Dear Sir

I have to acknowledge the receipt of your favor of May 14. in which you mention that you have finished the six first books of Euclid, plane trigonometry, surveying & algebra and ask whether I think a further pursuit of that branch of science would be useful to you. There are some propositions in the latter books of Euclid, & some of Archimedes, which are useful, & I have no doubt you have been made acquainted with them. Trigonometry, so far as this, is most valuable to every man, there is scarcely a day in which he will not resort to it for some of the purposes of common life. The science of calculation also is indispensable as far as the extraction of the square & cube roots; Algebra as far as the quadratic equation & the use of logarithms are often of value in ordinary cases; but all beyond these is but a luxury; a delicious luxury indeed; but not to be indulged in by one who is to have a profession to follow for his subsistence. In this light I view the conic sections, curves of the higher orders, perhaps even spherical trigonometry, Algebraical operations beyond the 2d dimension, and fluxions.

Letter from Thomas Jefferson to William G. Munford, Monticello, June 18, 1799.
**fall07ia**

**Answer Section**

1. **ANS:** 2  
   **PTS:** 2  
   **REF:** fall0701ia  
   **STA:** A.S.7  
   **TOP:** Scatter Plots

2. **ANS:** 3  
   **PTS:** 2  
   **REF:** fall0702ia  
   **STA:** A.S.23  
   **TOP:** Theoretical Probability

3. **ANS:** 3  
   \[
   \frac{(2x^3)(8x^5)}{4x^6} = \frac{16x^8}{4x^6} = 4x^2
   \]
   **PTS:** 2  
   **REF:** fall0703ia  
   **STA:** A.A.12  
   **TOP:** Division of Powers

4. **ANS:** 4  
   **PTS:** 2  
   **REF:** fall0704ia  
   **STA:** A.A.29  
   **TOP:** Set Theory

5. **ANS:** 3  
   **PTS:** 2  
   **REF:** fall0705ia  
   **STA:** A.N.1  
   **TOP:** Identifying Properties

6. **ANS:** 3  
   **PTS:** 2  
   **REF:** fall0706ia  
   **STA:** A.A.19  
   **TOP:** Factoring the Difference of Perfect Squares

7. **ANS:** 1  
   A rooster crows before sunrise, not because of the sun.  
   **PTS:** 2  
   **REF:** fall0707ia  
   **STA:** A.S.14  
   **TOP:** Analysis of Data

8. **ANS:** 3  
   \[
   5x + 2y = 48
   \]
   \[
   3x + 2y = 32
   \]
   \[
   2x = 16
   \]
   \[
   x = 8
   \]
   **PTS:** 2  
   **REF:** fall0708ia  
   **STA:** A.A.7  
   **TOP:** Solving Linear Systems

9. **ANS:** 2  
   The median score, 10, is the vertical line in the center of the box.  
   **PTS:** 2  
   **REF:** fall0709ia  
   **STA:** A.S.5  
   **TOP:** Box-and-Whisker Plots

10. **ANS:** 3  
     **PTS:** 2  
     **REF:** fall0710ia  
     **STA:** A.A.31  
     **TOP:** Set Theory

11. **ANS:** 1  
    \[
    30^2 + 40^2 = c^2
    \]
    \[
    30, 40, 50 is a multiple of 3, 4, 5.
    \]
    \[
    2500 = c^2
    \]
    \[
    50 = c
    \]
    **PTS:** 2  
    **REF:** fall0711ia  
    **STA:** A.A.45  
    **TOP:** Pythagorean Theorem
12 ANS: 4
\[ V = \pi r^2 h = \pi \cdot 6^2 \cdot 15 \approx 1696.5 \]

PTS: 2 REF: fall0712ia STA: A.G.2 TOP: Volume

13 ANS: 1
\[ m = \frac{3 - 0}{0 - 2} = \frac{3}{2} \]
Using the given \(y\)-intercept (0, 3) to write the equation of the line \( y = \frac{3}{2} x + 3 \).

PTS: 2 REF: fall0713ia STA: A.A.35 TOP: Writing Linear Equations

14 ANS: 2
The two values are shoe size and height.

PTS: 2 REF: fall0714ia STA: A.S.2 TOP: Analysis of Data

15 ANS: 4 PTS: 2 REF: fall0715ia STA: A.A.5 TOP: Modeling Inequalities

16 ANS: 3
\[ m = \frac{4 - 10}{3 - (-6)} = \frac{2}{3} \]

PTS: 2 REF: fall0716ia STA: A.A.33 TOP: Slope

17 ANS: 4 PTS: 2 REF: fall0717ia STA: A.G.4

18 ANS: 2
\[ \frac{9x^4 - 27x^6}{3x^3} = \frac{9x^4(1 - 3x^2)}{3x^3} = 3x(1 - 3x^2) \]

PTS: 2 REF: fall0718ia STA: A.A.14 TOP: Rational Expressions

19 ANS: 3
\[ 35000(1 - 0.05)^4 \approx 28507.72 \]

PTS: 2 REF: fall0719ia STA: A.A.9 TOP: Exponential Functions

20 ANS: 2
The slope of the inequality is \(-\frac{1}{2}\).

PTS: 2 REF: fall0720ia STA: A.G.6 TOP: Linear Inequalities

21 ANS: 1
\[ \sin C = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{13}{85} \]

PTS: 2 REF: fall0721ia STA: A.A.42 TOP: Basic Trigonometric Ratios

22 ANS: 4
The transformation is a reflection in the \(x\)-axis.

PTS: 2 REF: fall0722ia STA: A.G.4 TOP: Absolute Value

23 ANS: 1 PTS: 2 REF: fall0723ia STA: A.M.3 TOP: Error
24 ANS: 1

\[-2x + 5 > 17\]

\[-2x > 12\]

\[x < -6\]

PTS: 2 REF: fall0724ia STA: A.A.21 TOP: Interpreting Solutions

25 ANS: 2 PTS: 2 REF: fall0725ia STA: A.N.4

TOP: Operations with Scientific Notation

26 ANS: 4

\[w(w + 5) = 36\]

\[w^2 + 5w - 36 = 0\]

PTS: 2 REF: fall0726ia STA: A.A.5 TOP: Geometric Applications of Quadratics

27 ANS: 4

\[
\frac{(d \times 3) + (2 \times 2d)}{2 \times 3} = \frac{3d + 4d}{6} = \frac{7d}{6}
\]

PTS: 2 REF: fall0727ia STA: A.A.17 TOP: Expressions

28 ANS: 1 PTS: 2 REF: fall0728ia STA: A.A.15

TOP: Undefined Rationals

29 ANS: 4 PTS: 2 REF: fall0729ia STA: A.A.2

TOP: Expressions

30 ANS: 4 PTS: 2 REF: fall0730ia STA: A.G.3

TOP: Defining Functions

31 ANS:

\[30\sqrt{2}, \quad 5\sqrt{72} = 5\sqrt{36 \times 2} = 30\sqrt{2}\]

PTS: 2 REF: fall0731ia STA: A.N.2 TOP: Simplifying Radicals

32 ANS:

\[
4. \quad 3 + 2g = 5g - 9
\]

\[12 = 3g\]

\[g = 4\]

PTS: 2 REF: fall0732ia STA: A.A.22 TOP: Solving Equations
33. ANS:
33.4. Serena needs 24 \((9 + 6 + 9)\) feet of fencing to surround the rectangular portion of the garden. The length of the fencing needed for the semicircular portion of the garden is \(\frac{1}{2} \pi d = 3\pi \approx 9.4\) feet.

PTS: 2 REF: fall0733ia STA: A.G.1 TOP: Compositions of Polygons and Circles

34. ANS:
\[
\begin{align*}
\text{distance} &= \frac{60}{1.2} = 50, \\
\text{time} &= \frac{60}{40} = 1.5, \\
\text{speed} \times \text{time} &= 55 \times 2 = 110, \\
120 - 110 &= 10
\end{align*}
\]

PTS: 3 REF: fall0734ia STA: A.M.1 TOP: Speed

35. ANS:
7. \(15x + 22 \geq 120\)
\[x \geq 6.53\]

PTS: 3 REF: fall0735ia STA: A.A.6 TOP: Modeling Inequalities

36. ANS:
\((S,S), (S,K), (S,D), (K,S), (K,K), (K,D), (D,S), (D,K), (D,D), \frac{4}{9}\)

PTS: 3 REF: fall0736ia STA: A.S.19 TOP: Sample Space

37. ANS:
225000, 175000, the median better represents the value since it is closer to more values than the mean.

PTS: 4 REF: fall0737ia STA: A.S.4 TOP: Frequency Histograms, Bar Graphs and Tables

38. ANS:

PTS: 4 REF: fall0738ia STA: A.G.9 TOP: Quadratic-Linear Systems
$39 \hspace{1cm} \text{ANS:}$

$6, -2.$ 

\[ \frac{x + 1}{x} = \frac{-7}{x - 12} \]

$(x + 1)(x - 12) = -7x$

\[ x^2 - 11x - 12 = -7x \]

\[ x^2 - 4x - 12 = 0 \]

$(x - 6)(x + 2) = 0$

$x = 6 \text{ or } -2$

PTS: 4 \hspace{1cm} \text{REF: fall0739ia} \hspace{1cm} \text{STA: A.A.26} \hspace{1cm} \text{TOP: Solving Rationals}$
0608ia

Answer Section

1. ANS: 1  PTS: 2  REF: 060801ia  STA: A.G.4
   TOP: Families of Functions

2. ANS: 4
   \( P(G \text{ or } W) = \frac{4}{8}, P(G \text{ or } B) = \frac{3}{8}, P(Y \text{ or } B) = \frac{4}{8}, P(Y \text{ or } G) = \frac{5}{8} \)
   PTS: 2  REF: 060802ia  STA: A.S.22  TOP: Theoretical Probability

3. ANS: 1
   To determine student interest, survey the widest range of students.
   PTS: 2  REF: 060803ia  STA: A.S.3  TOP: Analysis of Data

4. ANS: 1  PTS: 2  REF: 060804ia  STA: A.A.19
   TOP:Factoring the Difference of Perfect Squares

5. ANS: 4  PTS: 2  REF: 060805ia  STA: A.S.12
   TOP: Scatter Plots

6. ANS: 2
   \( 3c + 4m = 12.50 \)
   \( 3c + 2m = 8.50 \)
   \( 2m = 4.00 \)
   \( m = 2.00 \)
   PTS: 2  REF: 060806ia  STA: A.A.7  TOP: Writing Linear Systems

7. ANS: 1  PTS: 2  REF: 060807ia  STA: A.A.13
   TOP: Multiplication of Powers

8. ANS: 3  PTS: 2  REF: 060808ia  STA: A.N.8
   TOP: Permutations

9. ANS: 2
   \( 1.5^3 = 3.375 \)
   PTS: 2  REF: 060809ia  STA: A.G.2  TOP: Volume

10. ANS: 4

   \( x^2 - 2 = x \)  Since \( y = x \), the solutions are \((2, 2)\) and \((-1, -1)\).
   \( x^2 - x - 2 = 0 \)
   \( (x - 2)(x + 1) = 0 \)
   \( x = 2 \text{ or } -1 \)
   PTS: 2  REF: 060810ia  STA: A.A.11  TOP: Quadratic-Linear Systems
11 ANS: 1 PTS: 2 REF: 060811ia STA: A.G.10
TOP: Identifying the Vertex of a Quadratic Given Graph

12 ANS: 3
\[ b = 42 - r \quad r = 2b + 3 \]
\[ r = 2b + 3 \quad r = 2(42 - r) + 3 \]
\[ r = 84 - 2r + 3 \]
\[ 3r = 87 \]
\[ r = 29 \]

13 ANS: 4
\[ \frac{2^6}{2^5} = 2 \]

14 ANS: 1
The slope of both is \(-4\).

15 ANS: 4
\[ \frac{x^2 - 1}{x + 1} \cdot \frac{x + 3}{3x - 3} = \frac{(x + 1)(x - 1)}{x + 1} \cdot \frac{x + 3}{3(x - 1)} = \frac{x + 3}{3} \]

16 ANS: 2
\[ \sin A = \frac{8}{12} \]
\[ A \approx 42\]
20 ANS: 3
\[ m = \frac{1 - (-4)}{-6 - 4} = \frac{1}{2} \]

PTS: 2  REF: 060820ia  STA: A.A.33  TOP: Slope

21 ANS: 2  PTS: 2  REF: 060821ia  STA: A.A.5
TOP: Modeling Inequalities

22 ANS: 3
25 - 18 = 7

PTS: 2  REF: 060822ia  STA: A.S.9
TOP: Frequency Histograms, Bar Graphs and Tables

23 ANS: 4
25(x – 3) = 25x - 75

PTS: 2  REF: 060823ia  STA: A.A.1  TOP: Expressions

24 ANS: 2
\[ \frac{2x^2 - 12x}{x - 6} = \frac{2x(x - 6)}{x - 6} = 2x \]

PTS: 2  REF: 060824ia  STA: A.A.14  TOP: Rational Expressions

25 ANS: 3  PTS: 2  REF: 060825ia  STA: A.A.45
TOP: Pythagorean Theorem

26 ANS: 4

\[ \frac{5}{x} = \frac{x + 13}{6} \]

\[ x^2 + 13x = 30 \]
\[ x^2 + 13x - 30 = 0 \]
\[ (x + 15)(x - 2) = 0 \]
\[ x = -15 \text{ or } 2 \]

PTS: 2  REF: 060826ia  STA: A.A.26  TOP: Solving Rationals

27 ANS: 4
\[ \text{SA} = 2hw + 2hw + 2lh = 2(3)(1.5) + 2(2)(1.5) + 2(3)(2) = 27 \]

PTS: 2  REF: 060827ia  STA: A.G.2  TOP: Surface Area
28 \[ \frac{\sqrt{32}}{4} = \frac{\sqrt{16} \sqrt{2}}{4} = \sqrt{2} \]

PTS: 2 \hspace{1cm} REF: 060828ia \hspace{1cm} STA: A.N.2 \hspace{1cm} TOP: Simplifying Radicals

29 ANS: 4 \hspace{1cm} PTS: 2 \hspace{1cm} REF: 060829ia \hspace{1cm} STA: A.G.5

TOP: Graphing Quadratics

30 ANS: 2 \hspace{1cm} PTS: 2 \hspace{1cm} REF: 060830ia \hspace{1cm} STA: A.A.9

TOP: Exponential Functions

31 \[ \text{Ann's. } \frac{225}{15} = 15 \text{ mpg is greater than } \frac{290}{23.2} = 12.5 \text{ mpg} \]

PTS: 2 \hspace{1cm} REF: 060831ia \hspace{1cm} STA: A.M.1 \hspace{1cm} TOP: Using Rate

32 ANS:

\[36 - 9\pi. \text{ Area of square–area of } 4 \text{ quarter circles. } (3 + 3)^2 - 3^2 \pi = 36 - 9\pi\]

PTS: 2 \hspace{1cm} REF: 060832ia \hspace{1cm} STA: A.G.1 \hspace{1cm} TOP: Compositions of Polygons and Circles

33 ANS:

\[0 \leq t \leq 40\]

PTS: 2 \hspace{1cm} REF: 060833ia \hspace{1cm} STA: A.A.31 \hspace{1cm} TOP: Set Theory

34 ANS:

\[10 + 2d \geq 75, 33. \quad 10 + 2d \geq 75\]

\[d \geq 32.5\]

PTS: 3 \hspace{1cm} REF: 060834ia \hspace{1cm} STA: A.A.6 \hspace{1cm} TOP: Modeling Inequalities

35 ANS:

\[\frac{1}{6}, 16.67\%, \$13.50. \quad \frac{18 - 15}{18} = \frac{1}{6}. \quad 18 \times 0.75 = 13.5\]

PTS: 3 \hspace{1cm} REF: 060835ia \hspace{1cm} STA: A.N.5 \hspace{1cm} TOP: Percents

36 ANS:

PTS: 3 \hspace{1cm} REF: 060836ia \hspace{1cm} STA: A.G.8 \hspace{1cm} TOP: Solving Quadratics by Graphing
37 ANS:
\[ w(w + 15) = 54, \ 3, \ 18. \quad w(w + 15) = 54 \]
\[ w^2 + 15w - 54 = 0 \]
\[ (w + 18)(w - 3) = 0 \]
\[ w = 3 \]

PTS: 4       REF: 060837ia       STA: A.A.8       TOP: Geometric Applications of Quadratics

38 ANS:

\[ 618.45, 613.44, 0.008. \quad 21.7 \times 28.5 = 618.45. \quad 21.6 \times 28.4 = 613.44. \quad \left| \frac{618.45 - 613.44}{613.44} \right| \approx 0.008. \quad \text{An error of less than 1\% would seem to be insignificant.} \]

PTS: 4       REF: 060838ia       STA: A.M.3       TOP: Error

39 ANS:

315,000, 180,000, the median better represents value since it is closer to more prices than the mean.

PTS: 4       REF: 060839ia       STA: A.S.4       TOP: Frequency Histograms, Bar Graphs and Tables
ANS: 4

\[5p - 1 = 2p + 20\]

\[3p = 21\]

\[p = 7\]

PTS: 2  REF: 080801ia  STA: A.A.22  TOP: Solving Equations

2 ANS: 2  PTS: 2  REF: 080802ia  STA: A.N.1
TOP: Identifying Properties

3 ANS: 1  PTS: 2  REF: 080803ia  STA: A.A.4
TOP: Modeling Inequalities

4 ANS: 3
mean = 6, median = 6 and mode = 7

PTS: 2  REF: 080804ia  STA: A.S.4  TOP: Central Tendency

5 ANS: 4
\[-4x + 2 > 10\]

\[-4x > 8\]

\[x < -2\]

PTS: 2  REF: 080805ia  STA: A.A.21  TOP: Solving Inequalities

6 ANS: 2
\[2x^2 + 10x - 12 = 2(x^2 + 5x - 6) = 2(x + 6)(x - 1)\]

PTS: 2  REF: 080806ia  STA: A.A.20  TOP: Factoring Polynomials

7 ANS: 2

If the car can travel 75 miles on 4 gallons, it can travel 300 miles on 16 gallons. \[\frac{75}{4} = \frac{x}{16}\].

\[x = 300\]

PTS: 2  REF: 080807ia  STA: A.G.4  TOP: Graphing Functions and Relations
8 ANS: 3
\[ 3ax + b = c \]
\[ 3ax = c - b \]
\[ x = \frac{c - b}{3a} \]

PTS: 2 REF: 080808ia STA: A.A.23 TOP: Transforming Formulas

9 ANS: 4
\[ 16^2 + b^2 = 34^2 \]
\[ b^2 = 900 \]
\[ b = 30 \]

PTS: 2 REF: 080809ia STA: A.A.45 TOP: Pythagorean Theorem

10 ANS: 2
TOP: Parallel and Perpendicular Lines

11 ANS: 2
\[ s + o = 126, s + 2s = 126 \]
\[ o = 2s \]
\[ s = 42 \]

PTS: 2 REF: 080811ia STA: A.A.7 TOP: Writing Linear Systems

12 ANS: 2
\[ x^2 + 5x + 6 = -x + 1 \]
\[ y = -x + 1 \]
\[ x^2 + 6x + 5 = 0 \]
\[ = -(5) + 1 \]
\[ (x + 5)(x + 1) = 0 \]
\[ = 6 \]
\[ x = -5 \text{ or } -1 \]

PTS: 2 REF: 080812ia STA: A.A.11 TOP: Quadratic-Linear Systems

13 ANS: 1
TOP: Identifying the Vertex of a Quadratic Given Graph

14 ANS: 3
\[ 0.75 \text{ hours} = 45 \text{ minutes} \]
\[ \frac{120}{1} = \frac{x}{45} \]
\[ x = 5400 \]

PTS: 2 REF: 080814ia STA: A.M.1 TOP: Using Rate

15 ANS: 2
TOP: Compositions of Polygons and Circles
16 ANS: 1
\[ _4P_4 = 4 \times 3 \times 2 \times 1 = 24 \]
PTS: 2 REF: 080816ia STA: A.N.8 TOP: Permutations

17 ANS: 2
\[ l(l - 5) = 24 \]
\[ l^2 - 5l - 24 = 0 \]
\[ (l - 8)(l + 3) = 0 \]
\[ l = 8 \]
PTS: 2 REF: 080817ia STA: A.A.8 TOP: Geometric Applications of Quadratics

18 ANS: 3
The value of the third quartile is the last vertical line of the box.
PTS: 2 REF: 080818ia STA: A.S.6 TOP: Box-and-Whisker Plots

19 ANS: 3 PTS: 2 REF: 080819ia STA: A.A.13
TOP: Addition and Subtraction of Polynomials

20 ANS: 4
\[ \frac{2x}{5} + \frac{1}{3} = \frac{7x - 2}{15} \]
\[ \frac{(2x \times 3) + (5 \times 1)}{5 \times 3} = \frac{7x - 2}{15} \]
\[ \frac{6x + 5}{15} = \frac{7x - 2}{15} \]
\[ 6x + 5 = 7x - 2 \]
\[ x = 7 \]
PTS: 2 REF: 080820ia STA: A.A.26 TOP: Solving Equations with Fractional Expressions

21 ANS: 4
\[ \frac{25x - 125}{x^2 - 25} = \frac{25(x - 5)}{(x + 5)(x - 5)} = \frac{25}{x + 5} \]
PTS: 2 REF: 080821ia STA: A.A.16 TOP: Rational Expressions
22 ANS: 4

PTS: 2  REF: 080822ia  STA: A.S.8  TOP: Scatter Plots

23 ANS: 2  PTS: 2  REF: 080823ia  STA: A.A.32
TOP: Slope

24 ANS: 1  PTS: 2  REF: 080824ia  STA: A.A.43
TOP: Using Trigonometry to Find an Angle

25 ANS: 4  PTS: 2  REF: 080825ia  STA: A.A.40
TOP: Systems of Linear Inequalities

26 ANS: 1
\[
\frac{4x}{x-1} \cdot \frac{x^2-1}{3x+3} = \frac{4x}{x-1} \cdot \frac{(x+1)(x-1)}{3(x+1)} = \frac{4x}{3}
\]

PTS: 2  REF: 080826ia  STA: A.A.18  TOP: Multiplication and Division of Rationals

27 ANS: 4  PTS: 2  REF: 080827ia  STA: A.A.12
TOP: Powers of Powers

28 ANS: 1
\[
\left|\frac{289 - 282}{289}\right| \approx 0.024
\]

PTS: 2  REF: 080828ia  STA: A.M.3  TOP: Error

29 ANS: 3
\[
\sin A = \frac{10}{16}, \quad B = 180 - (90 + 38.7) = 51.3
\]
\[
A \approx 38.7
\]

PTS: 2  REF: 080829ia  STA: A.A.43  TOP: Using Trigonometry to Find an Angle

30 ANS: 2
The events are not mutually exclusive: \(P(\text{prime}) = \frac{3}{6}, \ P(\text{even}) = \frac{3}{6}, \ P(\text{prime AND even}) = \frac{1}{6}\)

\[
P(\text{prime OR even}) = \frac{3}{6} + \frac{3}{6} - \frac{1}{6} = \frac{5}{6}
\]

PTS: 2  REF: 080830ia  STA: A.S.23  TOP: Probability of Events Not Mutually Exclusive
31. ANS: 
\[\frac{\text{distance}}{\text{time}} = \frac{89}{0.8} = 111.25\]

PTS: 2        REF: 080831ia        STA: A.M.1        TOP: Speed

32. ANS: 
\[\frac{3}{8} \cdot \frac{3}{4} \times \frac{1}{2} = \frac{3}{8}\]

PTS: 2        REF: 080832ia        STA: A.S.23        TOP: Probability of Independent Events

33. ANS: 
{1,2,4,5,9,10,12}

PTS: 2        REF: 080833ia        STA: A.A.30        TOP: Set Theory

34. ANS: 
\[60 - 42\sqrt{5}, 3\sqrt{20(2\sqrt{5} - 7)} = 6\sqrt{100} - 21\sqrt{20} = 60 - 21\sqrt{4\sqrt{5}} = 60 - 42\sqrt{5}\]

PTS: 3        REF: 080834ia        STA: A.N.3        TOP: Operations with Radicals

35. ANS: 

. The graph will never intersect the x-axis as \(2^x > 0\) for all values of \(x\).

PTS: 3        REF: 080835ia        STA: A.G.4        TOP: Exponential Functions

36. ANS: 
\[y = \frac{2}{5}x + 2, \quad m = \frac{4 - 0}{5 - (-5)} = \frac{2}{5}, \quad y = mx + b\]

\[4 = \frac{2}{5}(5) + b\]
\[b = 2\]

PTS: 3        REF: 080836ia        STA: A.A.35        TOP: Writing Linear Equations

37. ANS: 
\[m = 50\ell, \quad p = 15\ell. \quad 3m + 2p = 1.80, \quad 9m + 6p = 5.40. \quad 4(0.50) + 6p = 2.90\]
\[4m + 6p = 2.90, \quad 4m + 6p = 2.90, \quad 6p = 90\]
\[5m = 2.50, \quad p = \$0.15\]
\[m = \$0.50\]

PTS: 3        REF: 080837ia        STA: A.A.35        TOP: Writing Linear Systems
38 ANS:

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<th>Frequency</th>
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<td>3</td>
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<td>III II</td>
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Number of Days Outside

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<td>0-7</td>
<td>20</td>
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39 ANS:

PTS: 4 REF: 080839ia STA: A.G.9 TOP: Quadratic-Linear Systems
0109ia

Answer Section

1 ANS: 3
\[ F = \frac{9}{5} C + 32 = \frac{9}{5} (15) + 32 = 59 \]

PTS: 2 REF: 010901ia STA: A.M.2 TOP: Conversions

2 ANS: 4
\[ \frac{\text{distance}}{\text{time}} = \frac{24}{6} = 4 \]

PTS: 2 REF: 010902ia STA: A.M.1 TOP: Speed

3 ANS: 4
\[ P(O) = \frac{3}{6}, P(E) = \frac{3}{6}, P(< 6) = \frac{5}{6}, P(> 4) = \frac{2}{6} \]

PTS: 2 REF: 010903ia STA: A.S.22 TOP: Theoretical Probability

4 ANS: 1
\[ 0.07m + 19 \leq 29.50 \]
\[ 0.07m \leq 10.50 \]
\[ m \leq 150 \]

PTS: 2 REF: 010904ia STA: A.A.6 TOP: Modeling Inequalities

5 ANS: 1
PTS: 2 REF: 010905ia STA: A.G.4 TOP: Graphing Functions and Relations

6 ANS: 3
\[ \frac{k + 4}{2} = \frac{k + 9}{3} \]
\[ 3(k + 4) = 2(k + 9) \]
\[ 3k + 12 = 2k + 18 \]
\[ k = 6 \]

PTS: 2 REF: 010906ia STA: A.A.26 TOP: Solving Equations with Fractional Expressions

7 ANS: 4
The mean is 80.6, the median is 84.5 and the mode is 87.

PTS: 2 REF: 010907ia STA: A.S.4 TOP: Central Tendency
8 ANS: 4 PTS: 2 REF: 010908ia STA: A.A.9
TOP: Exponential Functions

9 ANS: 2 PTS: 2 REF: 010909ia STA: A.A.19
TOP: Factoring the Difference of Perfect Squares

10 ANS: 3 PTS: 2 REF: 010910ia STA: A.A.35
TOP: Writing Linear Equations

11 ANS: 2
\[ P = 2l + 2w \]
\[ P - 2l = 2w \]
\[ \frac{P - 2l}{2} = w \]
PTS: 2 REF: 010911ia STA: A.A.23
TOP: Transforming Formulas

12 ANS: 3
\[ \cos 30 = \frac{x}{24} \]
\[ x \approx 21 \]
PTS: 2 REF: 010912ia STA: A.A.44
TOP: Using Trigonometry to Find a Side

13 ANS: 2
\[ m = \frac{5 - 3}{2 - 7} = \frac{2}{-5} \]
PTS: 2 REF: 010913ia STA: A.A.33
TOP: Slope

14 ANS: 3
\[ x^2 - 10x + 21 = 0 \]
\[ (x - 7)(x - 3) = 0 \]
\[ x = 7 \quad x = 3 \]
PTS: 2 REF: 010914ia STA: A.A.28
TOP: Solving Quadratics by Factoring

15 ANS: 2 PTS: 2 REF: 010915ia STA: A.A.5
TOP: Modeling Equations

16 ANS: 2 PTS: 2 REF: 010916ia STA: A.G.10
TOP: Identifying the Vertex of a Quadratic Given Graph

17 ANS: 3 PTS: 2 REF: 010917ia STA: A.A.29
TOP: Set Theory

18 ANS: 1
\[ \frac{2}{x - 3} = \frac{26}{x} \]
\[ -3 = \frac{24}{x} \]
\[ x = -8 \]
PTS: 2 REF: 010918ia STA: A.A.26
TOP: Solving Rationals
19 ANS: 2
\[ \sin U = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{15}{17} \]
PTS: 2 REF: 010919ia STA: A.A.42 TOP: Basic Trigonometric Ratios

20 ANS: 3
\[ \sqrt{72} = \sqrt{36 \cdot 2} = 6\sqrt{2} \]
PTS: 2 REF: 010920ia STA: A.N.2 TOP: Simplifying Radicals

21 ANS: 2
\[ \frac{6}{5x} - \frac{2}{3x} = \frac{18x - 10x}{15x^2} = \frac{8x}{15x^2} = \frac{8}{15x} \]
PTS: 2 REF: 010921ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

22 ANS: 2
\[ x^2 - x - 20 = 3x - 15 \]
\[ y = 3x - 15 \]
\[ x^2 - 4x - 6 = 0 \]
\[ = 3(-1) - 15 \]
\[ (x = 5)(x + 1) = 0 \]
\[ = -18 \]
x = 5 or -1

PTS: 2 REF: 010922ia STA: A.A.11 TOP: Quadratic-Linear Systems

23 ANS: 1
Everyone eats, can shop in malls and wear clothes. People who work in a sporting goods store probably watch more sports television than most.

PTS: 2 REF: 010923ia STA: A.S.3 TOP: Analysis of Data

24 ANS: 4
\[ A = lw = (3w - 7)(w) = 3w^2 - 7w \]
PTS: 2 REF: 010924ia STA: A.A.1 TOP: Geometric Applications of Quadratics


26 ANS: 1
The slope of \( y = 3 - 2x \) is -2. Using \( m = \frac{A}{B} \), the slope of \( 4x + 2y = 5 \) is \( \frac{4}{2} = -2 \).

PTS: 2 REF: 010926ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

27 ANS: 4 PTS: 2 REF: 010927ia STA: A.N.4 TOP: Operations with Scientific Notation
28 ANS: 1
\[ \frac{1}{8} \times \frac{1}{8} = \frac{1}{64} \]

PTS: 2 
REF: 010928ia 
STA: A.S.23 
TOP: Probability of Independent Events

29 ANS: 4 
PTS: 2 
REF: 010929ia 
STA: A.S.6 
TOP: Box-and-Whisker Plots

30 ANS: 4 
PTS: 2 
REF: 010930ia 
STA: A.G.3 
TOP: Defining Functions

31 ANS:
\[ 50.12 + 10 + 12 + \frac{1}{2} (10\pi) \approx 50 \]

PTS: 2 
REF: 010931ia 
STA: A.G.1 
TOP: Compositions of Polygons and Circles

32 ANS:
\[ \frac{3k^2 m^6}{4} \]

PTS: 2 
REF: 010932ia 
STA: A.A.12 
TOP: Division of Powers

33 ANS:
\[ d = 6.25h, 250. \]
\[ d = 6.25(40) = 250 \]

PTS: 2 
REF: 010933ia 
STA: A.N.5 
TOP: Direct Variation

34 ANS:
\[ 1,512, 1,551.25, 0.025. \]
\[ 36 \times 42 = 1512. \]
\[ 36.5 \times 42.5 = 1551.25. \]
\[ RE = \left| \frac{1512 - 1551.25}{1551.25} \right| \approx 0.025. \]

PTS: 3 
REF: 010934ia 
STA: A.M.3 
TOP: Error

35 ANS:
\[ \frac{3}{4x-8} \] 
\[ \frac{3x+6}{4x+12} \] 
\[ \frac{x^2-4}{x+3} = \frac{3(x+2)}{4(x+3)} \cdot \frac{x+3}{(x+2)(x-2)} = \frac{3}{4(x-2)} \]

PTS: 3 
REF: 010935ia 
STA: A.A.18 
TOP: Multiplication and Division of Rationals

36 ANS:
\[ \frac{38}{\pi}, 2. \]
\[ V = \pi r^2 h \]
\[ \frac{36}{38} \approx 2.97. \] Three cans will not fit. The maximum number is 2.
\[ 342 = \pi \left( \frac{6}{2} \right)^2 h \]
\[ \frac{342}{9\pi} = h \]
\[ \frac{38}{\pi} = h \]

PTS: 3 
REF: 010936ia 
STA: A.G.2 
TOP: Volume
37 ANS:
\((-2, 5)\). \[3x + 2y = 4 \quad 12x + 8y = 16. \quad 3x + 2y = 4\]
\[4x + 3y = 7 \quad 12x + 9y = 21 \quad 3x + 2(5) = 4\]
\[y = 5 \quad 3x = -6\]
\[x = -2\]

PTS: 4  REF: 010937ia  STA: A.A.10  TOP: Solving Linear Systems

38 ANS:

PTS: 4  REF: 010938ia  STA: A.G.7  TOP: Systems of Linear Inequalities

39 ANS:

(H,F,M), (H,F,J), (H,F,S), (H,A,M), (H, A,J), (H,A,S), (C,F,M), (C,F,J), (C,F,S), (C,A,M), (C,A,J), (C,A,S),
(T,F,M), (T,F,J), (T,F,S), (T,A,M), (T,A,J), (T,A,S). There are 18 different kids’ meals, 12 do not include juice and 6 include chicken nuggets.

PTS: 4  REF: 010939ia  STA: A.S.19  TOP: Sample Space
1 ANS: 4
\[
\frac{5}{45} = \frac{8}{x}
\]
\[5x = 360\]
\[x = 72\]

PTS: 2 REF: 060901ia STA: A.M.1 TOP: Speed

2 ANS: 4
\[x^2 - 7x + 6 = 0\]
\[(x - 6)(x - 1) = 0\]
\[x = 6 \quad x = 1\]

PTS: 2 REF: 060902ia STA: A.A.28 TOP: Roots of Quadratics

3 ANS: 1 PTS: 2 REF: 060903ia STA: A.A.12 TOP: Division of Powers

4 ANS: 2 PTS: 2 REF: 060904ia STA: A.A.1 TOP: Expressions

5 ANS: 3
The other situations are quantitative.

PTS: 2 REF: 060905ia STA: A.S.1 TOP: Analysis of Data

6 ANS: 4 PTS: 2 REF: 060906ia STA: A.A.4 TOP: Modeling Inequalities

7 ANS: 1
\[
\frac{(2x \times 6) + (3 \times x)}{3 \times 6} = 5
\]
\[
\frac{12x + 3x}{18} = 5
\]
\[15x = 90\]
\[x = 6\]

PTS: 2 REF: 060907ia STA: A.A.25 TOP: Solving Equations with Fractional Expressions

9 ANS: 3
\[3^2 + 5^2 = x^2\]
\[34 = x^2\]
\[\sqrt{34} = x\]

PTS: 2 REF: 060909ia STA: A.A.45 TOP: Pythagorean Theorem

10 ANS: 2
\[\sqrt{32} = \sqrt{16 \cdot 2} = 4\sqrt{2}\]

PTS: 2 REF: 060910ia STA: A.N.2 TOP: Simplifying Radicals

11 ANS: 4
\[\frac{344 \text{ m}}{\text{sec}} \times \frac{60 \text{ sec}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hr}} = 1,238,400 \frac{\text{m}}{\text{hr}}\]

PTS: 2 REF: 060911ia STA: A.M.2 TOP: Conversions

12 ANS: 2
\[L + S = 47\]
\[L - S = 15\]
\[2L = 62\]
\[L = 31\]

PTS: 2 REF: 060912ia STA: A.A.7 TOP: Modeling Linear Systems

13 ANS: 3
\[a + ar = b + r\]
\[a(1 + r) = b + r\]
\[a = \frac{b + r}{1 + r}\]

PTS: 2 REF: 060913ia STA: A.A.23 TOP: Transforming Formulas

14 ANS: 1
\[\frac{4}{3}x + 5 < 17\]
\[\frac{4}{3}x < 12\]
\[4x < 36\]
\[x < 9\]

PTS: 2 REF: 060914ia STA: A.A.21 TOP: Interpreting Solutions

15 ANS: 3
The value of the upper quartile is the last vertical line of the box.

PTS: 2 REF: 060915ia STA: A.S.6 TOP: Box-and-Whisker Plots
16 ANS: 4 PTS: 2 REF: 060916ia STA: A.A.15
TOP: Undefined Rationals

F = f + 60 \quad j = 2f - 50 \quad se = 3f \quad f + (f + 60) + (2f - 50) + 3f = 1424
7f + 10 = 1424
f = 202

PTS: 2 REF: 060917ia STA: A.A.7 TOP: Writing Linear Systems

17 ANS: 1
so = f + 60 \quad j = 2f - 50 \quad se = 3f \quad f + (f + 60) + (2f - 50) + 3f = 1424

\begin{align*}
x &= \frac{-b}{2a} = \frac{-(-16)}{2(1)} = 8. \quad y &= (8)^2 - 16(8) + 63 = -1
\end{align*}

PTS: 2 REF: 060918ia STA: A.A.41 TOP: Identifying the Vertex of a Quadratic Given Equation

18 ANS: 1
\begin{align*}
x &= \frac{-b}{2a} = \frac{-(-16)}{2(1)} = 8. \quad y &= (8)^2 - 16(8) + 63 = -1
\end{align*}

PTS: 2 REF: 060919ia STA: A.G.3 TOP: Defining Functions

19 ANS: 3 PTS: 2 REF: 060919ia STA: A.G.6 TOP: Linear Inequalities

20 ANS: 2
\begin{align*}
\frac{x^2 - 2x - 15}{x^2 + 3x} &= \frac{(x-5)(x+3)}{x(x+3)} = \frac{x-5}{x}
\end{align*}

PTS: 2 REF: 060921ia STA: A.A.16 TOP: Rational Expressions

21 ANS: 1
\begin{align*}
y &= mx + b \\
-6 &= (-3)(4) + b \\
b &= 6
\end{align*}

PTS: 2 REF: 060922ia STA: A.A.34 TOP: Writing Linear Equations

22 ANS: 2
\begin{align*}
x + 2y &= 9 \\
x - y &= 3 \\
3y &= 6 \\
y &= 2
\end{align*}

PTS: 2 REF: 060925ia STA: A.A.10 TOP: Solving Linear Systems

23 ANS: 3 PTS: 2 REF: 060926ia STA: A.N.1 TOP: Properties of Reals
27 ANS: 4 PTS: 2 REF: 060927ia STA: A.N.4
TOP: Operations with Scientific Notation

28 ANS: 2
The volume of the cube using Ezra’s measurements is $8 \cdot (2^3)$. The actual volume is $9.261 \cdot (2.1^3)$. The relative error is \[
\frac{9.261 - 8}{9.261} \approx 0.14.
\]

29 ANS: 2
\[
\frac{6}{4a} - \frac{2}{3a} = \frac{18a - 8a}{12a^2} = \frac{10a}{12a^2} = \frac{5}{6a}
\]

30 ANS: 4 PTS: 2 REF: 060930ia STA: A.A.29
TOP: Set Theory

31 ANS:
\[
\binom{6}{3} = 60
\]

32 ANS:
\[
4x(x + 3)(x - 3). \quad 4x^3 - 36x = 4x(x^2 - 9) = 4x(x + 3)(x - 3)
\]

33 ANS:
\[
\frac{1}{8}. \text{ After the English and social studies books are taken, 8 books are left and 1 is an English book.}
\]

34 ANS:
\[
56. \text{ If the circumference of circle } O \text{ is } 16\pi \text{ inches, the diameter, } AD, \text{ is } 16 \text{ inches and the length of } BC \text{ is } 12 \text{ inches } \frac{3}{4} \times 16. \text{ The area of trapezoid } ABCD \text{ is } \frac{1}{2} \times 4(12 + 16) = 56.
\]

35 ANS:
\[
5,583.86. \quad A = P(1 + R)^t = 5000(1 + 0.0375)^3 \approx 5583.86
\]
36 ANS:

![Scatter Plot]

PTS: 3  REF: 060936ia  STA: A.S.8  TOP: Scatter Plots

37 ANS:

$$39, 63. \quad \tan 52 = \frac{50}{x}, \quad \sin 52 = \frac{50}{x}$$

$$x \approx 39 \quad x \approx 63$$

PTS: 4  REF: 060937ia  STA: A.A.44  TOP: Using Trigonometry to Find a Side

38 ANS:

![Frequency Histogram and Bar Graphs]

PTS: 4  REF: 060938ia  STA: A.S.5  TOP: Frequency Histograms, Bar Graphs and Tables

39 ANS:

![Quadratic-Linear System]

PTS: 4  REF: 060939ia  STA: A.G.9  TOP: Quadratic-Linear Systems
Answer Section

1 ANS: 2 PTS: 2 REF: 080901ia STA: A.A.4 top: Modeling Equations

2 ANS: 1 PTS: 2 REF: 080902ia STA: A.A.19 top: Factoring the Difference of Perfect Squares

3 ANS: 4 PTS: 2 REF: 080903ia STA: A.A.12 top: Multiplication of Powers

4 ANS: 1 
\[13.95 + 0.49s \leq 50.00\]
\[0.49s \leq 36.05\]
\[s \leq 73.57\]
PTS: 2 REF: 080904ia STA: A.A.6 top: Modeling Inequalities

5 ANS: 3 
\[(3 - 1) \times 2 \times 3 = 12\]
PTS: 2 REF: 080905ia STA: A.N.7 top: Conditional Probability

6 ANS: 1 
\[8^2 + 15^2 = c^2\]
\[c^2 = 289\]
\[c = 17\]
PTS: 2 REF: 080906ia STA: A.A.45 top: Pythagorean Theorem

7 ANS: 3 PTS: 2 REF: 080907ia STA: A.S.20 top: Theoretical Probability

8 ANS: 3
The number of correct answers on a test causes the test score.
PTS: 2 REF: 080908ia STA: A.S.13 top: Analysis of Data

9 ANS: 2 
\[\frac{3}{5}(x + 2) = x - 4\]
\[3(x + 2) = 5(x - 4)\]
\[3x + 6 = 5x - 20\]
\[26 = 2x\]
\[x = 13\]
PTS: 2 REF: 080909ia STA: A.A.25 top: Solving Equations with Fractional Expressions
10 ANS: 4
Surveying persons leaving a football game about a sports budget contains the most bias.

PTS: 2 REF: 080910ia STA: A.S.3 TOP: Analysis of Data

11 ANS: 1 PTS: 2 REF: 080911ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

12 ANS: 4
\[ A = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\} \]

PTS: 2 REF: 080912ia STA: A.A.30 TOP: Set Theory

13 ANS: 4
\[-2(x - 5) < 4\]
\[-2x + 10 < 4\]
\[-2x < -6\]
\[x > 3\]

PTS: 2 REF: 080913ia STA: A.A.21 TOP: Interpreting Solutions

14 ANS: 2
\[ \tan 32 = \frac{x}{25} \]
\[x \approx 15.6\]

PTS: 2 REF: 080914ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

15 ANS: 1
\[ m = \frac{4 - (-4)}{-5 - 15} = \frac{2}{5} \]

PTS: 2 REF: 080915ia STA: A.A.33 TOP: Slope

16 ANS: 2 PTS: 2 REF: 080916ia STA: A.G.8 TOP: Solving Quadratics by Graphing

17 ANS: 2
\[ \frac{2}{3x} + \frac{4}{3x} = \frac{9x + 8x}{6x^2} = \frac{17x}{6x^2} = \frac{17}{6x} \]

PTS: 2 REF: 080917ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

18 ANS: 1
\[ x^2 + 7x + 10 = 0 \]
\[(x + 5)(x + 2) = 0\]
\[x = -5 \text{ or } -2\]

PTS: 2 REF: 080918ia STA: A.A.15 TOP: Undefined Rationals
19 ANS: 3
An element of the domain, 1, is paired with two different elements of the range, 3 and 7.

PTS: 2 REF: 080919ia STA: A.G.3 TOP: Defining Functions

20 ANS: 1
\[x - 2y = 1\]
\[x + 4y = 7\]
\[-6y = -6\]
\[y = 1\]

PTS: 2 REF: 080920ia STA: A.A.10 TOP: Solving Linear Systems

21 ANS: 3
\[x^2 - 6x = 0\]
\[x(x - 6) = 0\]
\[x = 0 \quad x = 6\]

PTS: 2 REF: 080921ia STA: A.A.27 TOP: Solving Quadratics by Factoring

22 ANS: 2
\[5\sqrt{20} = 5\sqrt{4}\sqrt{5} = 10\sqrt{5}\]

PTS: 2 REF: 080922ia STA: A.N.2 TOP: Simplifying Radicals

23 ANS: 3
\[|-5(5) + 12| = |-13| = 13\]

PTS: 2 REF: 080923ia STA: A.N.6 TOP: Absolute Value

24 ANS: 1
PTS: 2 REF: 080924ia STA: A.G.1 TOP: Compositions of Polygons and Circles

25 ANS: 3
PTS: 2 REF: 080925ia STA: A.G.4 TOP: Identifying the Equation of a Graph

26 ANS: 2
\[\left|\frac{149.6 - 174.2}{149.6}\right| = 0.1644\]

PTS: 2 REF: 080926ia STA: A.M.3 TOP: Error

27 ANS: 4
\[y = mx + b\]
\[-1 = (2)(3) + b\]
\[b = -7\]

PTS: 2 REF: 080927ia STA: A.A.34 TOP: Writing Linear Equations
28 ANS: 4
Let $x =$ youngest brother and $x + 4 =$ oldest brother. $3x - (x + 4) = 48.$
$2x - 4 = 48$
$x = 26$

PTS: 2  REF: 080928ia  STA: A.A.6  TOP: Modeling Equations

29 ANS: 3
$500(1 + 0.06)^3 \approx 596$

PTS: 2  REF: 080929ia  STA: A.A.9  TOP: Exponential Functions

30 ANS: 2  PTS: 2  REF: 080930ia  STA: A.S.17  TOP: Scatter Plots

ANs:
Not all of the homework problems are equations. The first problem is an expression.

PTS: 2  REF: 080931ia  STA: A.A.3  TOP: Expressions

32 ANS:
$5112; \ (12 \times 30 \times 16) - (6 \times 12 \times 9) = 5112$

PTS: 2  REF: 080932ia  STA: A.G.2  TOP: Volume

33 ANS:
$\frac{3}{8}; \ (H,H,H), \ (H,H,T), \ (H,T,H), \ (H,T,T), \ (T,H,H), \ (T,H,T), \ (T,T,H), \ (T,T,T)$

PTS: 2  REF: 080933ia  STA: A.S.19  TOP: Sample Space

34 ANS:
$x = \frac{-b}{2a} = \frac{-(-8)}{2(-2)} = -2$
$(-2,11) . \ y = -2(-2)^2 - 8(-2) + 3 = 11$

PTS: 3  REF: 080934ia  STA: A.A.41  TOP: Identifying the Vertex of a Quadratic Given Equation

35 ANS:
$30.4\%; \ no, \ 23.3\% . \ \frac{7.50 - 5.75}{5.75} = 30.4\%. \ \frac{7.50 - 5.75}{7.50} = 23.3\%$

PTS: 3  REF: 080935ia  STA: A.N.5  TOP: Percents

36 ANS:
Greg’s rate of 5.5 is faster than Dave’s rate of 5.3. $\frac{\text{distance}}{\text{time}} = \frac{11}{2} = 5.5. \ \frac{16}{3} = 5.3$

PTS: 3  REF: 080936ia  STA: A.M.1  TOP: Speed
37 ANS:
\[
\frac{x - 7}{3x} \cdot \frac{2x^2 - 8x - 42}{6x^2} \div \frac{x^2 - 9}{x^2 - 3x} = \frac{2(x^2 - 4x - 21)}{6x^2} \cdot \frac{x(x - 3)}{(x + 3)(x - 3)} = \frac{(x - 7)(x + 3)}{3x} \cdot \frac{1}{x + 3} = \frac{x - 7}{3x}
\]

PTS: 4    REF: 080937ia    STA: A.A.18    TOP: Multiplication and Division of Rationals

38 ANS:

PTS: 4    REF: 080938ia    STA: A.G.7    TOP: Solving Linear Systems

39 ANS:

PTS: 4    REF: 080939ia    STA: A.S.5    TOP: Box-and-Whisker Plots
0110ia

Answer Section

1 ANS: 1 PTS: 2 REF: 011001ia STA: A.S.6
TOP: Box-and-Whisker Plots

2 ANS: 2 PTS: 2 REF: 011002ia STA: A.S.20
TOP: Theoretical Probability

3 ANS: 2

\[1P + 2C = 5\]

\[1P + 4C = 6\]

\[2C = 1\]

\[C = 0.5\]

PTS: 2 REF: 011003ia STA: A.A.7 TOP: Writing Linear Systems

4 ANS: 1 PTS: 2 REF: 011004ia STA: A.A.31
TOP: Set Theory

5 ANS: 2 PTS: 2 REF: 011005ia STA: A.A.5
TOP: Modeling Inequalities

6 ANS: 2

\[R = 0.5^{d-1}\]

PTS: 2 REF: 011006ia STA: A.A.9 TOP: Exponential Functions

7 ANS: 4

\[A(-3,4) \text{ and } B(5,8). \ m = \frac{4 - 8}{-3 - 5} = \frac{-4}{-8} = \frac{1}{2}\]

PTS: 2 REF: 011007ia STA: A.A.33 TOP: Slope

8 ANS: 3

\[\cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{15}{17}\]

PTS: 2 REF: 011008ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

9 ANS: 2
Debbie failed to distribute the 3 properly.

PTS: 2 REF: 011009ia STA: A.A.22 TOP: Solving Equations

10 ANS: 1

\[-|a - b| = -|7 - (-3)| = -|-10| = -10\]

PTS: 2 REF: 011010ia STA: A.N.6 TOP: Absolute Value

11 ANS: 3

\[\frac{12x^3 - 6x^2 + 2x}{2x} = \frac{2x(6x^2 - 3x + 1)}{2x} = 6x^2 - 3x + 1\]

PTS: 2 REF: 011011ia STA: A.A.14 TOP: Rational Expressions
12. ANS: 2  PTS: 2  REF: 011012ia  STA: A.G.9
   TOP: Quadratic-Linear Systems

13. ANS: 3
   \[ m = \frac{7 - 3}{-3 - 3} = \frac{4}{-6} = \frac{2}{3} \]
   \[ y = mx + b \]
   \[ 3 = \frac{2}{3} (3) + b \]
   \[ 3 = -2 + b \]
   \[ 5 = b \]

   PTS: 2  REF: 011013ia  STA: A.A.35  TOP: Writing Linear Equations

14. ANS: 3
   Frequency is not a variable.

   PTS: 2  REF: 011014ia  STA: A.S.2  TOP: Analysis of Data

15. ANS: 2  PTS: 2  REF: 011015ia  STA: A.G.10
   TOP: Identifying the Vertex of a Quadratic Given Graph

16. ANS: 4  PTS: 2  REF: 011016ia  STA: A.A.23
   TOP: Transforming Formulas

17. ANS: 3  PTS: 2  REF: 011017ia  STA: A.G.5
   TOP: Graphing Quadratics

18. ANS: 4
   In (4), each element in the domain corresponds to a unique element in the range.

   PTS: 2  REF: 011018ia  STA: A.G.3  TOP: Defining Functions

19. ANS: 2  PTS: 2  REF: 011019ia  STA: A.S.12
   TOP: Scatter Plots

20. ANS: 4  PTS: 2  REF: 011020ia  STA: A.A.12
    TOP: Multiplication of Powers

21. ANS: 1
   \[ 4y - 2x = 0 \]
   \[ 4(-1) - 2(-2) = 0 \]
   \[ -4 + 4 = 0 \]

   PTS: 2  REF: 011021ia  STA: A.A.39  TOP: Identifying Points on a Line

22. ANS: 2  PTS: 2  REF: 011022ia  STA: A.A.19
    TOP: Factoring the Difference of Perfect Squares

23. ANS: 2  PTS: 2  REF: 011023ia  STA: A.A.40
    TOP: Systems of Linear Inequalities

24. ANS: 4
   \[ 6\sqrt{50} + 6\sqrt{2} = 6\sqrt{25 \cdot 2} + 6\sqrt{2} = 30\sqrt{2} + 6\sqrt{2} = 36\sqrt{2} \]

   PTS: 2  REF: 011024ia  STA: A.N.3  TOP: Operations with Radicals

25. ANS: 4  PTS: 2  REF: 011025ia  STA: A.A.17
    TOP: Addition and Subtraction of Rationals
26 ANS: 1
The slope of \(2x - 4y = 16\) is \(\frac{-A}{B} = \frac{-2}{-4} = \frac{1}{2}\).

PTS: 2       REF: 011026ia    STA: A.A.38    TOP: Parallel and Perpendicular Lines

27 ANS: 2     PTS: 2       REF: 011027ia    STA: A.A.3    TOP: Expressions

28 ANS: 4

\[
\frac{x + 2}{x - 2} = \frac{-3}{x}
\]

\[
x(x + 2) = -3(x - 2)
\]

\[
x^2 + 2x = -3x + 6
\]

\[
x^2 + 5x - 6 = 0
\]

\[
(x + 6)(x - 1) = 0
\]

\[
x = -6 \text{ or } 1
\]

PTS: 2       REF: 011028ia    STA: A.A.26    TOP: Solving Rationals

29 ANS: 4
SA = \(2lw + 2hw + 2lh = 2(2)(3) + 2(4)(3) + 2(2)(4) = 52\)

PTS: 2       REF: 011029ia    STA: A.G.2    TOP: Surface Area

30 ANS: 3
The age of a child does not cause the number of siblings he has, or vice versa.

PTS: 2       REF: 011030ia    STA: A.S.14    TOP: Analysis of Data

31 ANS:
16. 12 feet equals 4 yards. \(4 \times 4 = 16\).

PTS: 2       REF: 011031ia    STA: A.M.2    TOP: Conversions

32 ANS:
53. \(\sin A = \frac{16}{20}\)

\[
A \approx 53
\]

PTS: 2       REF: 011032ia    STA: A.A.43    TOP: Using Trigonometry to Find an Angle

33 ANS:
orchestra: \(\frac{3}{26} > \frac{4}{36}\)

PTS: 2       REF: 011033ia    STA: A.S.22    TOP: Theoretical Probability
34 ANS:
\(-2, 3\). \(x^2 - x = 6\)
\[x^2 - x - 6 = 0\]
\[(x - 3)(x + 2) = 0\]
\[x = 3 \text{ or } -2\]

PTS: 3  REF: 011034ia  STA: A.A.27  TOP: Solving Quadratics by Factoring

35 ANS:
81.3, 80, both increase

PTS: 3  REF: 011035ia  STA: A.S.16  TOP: Central Tendency

36 ANS:
\[
\frac{0.102}{5.3 \times 8.2 \times 4.1} = \frac{178.16 - 160}{178.16} = 0.102
\]

PTS: 3  REF: 011036ia  STA: A.M.3  TOP: Error

37 ANS:
15,600,000, 4,368,000. \(10 \times 10 \times 10 \times 26 \times 25 \times 24 = 15,600,000\). \(10 \times 9 \times 8 \times 26 \times 25 \times 24 = 11,232,000\).
15,600,000 - 11,232,000 = 4,368,000.

PTS: 4  REF: 011037ia  STA: A.N.8  TOP: Permutations

38 ANS:
\((1, -3)\) is in the solution set. \(4(1) - 3(-3) > 9\)
\[4 + 9 > 9\]

PTS: 4  REF: 011038ia  STA: A.G.6  TOP: Linear Inequalities
ANS:
6, 8, 10. Three consecutive even integers are $x$, $x + 2$ and $x + 4$. $(x + 2)(x + 4) = 10x + 20$

$$x^2 + 6x + 8 = 10x + 20$$

$$x^2 - 4x - 12 = 0$$

$(x - 6)(x + 2) = 0$

$$x = 6$$

PTS: 4       REF: 011039ia       STA: A.A.8       TOP: Writing Quadratics