graph represents the inverse of this function?



- 17 Factored completely, the expression $6x - x^3 - x^2$ is equivalent to

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

- 18 The expression $4ab\sqrt{2b} - 3a\sqrt{18b^3} + 7ab\sqrt{6b}$ is equivalent to

- 1) $2ab\sqrt{6b}$
- 2) $16ab\sqrt{2b}$
- 3) $-5ab + 7ab\sqrt{6b}$
- 4) $-5ab\sqrt{2b} + 7ab\sqrt{6b}$

- 19 What is the fourth term in the expansion of $(3x-2)^5$?

- 1) $-720x^2$
- 2) $-240x$
- 3) $720x^2$
- 4) $1,080x^3$

- 20 Written in simplest form, the expression $\frac{\frac{x}{4} - \frac{1}{x}}{\frac{1}{2x} + \frac{1}{4}}$ is

- equivalent to
- 1) $x-1$
 - 2) $x-2$
 - 3) $\frac{x-2}{2}$
 - 4) $\frac{x^2-4}{x+2}$

21 What is the solution of the equation $2\log_4(5x) = 3$?

- 1) 6.4
- 2) 2.56
- 3) $\frac{9}{5}$
- 4) $\frac{8}{5}$

22 A circle has a radius of 4 inches. In inches, what is the length of the arc intercepted by a central angle of 2 radians?

- 1) 2π
- 2) 2
- 3) 8π
- 4) 8

23 What is the domain of the function

$$f(x) = \sqrt{x-2} + 3$$

- 1) $(-\infty, \infty)$
- 2) $(2, \infty)$
- 3) $[2, \infty)$
- 4) $[3, \infty)$

24 The table below shows the first-quarter averages for Mr. Harper's statistics class.

Statistics Class Averages

Quarter Averages	Frequency
99	1
97	5
95	4
92	4
90	7
87	2
84	6
81	2
75	1
70	2
65	1

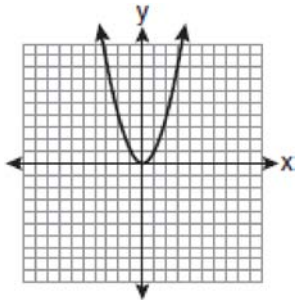
What is the population variance for this set of data?

- 1) 8.2
- 2) 8.3
- 3) 67.3
- 4) 69.3

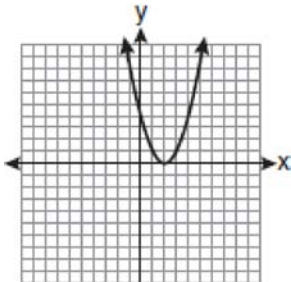
25 Which formula can be used to determine the total number of different eight-letter arrangements that can be formed using the letters in the word *DEADLINE*?

- 1) $8!$
- 2) $\frac{8!}{4!}$
- 3) $\frac{8!}{2!+2!}$
- 4) $\frac{8!}{2! \cdot 2!}$

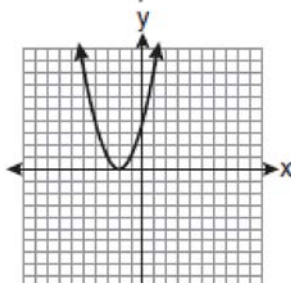
26 The graph below shows the function $f(x)$.



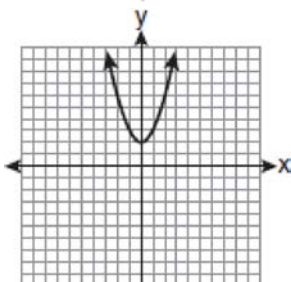
Which graph represents the function $f(x+2)$?



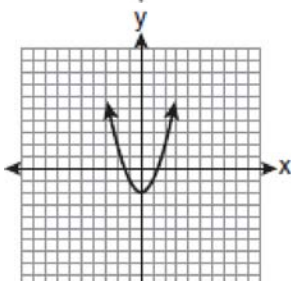
1)



2)



3)



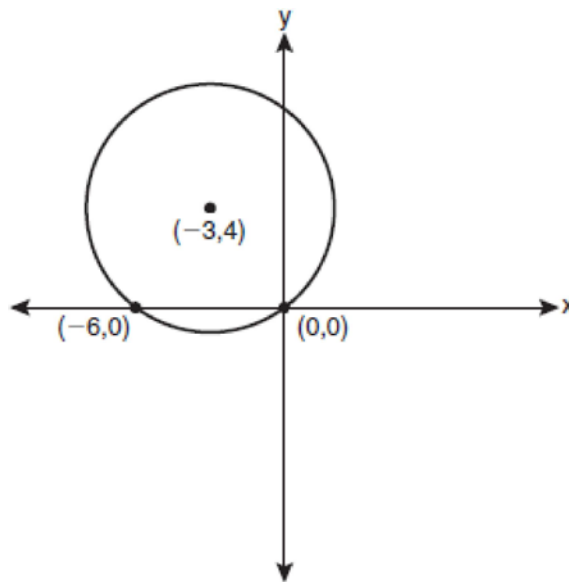
4)

27 The equation $y - 2 \sin \theta = 3$ may be rewritten as

- 1) $f(y) = 2 \sin x + 3$
- 2) $f(y) = 2 \sin \theta + 3$
- 3) $f(x) = 2 \sin \theta + 3$
- 4) $f(\theta) = 2 \sin \theta + 3$

28 Express $\frac{5}{3 - \sqrt{2}}$ with a rational denominator, in simplest radical form.

29 Write an equation of the circle shown in the graph below.



30 Solve for x : $\frac{4x}{x-3} = 2 + \frac{12}{x-3}$

- 31 Find, to the *nearest minute*, the angle whose measure is 3.45 radians.

- 32 Matt places \$1,200 in an investment account earning an annual rate of 6.5%, compounded continuously. Using the formula $V = Pe^{rt}$, where V is the value of the account in t years, P is the principal initially invested, e is the base of a natural logarithm, and r is the rate of interest, determine the amount of money, to the *nearest cent*, that Matt will have in the account after 10 years.

- 33 If θ is an angle in standard position and its terminal side passes through the point $(-3, 2)$, find the exact value of $\csc \theta$.

- 34 Find the first four terms of the recursive sequence defined below.

$$a_1 = -3$$

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

- 35 A committee of 5 members is to be randomly selected from a group of 9 teachers and 20 students. Determine how many different committees can be formed if 2 members must be teachers and 3 members must be students.

- 36 Solve $2x^2 - 12x + 4 = 0$ by completing the square, expressing the result in simplest radical form.

- 37 Solve the equation $8x^3 + 4x^2 - 18x - 9 = 0$ algebraically for all values of x .

- 38 The table below shows the results of an experiment involving the growth of bacteria.

Time (x) (in minutes)	1	3	5	7	9	11
Number of Bacteria (y)	2	25	81	175	310	497

Write a power regression equation for this set of data, rounding all values to *three decimal places*. Using this equation, predict the bacteria's growth, to the *nearest integer*, after 15 minutes.

- 39 Two forces of 25 newtons and 85 newtons acting on a body form an angle of 55° . Find the magnitude of the resultant force, to the *nearest hundredth of a newton*. Find the measure, to the *nearest degree*, of the angle formed between the resultant and the larger force.

fall09a2

Answer Section

1	ANS: 2	PTS: 2	REF: fall0901a2	STA: A2.N.9
	TOP: Multiplication and Division of Complex Numbers			
2	ANS: 3	PTS: 2	REF: fall0902a2	STA: A2.A.42
	TOP: Compositions of Functions			
3	ANS: 1	PTS: 2	REF: fall0903a2	STA: A2.A.68
	TOP: Trigonometric Equations			
4	ANS: 4	PTS: 2	REF: fall0904a2	STA: A2.S.2
	TOP: Analysis of Data			
5	ANS: 1	PTS: 2	REF: fall0905a2	STA: A2.A.1
	TOP: Absolute Value Inequalities			
6	ANS: 4	PTS: 2	REF: fall0906a2	STA: A2.A.43
	TOP: Defining Functions			
7	ANS: 2	PTS: 2	REF: fall0907a2	STA: A2.A.74
	TOP: Using Trigonometry to Find Area			
8	ANS: 4	PTS: 2	REF: fall0908a2	STA: A2.A.38
	TOP: Defining Functions			
9	ANS: 2	PTS: 2	REF: fall0909a2	STA: A2.A.18
	TOP: Evaluating Logarithmic Expressions			
10	ANS: 3	PTS: 2	REF: fall0910a2	STA: A2.A.76
	TOP: Angle Sum and Difference Identities			
11	ANS: 3	PTS: 2	REF: fall0911a2	STA: A2.N.10
	TOP: Sigma Notation			
12	ANS: 3	PTS: 2	REF: fall0912a2	STA: A2.A.21
	TOP: Roots of Quadratics			
13	ANS: 3	PTS: 2	REF: fall0913a2	STA: A2.A.65
	TOP: Trigonometric Graphs			
14	ANS: 1	PTS: 2	REF: fall0914a2	STA: A2.A.8
	TOP: Negative and Fractional Exponents			
15	ANS: 1	PTS: 2	REF: fall0915a2	STA: A2.S.5
	TOP: Normal Distributions		KEY: interval	
16	ANS: 2	PTS: 2	REF: fall0916a2	STA: A2.A.54
	TOP: Exponential and Logarithmic Functions as Inverses			
17	ANS: 4	PTS: 2	REF: fall0917a2	STA: A2.A.7
	TOP: Factoring Polynomials			
18	ANS: 4	PTS: 2	REF: fall0918a2	STA: A2.A.14
	TOP: Operations with Radicals			
19	ANS: 1	PTS: 2	REF: fall0919a2	STA: A2.A.36
	TOP: Binomial Expansions			
20	ANS: 2	PTS: 2	REF: fall0920a2	STA: A2.A.17
	TOP: Complex Fractions			
21	ANS: 4	PTS: 2	REF: fall0921a2	STA: A2.A.28
	TOP: Logarithmic Equations			
22	ANS: 4	PTS: 2	REF: fall0922a2	STA: A2.A.61
	TOP: Arc Length			

- 23 ANS: 3 PTS: 2 REF: fall0923a2 STA: A2.A.39
TOP: Domain and Range
- 24 ANS: 3 PTS: 2 REF: fall0924a2 STA: A2.S.4
TOP: Dispersion
- 25 ANS: 4 PTS: 2 REF: fall0925a2 STA: A2.S.10
TOP: Permutations
- 26 ANS: 2 PTS: 2 REF: fall0926a2 STA: A2.A.46
TOP: Transformations with Functions and Relations
- 27 ANS: 4 PTS: 2 REF: fall0927a2 STA: A2.A.40
TOP: Functional Notation
- 28 ANS:
$$\frac{5(3 + \sqrt{2})}{7}$$
- PTS: 2 REF: fall0928a2 STA: A2.N.5 TOP: Rationalizing Denominators
- 29 ANS:
$$(x + 3)^2 + (y - 4)^2 = 25$$
- PTS: 2 REF: fall0929a2 STA: A2.A.49 TOP: Writing Equations of Circles
- 30 ANS:
no solution
- PTS: 2 REF: fall0930a2 STA: A2.A.23 TOP: Solving Rationals
- 31 ANS:
197°40'
- PTS: 2 REF: fall0931a2 STA: A2.M.2 TOP: Radian Measure
- 32 ANS:
2,298.65
- PTS: 2 REF: fall0932a2 STA: A2.A.12 TOP: Evaluating Exponential Expressions
- 33 ANS:
$$\frac{\sqrt{13}}{2}$$
- PTS: 2 REF: fall0933a2 STA: A2.A.62
TOP: Finding the Value of a Trigonometric Function Given Point on Terminal Side
- 34 ANS:
-3, -5, -8, -12
- PTS: 2 REF: fall0934a2 STA: A2.A.33 TOP: Recursive Sequences
- 35 ANS:
41,040
- PTS: 2 REF: fall0935a2 STA: A2.S.12 TOP: Combinations

36 ANS:

$$3 \pm \sqrt{7}$$

PTS: 4

REF: fall0936a2

STA: A2.A.24

TOP: Completing the Square

37 ANS:

$$\pm \frac{3}{2}, -\frac{1}{2}$$

PTS: 4

REF: fall0937a2

STA: A2.A.26

TOP: Factoring by Grouping

38 ANS:

$$y = 2.001x^{2.298}, 1,009$$

PTS: 4

REF: fall0938a2

STA: A2.S.7

TOP: Power Regression

39 ANS:

101.43, 12

PTS: 6

REF: fall0939a2

STA: A2.A.73

TOP: Vectors