

0610ia

- 1 Given: Set $U = \{S, O, P, H, I, A\}$

Set $B = \{A, I, O\}$

If set B is a subset of set U , what is the complement of set B ?

- 1) $\{O, P, S\}$
 - 2) $\{I, P, S\}$
 - 3) $\{A, H, P\}$
 - 4) $\{H, P, S\}$
- 2 How many different sandwiches consisting of one type of cheese, one condiment, and one bread choice can be prepared from five types of cheese, two condiments, and three bread choices?
- 1) 10
 - 2) 13
 - 3) 15
 - 4) 30

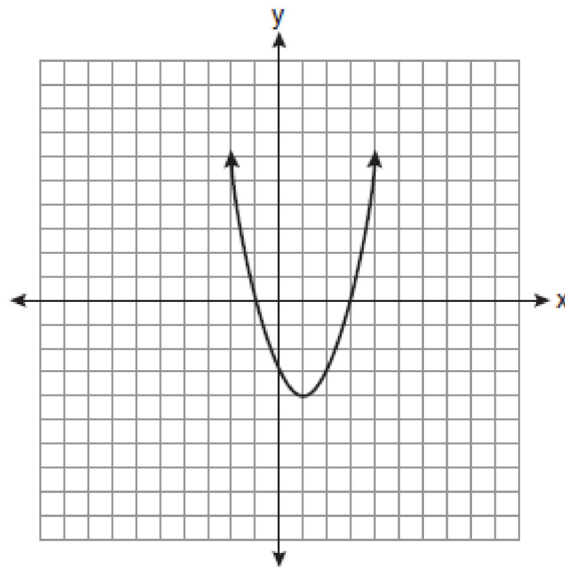
- 3 The sum of $4x^3 + 6x^2 + 2x - 3$ and

- $3x^3 + 3x^2 - 5x - 5$ is
- 1) $7x^3 + 3x^2 - 3x - 8$
 - 2) $7x^3 + 3x^2 + 7x + 2$
 - 3) $7x^3 + 9x^2 - 3x - 8$
 - 4) $7x^6 + 9x^4 - 3x^2 - 8$

- 4 What is the slope of the line that passes through the points $(3, 5)$ and $(-2, 2)$?

- 1) $\frac{1}{5}$
- 2) $\frac{3}{5}$
- 3) $\frac{5}{3}$
- 4) 5

- 5 What are the vertex and axis of symmetry of the parabola shown in the diagram below?



- 1) vertex: $(1, -4)$; axis of symmetry: $x = 1$
- 2) vertex: $(1, -4)$; axis of symmetry: $x = -4$
- 3) vertex: $(-4, 1)$; axis of symmetry: $x = 1$
- 4) vertex: $(-4, 1)$; axis of symmetry: $x = -4$

Integrated Algebra Regents Exam 0610

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- 6 Three high school juniors, Reese, Matthew, and Chris, are running for student council president. A survey is taken a week before the election asking 40 students which candidate they will vote for in the election. The results are shown in the table below.

Candidate's Name	Number of Students Supporting Candidate
Reese	15
Matthew	13
Chris	12

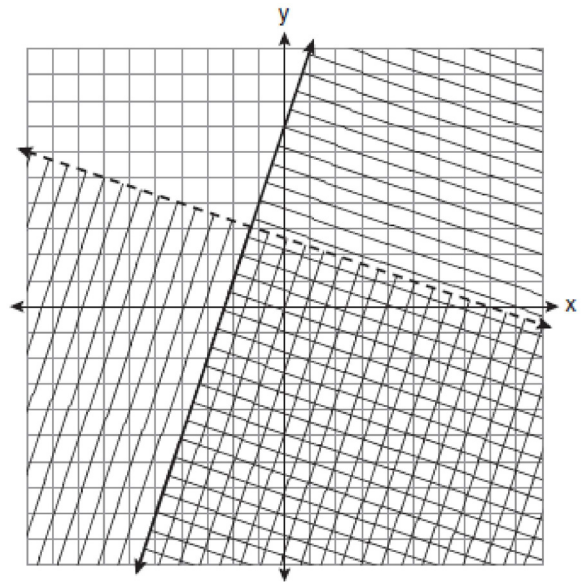
Based on the table, what is the probability that a student will vote for Reese?

- 1) $\frac{1}{3}$
 - 2) $\frac{3}{5}$
 - 3) $\frac{3}{8}$
 - 4) $\frac{5}{8}$
- 7 Which linear equation represents a line containing the point (1,3)?
- 1) $x + 2y = 5$
 - 2) $x - 2y = 5$
 - 3) $2x + y = 5$
 - 4) $2x - y = 5$
- 8 The expression $\sqrt{72} - 3\sqrt{2}$ written in simplest radical form is
- 1) $5\sqrt{2}$
 - 2) $3\sqrt{6}$
 - 3) $3\sqrt{2}$
 - 4) $\sqrt{6}$

- 9 In $\triangle ABC$, the measure of $\angle B = 90^\circ$, $AC = 50$, $AB = 48$, and $BC = 14$. Which ratio represents the tangent of $\angle A$?

- 1) $\frac{14}{50}$
- 2) $\frac{14}{48}$
- 3) $\frac{48}{50}$
- 4) $\frac{48}{14}$

- 10 Which ordered pair is in the solution set of the system of linear inequalities graphed below?



- 1) (1, -4)
- 2) (-5, 7)
- 3) (5, 3)
- 4) (-7, -2)

11 Which table does *not* show bivariate data?

1)

Height (inches)	Weight (pounds)
39	50
48	70
60	90

2)

Gallons	Miles Driven
15	300
20	400
25	500

3)

Quiz Average	Frequency
70	12
80	15
90	6

4)

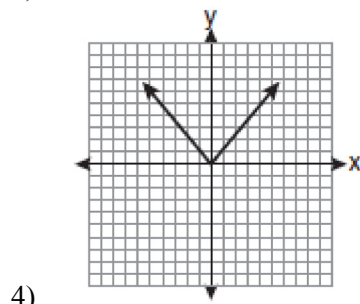
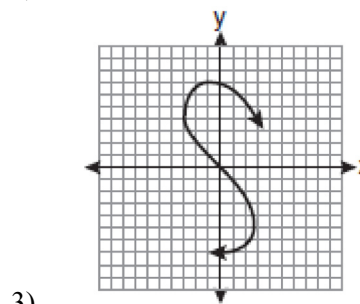
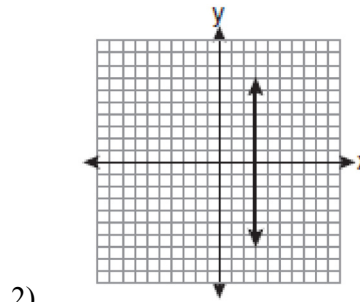
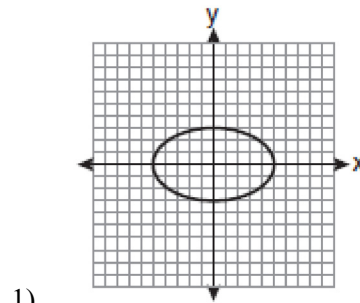
Speed (mph)	Distance (miles)
40	80
50	120
55	150

12 What is the solution of the system of equations

$$c + 3d = 8 \text{ and } c = 4d - 6?$$

- 1) $c = -14, d = -2$
- 2) $c = -2, d = 2$
- 3) $c = 2, d = 2$
- 4) $c = 14, d = -2$

13 Which graph represents a function?



14 The algebraic expression $\frac{x-2}{x^2-9}$ is undefined when

x is

- 1) 0
- 2) 2
- 3) 3
- 4) 9

- 15 The graphs of the equations $y = 2x - 7$ and $y - kx = 7$ are parallel when k equals
- 1) -2
 - 2) 2
 - 3) -7
 - 4) 7

- 16 Which verbal expression is represented by $\frac{1}{2}(n - 3)$?
- 1) one-half n decreased by 3
 - 2) one-half n subtracted from 3
 - 3) the difference of one-half n and 3
 - 4) one-half the difference of n and 3

- 17 The freshman class held a canned food drive for 12 weeks. The results are summarized in the table below.

Canned Food Drive Results

Week	1	2	3	4	5	6	7	8	9	10	11	12
Number of Cans	20	35	32	45	58	46	28	23	31	79	65	62

Which number represents the second quartile of the number of cans of food collected?

- 1) 29.5
 - 2) 30.5
 - 3) 40
 - 4) 60
- 18 Which expression represents $\frac{-14a^2c^8}{7a^3c^2}$ in simplest form?
- 1) $-2ac^4$
 - 2) $-2ac^6$
 - 3) $\frac{-2c^4}{a}$
 - 4) $\frac{-2c^6}{a}$

- 19 Which value of x is the solution of $\frac{x}{3} + \frac{x+1}{2} = x$?
- 1) 1
 - 2) -1
 - 3) 3
 - 4) -3

- 20 When 36 is subtracted from the square of a number, the result is five times the number. What is the positive solution?
- 1) 9
 - 2) 6
 - 3) 3
 - 4) 4

- 21 Which interval notation represents the set of all numbers greater than or equal to 5 and less than 12?
- 1) $[5, 12)$
 - 2) $(5, 12]$
 - 3) $(5, 12)$
 - 4) $[5, 12]$

- 22 Four hundred licensed drivers participated in the math club's survey on driving habits. The table below shows the number of drivers surveyed in each age group.

Ages of People in Survey on Driving Habits

Age Group	Number of Drivers
16–25	150
26–35	129
36–45	33
46–55	57
56–65	31

Which statement best describes a conclusion based on the data in the table?

- 1) It may be biased because no one younger than 16 was surveyed.
 - 2) It would be fair because many different age groups were surveyed.
 - 3) It would be fair because the survey was conducted by the math club students.
 - 4) It may be biased because the majority of drivers surveyed were in the younger age intervals.
- 23 A formula used for calculating velocity is

$v = \frac{1}{2}at^2$. What is a expressed in terms of v and t ?

- 1) $a = \frac{2v}{t}$
- 2) $a = \frac{2v}{t^2}$
- 3) $a = \frac{v}{t}$
- 4) $a = \frac{v}{2t^2}$

- 24 What is the sum of $\frac{-x+7}{2x+4}$ and $\frac{2x+5}{2x+4}$?

- 1) $\frac{x+12}{2x+4}$
- 2) $\frac{3x+12}{2x+4}$
- 3) $\frac{x+12}{4x+8}$
- 4) $\frac{3x+12}{4x+8}$

- 25 Steve ran a distance of 150 meters in $1\frac{1}{2}$ minutes.

What is his speed in meters per hour?

- 1) 6
- 2) 60
- 3) 100
- 4) 6,000

- 26 How many different three-letter arrangements can be formed using the letters in the word *ABSOLUTE* if each letter is used only once?

- 1) 56
- 2) 112
- 3) 168
- 4) 336

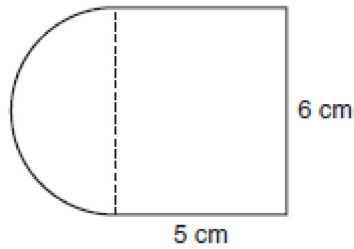
- 27 Factored completely, the expression $3x^2 - 3x - 18$ is equivalent to

- 1) $3(x^2 - x - 6)$
- 2) $3(x - 3)(x + 2)$
- 3) $(3x - 9)(x + 2)$
- 4) $(3x + 6)(x - 3)$

- 28 Which quadrant will be completely shaded in the graph of the inequality $y \leq 2x$?

- 1) Quadrant I
- 2) Quadrant II
- 3) Quadrant III
- 4) Quadrant IV

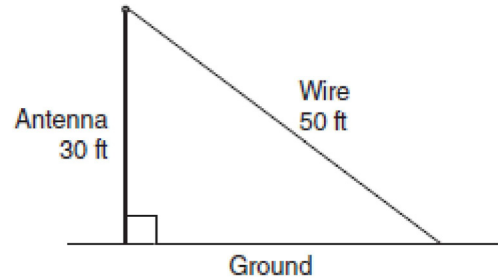
- 29 A figure is made up of a rectangle and a semicircle as shown in the diagram below.



What is the area of the figure, to the *nearest tenth* of a square centimeter?

- 1) 39.4
 - 2) 44.1
 - 3) 48.8
 - 4) 58.3
- 30 The value, y , of a \$15,000 investment over x years is represented by the equation $y = 15000(1.2)^{\frac{x}{3}}$. What is the profit (interest) on a 6-year investment?
- 1) \$6,600
 - 2) \$10,799
 - 3) \$21,600
 - 4) \$25,799
- 31 Alexis calculates the surface area of a gift box as 600 square inches. The actual surface area of the gift box is 592 square inches. Find the relative error of Alexis' calculation expressed as a decimal to the *nearest thousandth*.
- 32 Perform the indicated operation: $-6(a - 7)$
State the name of the property used.

- 33 A communications company is building a 30-foot antenna to carry cell phone transmissions. As shown in the diagram below, a 50-foot wire from the top of the antenna to the ground is used to stabilize the antenna.



Find, to the *nearest degree*, the measure of the angle that the wire makes with the ground.

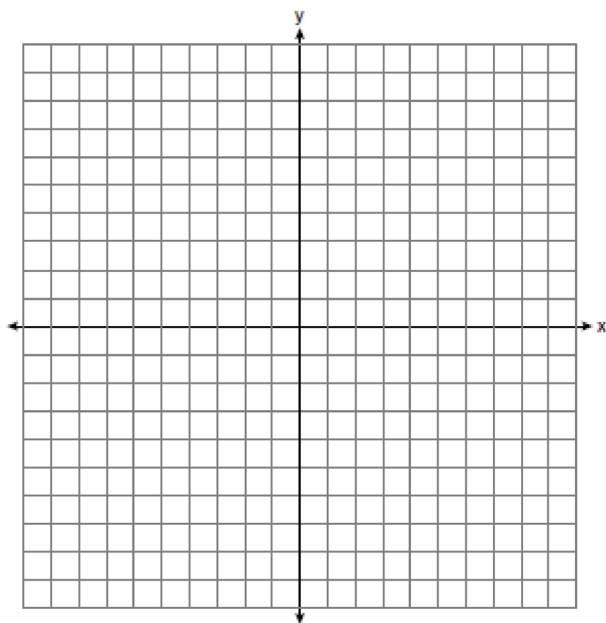
- 34 Given: $A = \{18, 6, -3, -12\}$
Determine all elements of set A that are in the solution of the inequality $\frac{2}{3}x + 3 < -2x - 7$.

- 35 Graph and label the following equations on the set of axes below.

$$y = |x|$$

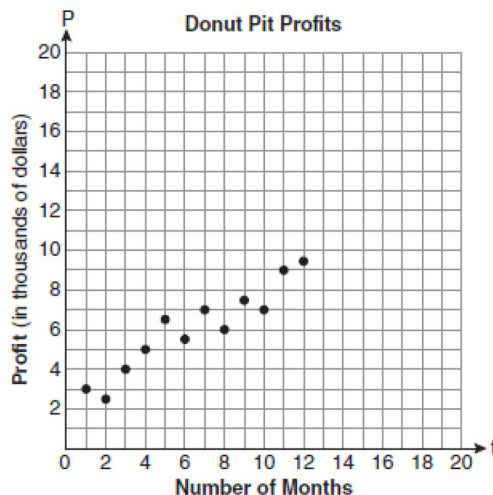
$$y = \left| \frac{1}{2}x \right|$$

Explain how *decreasing* the coefficient of x affects the graph of the equation $y = |x|$.



t (months)	P (profit, in thousands of dollars)
1	3.0
2	2.5
3	4.0
4	5.0
5	6.5
6	5.5
7	7.0
8	6.0
9	7.5
10	7.0
11	9.0
12	9.5

- 36 Megan and Bryce opened a new store called the Donut Pit. Their goal is to reach a profit of \$20,000 in their 18th month of business. The table and scatter plot below represent the profit, P , in thousands of dollars, that they made during the first 12 months.

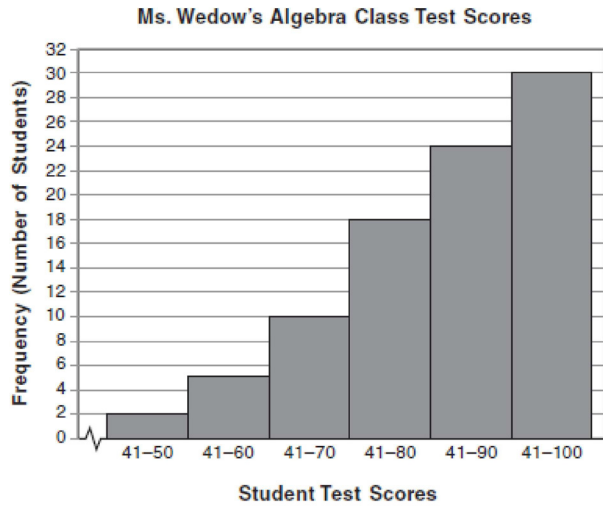


Draw a reasonable line of best fit. Using the line of best fit, predict whether Megan and Bryce will reach their goal in the 18th month of their business. Justify your answer.

- 37 Express in simplest form:

$$\frac{x^2 + 9x + 14}{x^2 - 49} \div \frac{3x + 6}{x^2 + x - 56}$$

- 38 The diagram below shows a cumulative frequency histogram of the students' test scores in Ms. Wedow's algebra class.

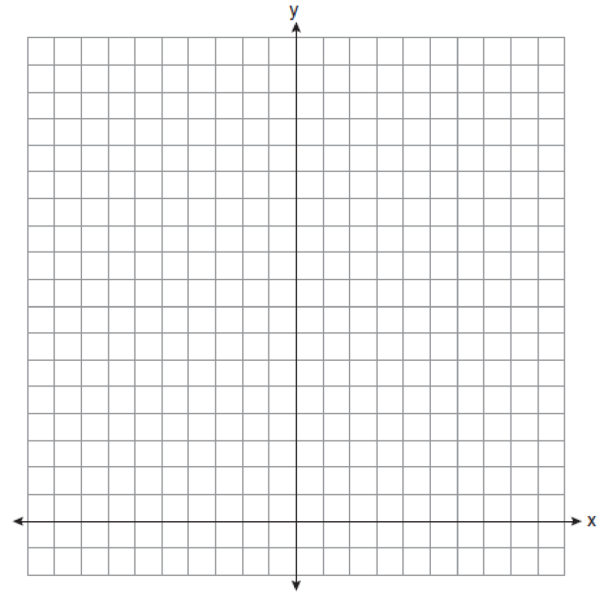


Determine the total number of students in the class. Determine how many students scored higher than 70. State which *ten-point interval* contains the median. State which *two ten-point intervals* contain the same frequency.

- 39 On the set of axes below, solve the following system of equations graphically for all values of x and y .

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

$$y = -2x + 4$$



0610ia
Answer Section

- 1 ANS: 4 PTS: 2 REF: 061001ia STA: A.A.30
TOP: Set Theory
- 2 ANS: 4
 $5 \times 2 \times 3 = 30$
- PTS: 2 REF: 061002ia STA: A.N.7 TOP: Multiplication Counting Principle
- 3 ANS: 3 PTS: 2 REF: 061003ia STA: A.A.13
TOP: Addition and Subtraction of Polynomials KEY: addition
- 4 ANS: 2
 $m = \frac{5-2}{3-(-2)} = \frac{3}{5}$
- PTS: 2 REF: 061004ia STA: A.A.33 TOP: Slope
- 5 ANS: 1 PTS: 2 REF: 061005ia STA: A.G.10
TOP: Identifying the Vertex of a Quadratic Given Graph
- 6 ANS: 3
 $\frac{15}{15+13+12} = \frac{15}{40} = \frac{3}{8}$
- PTS: 2 REF: 061006ia STA: A.S.21 TOP: Experimental Probability
- 7 ANS: 3
 $2(1)+3=5$
- PTS: 2 REF: 061007ia STA: A.A.39 TOP: Linear Equations
- 8 ANS: 3
 $\sqrt{72} - 3\sqrt{2} = \sqrt{36}\sqrt{2} - 3\sqrt{2} = 6\sqrt{2} - 3\sqrt{2} = 3\sqrt{2}$
- PTS: 2 REF: 061008ia STA: A.N.3 TOP: Operations with Radicals
KEY: subtraction
- 9 ANS: 2
 $\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{14}{48}$
- PTS: 2 REF: 061009ia STA: A.A.42 TOP: Trigonometric Ratios
- 10 ANS: 1 PTS: 2 REF: 061010ia STA: A.A.40
TOP: Systems of Linear Inequalities
- 11 ANS: 3 PTS: 2 REF: 061011ia STA: A.S.2
TOP: Analysis of Data

12 ANS: 3

$$c + 3d = 8 \quad c = 4d - 6$$

$$4d - 6 + 3d = 8 \quad c = 4(2) - 6$$

$$7d = 14 \quad c = 2$$

$$d = 2$$

PTS: 2

REF: 061012ia

STA: A.A.10

TOP: Solving Linear Systems

13 ANS: 4

PTS: 2

REF: 061013ia

STA: A.G.3

TOP: Defining Functions

14 ANS: 3

$$x^2 - 9 = 0$$

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

$$x = \pm 3$$

PTS: 2

REF: 061014ia

STA: A.A.15

TOP: Undefined Rationals

15 ANS: 2

$y - kx = 7$ may be rewritten as $y = kx + 7$

PTS: 2

REF: 061015ia

STA: A.A.38

TOP: Parallel and Perpendicular Lines

16 ANS: 4

PTS: 2

REF: 061016ia

STA: A.A.2

TOP: Expressions

17 ANS: 3

PTS: 2

REF: 061017ia

STA: A.S.11

TOP: Quartiles and Percentiles

18 ANS: 4

PTS: 2

REF: 061018ia

STA: A.A.12

TOP: Division of Powers

19 ANS: 3

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

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

$$5x + 3 = 6x$$

$$3 = x$$

PTS: 2

REF: 061019ia

STA: A.A.25

TOP: Solving Equations with Fractional Expressions

20 ANS: 1

$$x^2 - 36 = 5x$$

$$x^2 - 5x - 36 = 0$$

$$(x - 9)(x + 4) = 0$$

$$x = 9$$

PTS: 2

REF: 061020ia

STA: A.A.8

TOP: Writing Quadratics

- 21 ANS: 1 PTS: 2 REF: 061021ia STA: A.A.29
TOP: Set Theory
- 22 ANS: 4 PTS: 2 REF: 061022ia STA: A.S.3
TOP: Analysis of Data
- 23 ANS: 2 PTS: 2 REF: 061023ia STA: A.A.23
TOP: Transforming Formulas
- 24 ANS: 1 PTS: 2 REF: 061024ia STA: A.A.17
TOP: Addition and Subtraction of Rationals
- 25 ANS: 4
$$s = \frac{d}{t} = \frac{150 \text{ m}}{1.5 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = 6,000 \frac{\text{m}}{\text{hr}}$$
- PTS: 2 REF: 061025ia STA: A.M.1 TOP: Speed
- 26 ANS: 4
 ${}_8P_3 = 336$
- PTS: 2 REF: 061026ia STA: A.N.8 TOP: Permutations
- 27 ANS: 2 PTS: 2 REF: 061027ia STA: A.A.20
TOP: Factoring Polynomials
- 28 ANS: 4 PTS: 2 REF: 061028ia STA: A.G.6
TOP: Linear Inequalities
- 29 ANS: 2
$$A = lw + \frac{\pi r^2}{2} = 6 \cdot 5 + \frac{\pi \cdot 3^2}{2} \approx 44.1$$
- PTS: 2 REF: 061029ia STA: A.G.1 TOP: Compositions of Polygons and Circles
- 30 ANS: 1
$$15000(1.2)^{\frac{6}{3}} = 21,600. \quad 21,600 - 15,000 = 6,600$$
- PTS: 2 REF: 061030ia STA: A.A.9 TOP: Exponential Functions
- 31 ANS:
$$\frac{600 - 592}{592} \approx 0.014$$
- PTS: 2 REF: 061031ia STA: A.M.3 TOP: Relative Error
- 32 ANS:
-6a + 42. distributive
- PTS: 2 REF: 061032ia STA: A.N.1 TOP: Properties of Reals

33 ANS:

$$\sin x = \frac{30}{50}$$

$$x = \sin^{-1} \frac{3}{5}$$

$$x \approx 37$$

PTS: 2

REF: 061033ia

STA: A.A.43

TOP: Using Trigonometry to Find an Angle

34 ANS:

$$-12. 3 \left(\frac{2}{3}x + 3 < -2x - 7 \right)$$

$$x + 9 < -6x - 21$$

$$7x < -30$$

$$x < \frac{-30}{7}$$

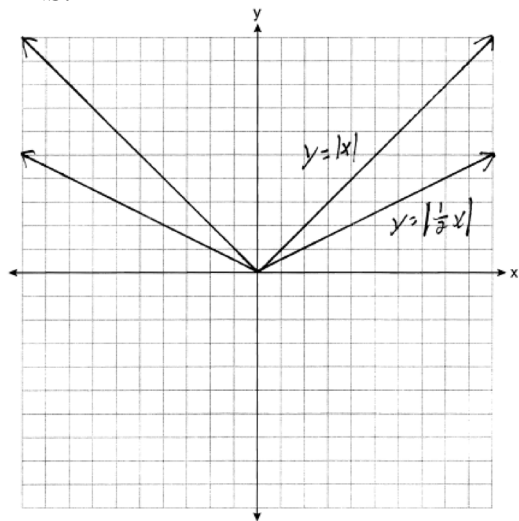
PTS: 3

REF: 061034ia

STA: A.A.21

TOP: Interpreting Solutions

35 ANS:



. Graph becomes wider as the coefficient approaches 0.

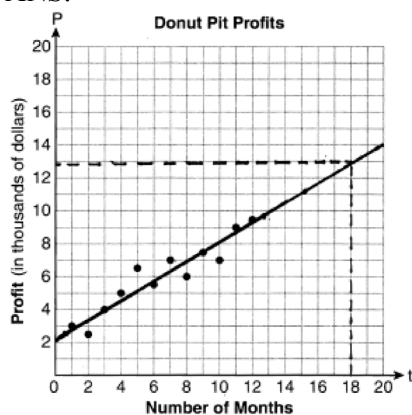
PTS: 3

REF: 061035ia

STA: A.G.5

TOP: Graphing Absolute Value Functions

36 ANS:



They will not reach their goal in 18 months.

PTS: 3 REF: 061036ia STA: A.S.17 TOP: Scatter Plots

37 ANS:

$$\frac{x^2 + 9x + 14}{x^2 - 49} \div \frac{3x + 6}{x^2 + x - 56} = \frac{(x + 7)(x + 2)}{(x + 7)(x - 7)} \cdot \frac{(x + 8)(x - 7)}{3(x + 2)} = \frac{x + 8}{3}$$

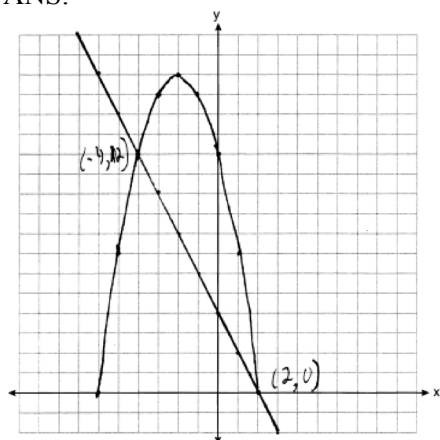
PTS: 4 REF: 061037ia STA: A.A.18 TOP: Multiplication and Division of Rationals

38 ANS:

30, 20, 71-80, 81-90 and 91-100

PTS: 4 REF: 061038ia STA: A.S.9
TOP: Frequency Histograms, Bar Graphs and Tables

39 ANS:



PTS: 4 REF: 061039ia STA: A.G.9 TOP: Quadratic-Linear Systems