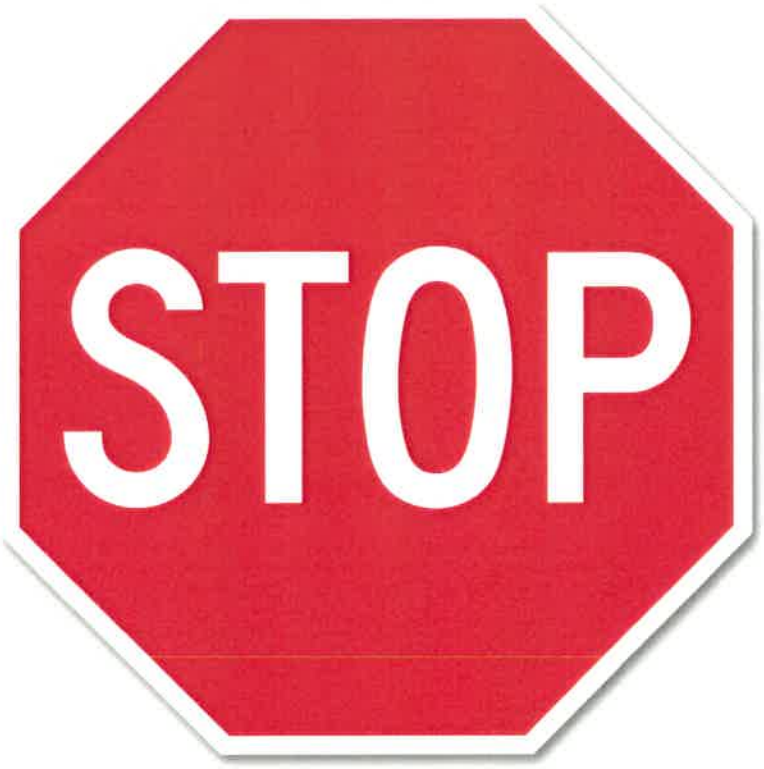
Post Algebra 2

Summer Homework

Name: _____



Please do not begin this packet until you have read the instructions! The instructions can be found in a separate link on the CSN website. Most importantly, please make sure you have read and understood what you will be turning in to your teacher and how you will be graded. ALL TEACHERS REQUIRE WORK TO BE SHOWN FOR ALL PROBLEMS. If you have questions about the Summer Math Homework, please contact your teacher or Ms. Cankar.

Ms. Cankar:
bcankar@communityschoolnaples.org

MATHEMATICS TEST

60 Minutes—60 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose, but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

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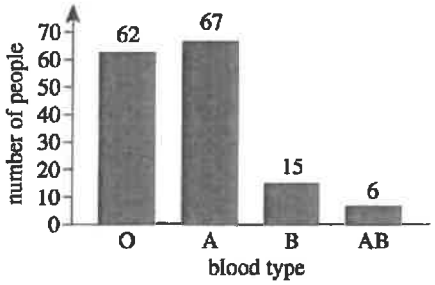
1. The blood types of 150 people were determined for a study as shown in the figure below.



If 1 person from this study is randomly selected, what is the probability that this person has either Type A or Type AB blood?

A. $\frac{62}{150}$

B. $\frac{66}{150}$

C. $\frac{68}{150}$

D. $\frac{73}{150}$

E. $\frac{84}{150}$

2. The monthly fees for single rooms at 5 colleges are \$370, \$310, \$380, \$340, and \$310, respectively. What is the mean of these monthly fees?

F. \$310
G. \$340
H. \$342
J. \$350
K. \$380

3. On a particular road map, $\frac{1}{2}$ inch represents 18 miles. About how many miles apart are 2 towns that are $2\frac{1}{2}$ inches apart on this map?

A. 18

B. $22\frac{1}{2}$

C. 36

D. 45

E. 90

4. Given $f = cd^3$, $f = 450$, and $d = 10$, what is c ?

F. 0.45
G. 4.5
H. 15
J. 45
K. 150

5. If $f(x) = (3x + 7)^2$, then $f(1) = ?$

A. 10
B. 16
C. 58
D. 79
E. 100

6. Jorge's current hourly wage for working at Denti Smiles is \$12.00. Jorge was told that at the beginning of next month, his new hourly wage will be an increase of 6% of his current hourly wage. What will be Jorge's new hourly wage?

F. \$12.06
G. \$12.60
H. \$12.72
J. \$18.00
K. \$19.20

7. The first term is 1 in the geometric sequence 1, –3, 9, –27, ···. What is the SEVENTH term of the geometric sequence?

A. –243
B. –30
C. 81
D. 189
E. 729

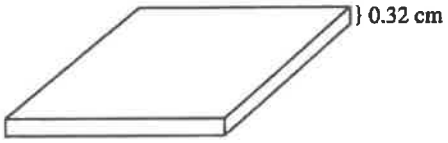
8. The shipping rate for customers of Ship Quick consists of a fee per box and a price per pound for each box. The table below gives the fee and the price per pound for customers shipping boxes of various weights.

Weight of box (pounds)	Fee	Price per pound
Less than 10	$ 5.00	$1.00
10–25	$10.00	$0.65
More than 25	$20.00	$0.30

Gregg wants Ship Quick to ship 1 box that weighs 15 pounds. What is the shipping rate for this box?

F. $ 9.75
G. $16.50
H. $19.75
J. $20.00
K. $24.50

9. A computer chip 0.32 cm thick is made up of layers of silicon. If the top and bottom layers are each 0.03 cm thick and the inner layers are each 0.02 cm thick, how many inner layers are there?



A. 13
B. 15
C. 16
D. 52
E. 64

10. The table below shows the number of cars Jing sold each month last year. What is the median of the data in the table?

Month	Number of cars sold
January	25
February	15
March	22
April	19
May	16
June	13
July	19
August	25
September	26
October	27
November	28
December	29

F. 13
G. 16
H. 19
J. 20.5
K. 23.5

11. Students studying motion observed a cart rolling at a constant rate along a straight line. The table below gives the distance, d feet, the cart was from a reference point at 1-second intervals from $t = 0$ seconds to $t = 5$ seconds.

t	0	1	2	3	4	5
d	14	20	26	32	38	44

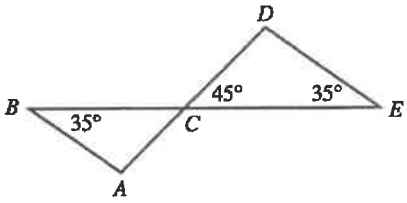
Which of the following equations represents this relationship between d and t?

A. $d = t + 14$
B. $d = 6t + 8$
C. $d = 6t + 14$
D. $d = 14t + 6$
E. $d = 34t$

12. The length of a rectangle with area 54 square centimeters is 9 centimeters. What is the perimeter of the rectangle, in centimeters?

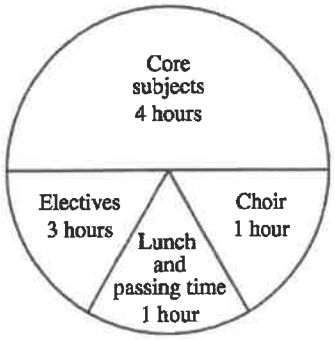
F. 6
G. 12
H. 15
J. 24
K. 30

13. In the figure below, C is the intersection of $\overline{AD}$ and $\overline{BE}$. If it can be determined, what is the measure of $\angle BAC$?



A. 80°
B. 100°
C. 110°
D. 115°
E. Cannot be determined from the given information

14. Antwan drew the circle graph below describing his time spent at school in 1 day. His teacher said that the numbers of hours listed were correct, but that the central angle measures for the sectors were not correct. What should be the central angle measure for the Core subjects sector?



F. 72°
G. 80°
H. 160°
J. 200°
K. 288°

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15. This month, Kami sold 70 figurines in 2 sizes. The large figurines sold for \$12 each, and the small figurines sold for \$8 each. The amount of money he received from the sales of the large figurines was equal to the amount of money he received from the sales of the small figurines. How many large figurines did Kami sell this month?

A. 20
B. 28
C. 35
D. 42
E. 50

16. A car accelerated from 88 feet per second (fps) to 220 fps in exactly 3 seconds. Assuming the acceleration was constant, what was the car's acceleration, in feet per second per second, from 88 fps to 220 fps ?

F. $\frac{1}{44}$
G. $29\frac{1}{3}$
H. 44
J. $75\frac{1}{3}$
K. $102\frac{2}{3}$

17. In a plane, the distinct lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at A, where A is between C and D. The measure of $\angle BAC$ is 47°. What is the measure of $\angle BAD$?

A. 43°
B. 47°
C. 94°
D. 133°
E. 137°

18. In which of the following are $\frac{1}{2}$, $\frac{5}{6}$, and $\frac{5}{8}$ arranged in ascending order?

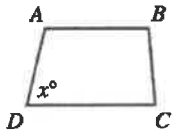
F. $\frac{1}{2} < \frac{5}{8} < \frac{5}{6}$
G. $\frac{5}{6} < \frac{1}{2} < \frac{5}{8}$
H. $\frac{5}{6} < \frac{5}{8} < \frac{1}{2}$
J. $\frac{5}{8} < \frac{1}{2} < \frac{5}{6}$
K. $\frac{5}{8} < \frac{5}{6} < \frac{1}{2}$

19. In scientific notation, 670,000,000 + 700,000,000 = ?

A. 1.37×10^{-9}
B. 1.37×10^{7}
C. 1.37×10^{8}
D. 1.37×10^{9}
E. 137×10^{15}

20. For trapezoid $ABCD$ shown below, $\overline{AB} \parallel \overline{DC}$, the measures of the interior angles are distinct, and the measure of $\angle D$ is $x°$. What is the degree measure of $\angle A$ in terms of x ?

F. $(180 - x)°$
G. $(180 - 0.5x)°$
H. $(180 + 0.5x)°$
J. $(180 + x)°$
K. $x°$



21. To get a driver's license, an applicant must pass a written test and a driving test. Past records show that 80% of the applicants pass the written test and 60% of those who have passed the written test pass the driving test. Based on these figures, how many applicants in a random group of 1,000 applicants would you expect to get driver's licenses?

A. 200
B. 480
C. 600
D. 750
E. 800

22. If a, b, and c are positive integers such that $a^b = x$ and $c^b = y$, then xy = ?

F. ac^b
G. ac^{2b}
H. $(ac)^b$
J. $(ac)^{2b}$
K. $(ac)^{b^2}$

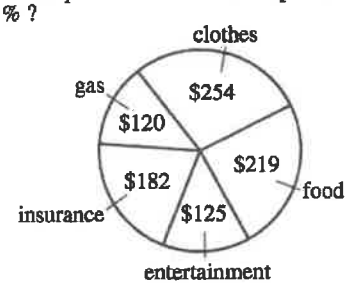
23. Which of the following expressions is equivalent to $\frac{1}{2}y^2(6x + 2y + 12x - 2y)$?

A. $9xy^2$
B. $18xy$
C. $3xy^2 + 12x$
D. $9xy^2 - 2y^3$
E. $3xy^2 + 12x - y^3 - 2y$

24. An artist makes a profit of $(500p - p^2)$ dollars from selling p paintings. What is the fewest number of paintings the artist can sell to make a profit of at least \$60,000 ?

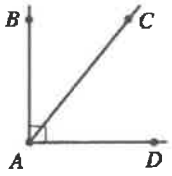
F. 100
G. 150
H. 200
J. 300
K. 600

25. Last month, Lucie had total expenditures of $900. The pie chart below breaks down these expenditures by category. The category in which Lucie's expenditures were greatest is what percent of her total expenditures, to the nearest 1% ?



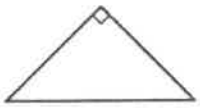
A. 24%
B. 28%
C. 32%
D. 34%
E. 39%

26. In the figure shown below, the measure of $\angle BAC$ is $(x + 20)°$ and the measure of $\angle BAD$ is 90°. What is the measure of $\angle CAD$?



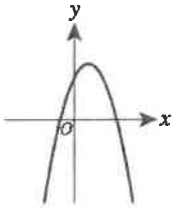
F. $(x - 70)°$
G. $(70 - x)°$
H. $(70 + x)°$
J. $(160 - x)°$
K. $(160 + x)°$

27. What is the perimeter, in inches, of the isosceles right triangle shown below, whose hypotenuse is $8\sqrt{2}$ inches long?



A. 8
B. $8 + 8\sqrt{2}$
C. $8 + 16\sqrt{2}$
D. 16
E. $16 + 8\sqrt{2}$

28. The equation $y = ax^2 + bx + c$ is graphed in the standard (x,y) coordinate plane below for real values of a, b, and c. When $y = 0$, which of the following best describes the solutions for x ?

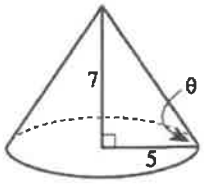


F. 2 distinct positive real solutions
G. 2 distinct negative real solutions
H. 1 positive real solution and 1 negative real solution
J. 2 real solutions that are not distinct
K. 2 distinct solutions that are not real

29. What is the product of the complex numbers $(-3i + 4)$ and $(3i + 4)$?

A. 1
B. 7
C. 25
D. $-7 + 24i$
E. $7 + 24i$

30. The radius of the base of the right circular cone shown below is 5 inches, and the height of the cone is 7 inches. Solving which of the following equations gives the measure, θ, of the angle formed by a slant height of the cone and a radius?



F. $\tan \theta = \frac{5}{7}$
G. $\tan \theta = \frac{7}{5}$
H. $\sin \theta = \frac{5}{7}$
J. $\sin \theta = \frac{7}{5}$
K. $\cos \theta = \frac{7}{5}$

31. To make a 750-piece jigsaw puzzle more challenging, a puzzle company includes 5 extra pieces in the box along with the 750 pieces, and those 5 extra pieces do not fit anywhere in the puzzle. If you buy such a puzzle box, break the seal on the box, and immediately select 1 piece at random, what is the probability that it will be 1 of the extra pieces?

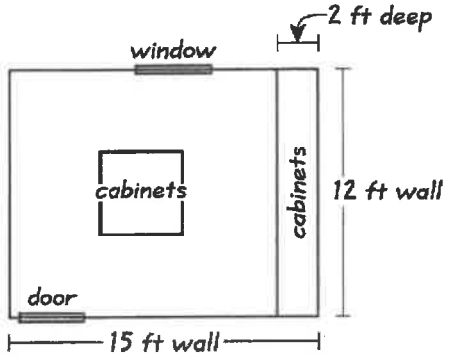
A. $\frac{1}{5}$
B. $\frac{1}{755}$
C. $\frac{1}{750}$
D. $\frac{5}{755}$
E. $\frac{5}{750}$

32. What fraction lies exactly halfway between $\frac{2}{3}$ and $\frac{3}{4}$?

F. $\frac{3}{5}$
G. $\frac{5}{6}$
H. $\frac{7}{12}$
J. $\frac{9}{16}$
K. $\frac{17}{24}$

Use the following information to answer questions 33–35.

Gianna is converting a 12-foot-by-15-foot room in her house to a craft room. Gianna will install tile herself but will have CC Installations build and install the cabinets. The scale drawing shown below displays the location of the cabinets in the craft room (0.25 inch represents 2 feet).



Cabinets will be installed along one of the 12-foot walls from floor to ceiling, and 4 cabinets that are each 3 feet tall will be installed in the middle of the room. These are the only cabinets that will be installed, and each of them will be 2 feet wide and 2 feet deep. CC Installations has given Gianna an estimate of $2,150.00 for building and installing the cabinets.

33. A 15-foot wall is how many inches long in the scale drawing?

A. 1.5
B. 1.875
C. 3
D. 3.375
E. 3.75

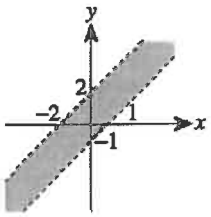
34. Gianna will install tile on the portion of the floor that will NOT be covered by cabinets. What is the area, in square feet, of the portion of the floor that will NOT be covered by cabinets?

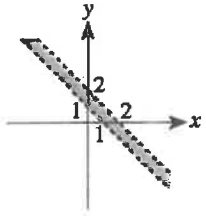
F. 72
G. 90
H. 140
J. 156
K. 164

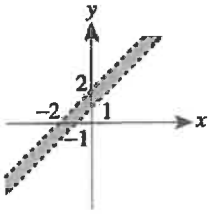
35. CC Installations' estimate consists of a $650.00 charge for labor, plus a fixed charge per cabinet. The labor charge and the charge per cabinet remain the same for any number of cabinets built and installed. CC Installations would give Gianna what estimate if the craft room were to have twice as many cabinets as Gianna is planning to have?

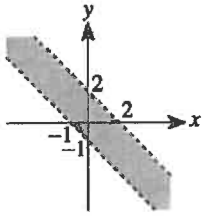
A. $2,800.00
B. $3,000.00
C. $3,450.00
D. $3,650.00
E. $4,300.00

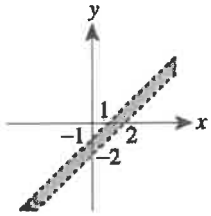
36. Which of the following is the graph of the region $1 < x + y < 2$ in the standard (x,y) coordinate plane?

F.


J.


G.


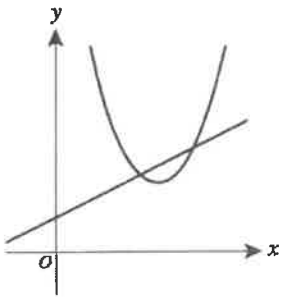
K.


H.


37. What is the difference between the mean and the median of the set {3, 8, 10, 15} ?

A. 0
B. 1
C. 4
D. 9
E. 12

38. Which of the following describes a true relationship between the functions $f(x) = (x-3)^2 + 2$ and $g(x) = \frac{1}{2}x + 1$ graphed below in the standard (x,y) coordinate plane?



F. $f(x) = g(x)$ for exactly 2 values of x
G. $f(x) = g(x)$ for exactly 1 value of x
H. $f(x) < g(x)$ for all x
J. $f(x) > g(x)$ for all x
K. $f(x)$ is the inverse of $g(x)$

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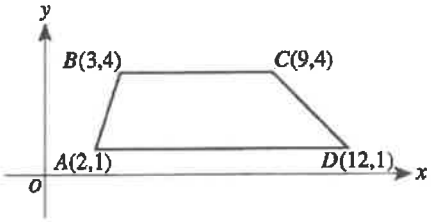
Use the following information to answer questions 39–41.

Trapezoid $ABCD$ is graphed in the standard (x,y) coordinate plane below.



39. What is the slope of $\overline{CD}$?

A. -3

B. -1

C. 1

D. $\frac{5}{21}$

E. $\frac{3}{2}$

40. When $ABCD$ is reflected over the y-axis to $A'B'C'D'$, what are the coordinates of D' ?

F. $(-12, 1)$
G. $(-12, -1)$
H. $(12, -1)$
J. $(1, 12)$
K. $(1, -12)$

41. Which of the following vertical lines cuts $ABCD$ into 2 trapezoids with equal areas?

A. $x = 2.5$
B. $x = 3.5$
C. $x = 4.5$
D. $x = 5.5$
E. $x = 6.5$

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42. Given $f(x) = x - \frac{1}{x}$ and $g(x) = \frac{1}{x}$, what is $f\left(g\left(\frac{1}{2}\right)\right)$?

F. -3

G. $-\frac{3}{2}$

H. $-\frac{2}{3}$

J. 0

K. $\frac{3}{2}$

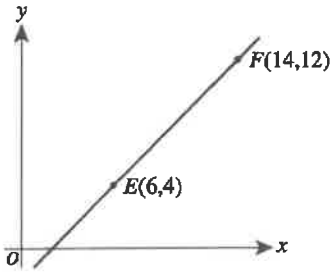
43. A formula to estimate the monthly payment, p dollars, on a short-term loan is

$$p = \frac{\frac{1}{2}ary + a}{12y}$$

where a dollars is the amount of the loan, r is the annual interest rate expressed as a decimal, and y years is the length of the loan. When a is multiplied by 2, what is the effect on p ?

A. p is divided by 6
B. p is divided by 2
C. p does not change
D. p is multiplied by 2
E. p is multiplied by 4

44. The points $E(6,4)$ and $F(14,12)$ lie in the standard (x,y) coordinate plane shown below. Point D lies on $\overline{EF}$ between E and F such that the length of $\overline{EF}$ is 4 times the length of $\overline{DE}$. What are the coordinates of D ?



F. $(7, 5)$
G. $(8, 6)$
H. $(8, 8)$
J. $(10, 8)$
K. $(12, 10)$

45. Given that $a\begin{bmatrix} 2 & 6 \\ 1 & 4 \end{bmatrix} = \begin{bmatrix} x & 27 \\ y & z \end{bmatrix}$ for some real number a, what is $x + z$?

A. $\frac{4}{3}$

B. $\frac{27}{2}$

C. 26

D. 27

E. 48

46. A container is $\frac{1}{8}$ full of water. After 10 cups of water are added, the container is $\frac{3}{4}$ full. What is the volume of the container, in cups?

F. $13\frac{1}{3}$

G. $13\frac{1}{2}$

H. 15

J. 16

K. 40

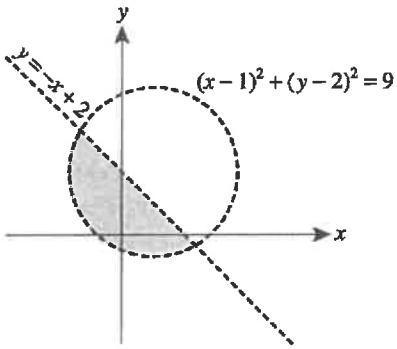
47. Only tenth-, eleventh-, and twelfth-grade students attend Washington High School. The ratio of tenth graders to the school's total student population is 86:255, and the ratio of eleventh graders to the school's total student population is 18:51. If 1 student is chosen at random from the entire school, which grade is that student most likely to be in?

A. Tenth
B. Eleventh
C. Twelfth
D. All grades are equally likely.
E. Cannot be determined from the given information

48. $\frac{4}{\sqrt{2}} + \frac{2}{\sqrt{3}} = ?$

F. $\frac{4\sqrt{3}+2\sqrt{2}}{\sqrt{5}}$
G. $\frac{4\sqrt{3}+2\sqrt{2}}{\sqrt{6}}$
H. $\frac{6}{\sqrt{2}+\sqrt{3}}$
J. $\frac{6}{\sqrt{5}}$
K. $\frac{8}{\sqrt{6}}$

49. The shaded region in the graph below represents the solution set to which of the following systems of inequalities?



A. $\begin{cases} y < -x+2 \\ (x-1)^2 + (y-2)^2 < 9 \end{cases}$
B. $\begin{cases} y > -x+2 \\ (x-1)^2 + (y-2)^2 < 9 \end{cases}$
C. $\begin{cases} y > -x+2 \\ (x-1)^2 + (y-2)^2 > 9 \end{cases}$
D. $\begin{cases} y < -x+2 \\ (x-1)^2 + (y-2)^2 > 9 \end{cases}$
E. $\begin{cases} (y-2) < 3 \\ (x-1) > 3 \end{cases}$

50. You can find the volume of an irregularly shaped solid object by completely submerging it in water and calculating the volume of water the object displaces. You completely submerge a solid object in a rectangular tank that has a base 40 centimeters by 30 centimeters and is filled with water to a depth of 20 centimeters. The object sinks to the bottom, and the water level goes up 0.25 centimeters. What is the volume, in cubic centimeters, of the object?

F. 300
G. 240
H. 200
J. 150
K. 75

51. If $x{:}y = 5{:}2$ and $y{:}z = 3{:}2$, what is the ratio of $x{:}z$?

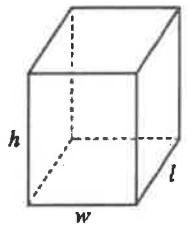
A. 3:1
B. 3:5
C. 5:3
D. 8:4
E. 15:4

52. Which of the following is the solution statement for the inequality shown below?

$$-5 < 1 - 3x < 10$$

F. $-5 < x < 10$
G. $-3 < x$
H. $-3 < x < 2$
J. $-2 < x < 3$
K. $x < -3$ or $x > 2$

53. A formula for the surface area (A) of the rectangular solid shown below is $A = 2lw + 2lh + 2wh$ where l represents length; w, width; and h, height. By doubling each of the dimensions (l, w, and h), the surface area will be multiplied by what factor?



A. 2
B. 4
C. 6
D. 8
E. 12

54. A dog eats 7 cans of food in 3 days. At this rate, how many cans of food does the dog eat in $3 + d$ days?

F. $\frac{7}{3} + d$
G. $\frac{7}{3} + \frac{d}{3}$
H. $\frac{7}{3} + \frac{7}{3d}$
J. $7 + \frac{d}{3}$
K. $7 + \frac{7d}{3}$

55. Kelly asked 120 students questions about skiing. The results of the poll are shown in the table below.

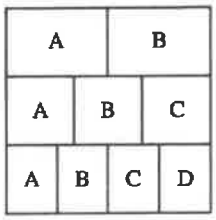
Question	Yes	No
1. Have you skied either cross-country or downhill?	65	55
2. If you answered Yes to Question 1, did you ski downhill?	28	37
3. If you answered Yes to Question 1, did you ski cross-country?	45	20

After completing the poll, Kelly wondered how many of the students polled had skied both cross-country *and* downhill. How many of the students polled indicated that they had skied both cross-country and downhill?

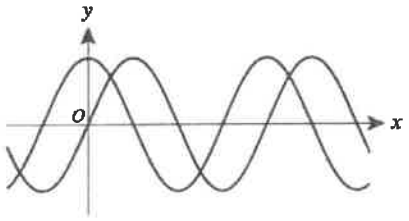
A. 73
B. 65
C. 47
D. 18
E. 8

56. The square below is divided into 3 rows of equal area. In the top row, the region labeled A has the same area as the region labeled B. In the middle row, the 3 regions have equal areas. In the bottom row, the 4 regions have equal areas. What fraction of the square's area is in a region labeled A ?

F. $\frac{1}{9}$
G. $\frac{3}{9}$
H. $\frac{6}{9}$
J. $\frac{13}{12}$
K. $\frac{13}{36}$



57. The functions $y = \sin x$ and $y = \sin(x + a) + b$, for constants a and b, are graphed in the standard (x,y) coordinate plane below. The functions have the same maximum value. One of the following statements about the values of a and b is true. Which statement is it?



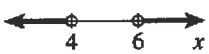
A. $a < 0$ and $b = 0$
B. $a < 0$ and $b > 0$
C. $a = 0$ and $b > 0$
D. $a > 0$ and $b < 0$
E. $a > 0$ and $b > 0$

58. Which of the following number line graphs shows the solution set to the inequality $|x - 5| < -1$?

F.


G.


H.


J.


K.


(empty set)

59. As part of a probability experiment, Elliott is to answer 4 multiple-choice questions. For each question, there are 3 possible answers, only 1 of which is correct. If Elliott randomly and independently answers each question, what is the probability that he will answer the 4 questions correctly?

A. $\frac{27}{81}$
B. $\frac{12}{81}$
C. $\frac{4}{81}$
D. $\frac{3}{81}$
E. $\frac{1}{81}$

60. The sides of an acute triangle measure 14 cm, 18 cm, and 20 cm, respectively. Which of the following equations, when solved for θ, gives the measure of the smallest angle of the triangle?

(Note: For any triangle with sides of length a, b, and c that are opposite angles A, B, and C, respectively, $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$ and $c^2 = a^2 + b^2 - 2ab\cos C$.)

F. $\frac{\sin\theta}{14} = \frac{1}{18}$
G. $\frac{\sin\theta}{14} = \frac{1}{20}$
H. $\frac{\sin\theta}{20} = \frac{1}{14}$
J. $14^2 = 18^2 + 20^2 - 2(18)(20)\cos\theta$
K. $20^2 = 14^2 + 18^2 - 2(14)(18)\cos\theta$

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

Name

Quiz

Class

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Summer HW ACT Section 2 (7480)

1	A	B	C	D	E	21	A	B	C	D	E	41	A	B	C	D	E
2	F	G	H	J	K	22	F	G	H	J	K	42	F	G	H	J	K
3	A	B	C	D	E	23	A	B	C	D	E	43	A	B	C	D	E
4	F	G	H	J	K	24	F	G	H	J	K	44	F	G	H	J	K
5	A	B	C	D	E	25	A	B	C	D	E	45	A	B	C	D	E
6	F	G	H	J	K	26	F	G	H	J	K	46	F	G	H	J	K
7	A	B	C	D	E	27	A	B	C	D	E	47	A	B	C	D	E
8	F	G	H	J	K	28	F	G	H	J	K	48	F	G	H	J	K
9	A	B	C	D	E	29	A	B	C	D	E	49	A	B	C	D	E
10	F	G	H	J	K	30	F	G	H	J	K	50	F	G	H	J	K
11	A	B	C	D	E	31	A	B	C	D	E	51	A	B	C	D	E
12	F	G	H	J	K	32	F	G	H	J	K	52	F	G	H	J	K
13	A	B	C	D	E	33	A	B	C	D	E	53	A	B	C	D	E
14	F	G	H	J	K	34	F	G	H	J	K	54	F	G	H	J	K
15	A	B	C	D	E	35	A	B	C	D	E	55	A	B	C	D	E
16	F	G	H	J	K	36	F	G	H	J	K	56	F	G	H	J	K
17	A	B	C	D	E	37	A	B	C	D	E	57	A	B	C	D	E
18	F	G	H	J	K	38	F	G	H	J	K	58	F	G	H	J	K
19	A	B	C	D	E	39	A	B	C	D	E	59	A	B	C	D	E
20	F	G	H	J	K	40	F	G	H	J	K	60	F	G	H	J	K

Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

Turn to Section 3 of your answer sheet to answer the questions in this section.

DIRECTIONS

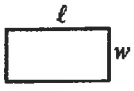
For questions 1-15, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 16-20,** solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 16 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

NOTES

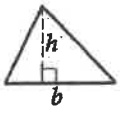
1. The use of a calculator **is not permitted.**
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

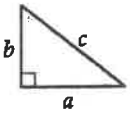
$A = \pi r^2$
$C = 2\pi r$



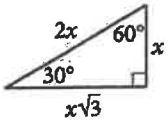
$A = \ell w$

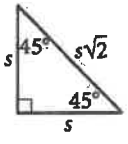


$A = \frac{1}{2}bh$

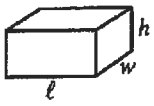


$c^2 = a^2 + b^2$

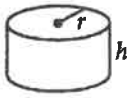




Special Right Triangles



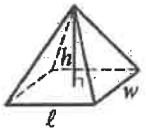
$V = \ell wh$



$V = \pi r^2 h$

$V = \frac{4}{3}\pi r^3$

$V = \frac{1}{3}\pi r^2 h$



$V = \frac{1}{3}\ell wh$

The number of degrees of arc in a circle is 360.
The number of radians of arc in a circle is 2π.
The sum of the measures in degrees of the angles of a triangle is 180.

CONTINUE

1

If $\frac{x-1}{3} = k$ and $k = 3$, what is the value of x ?

A) 2

B) 4

C) 9

D) 10

2

For $i = \sqrt{-1}$, what is the sum $(7 + 3i) + (-8 + 9i)$?

A) $-1 + 12i$

B) $-1 - 6i$

C) $15 + 12i$

D) $15 - 6i$

3

On Saturday afternoon, Armand sent m text messages each hour for 5 hours, and Tyrone sent p text messages each hour for 4 hours. Which of the following represents the total number of messages sent by Armand and Tyrone on Saturday afternoon?

A) $9mp$

B) $20mp$

C) $5m + 4p$

D) $4m + 5p$

4

Kathy is a repair technician for a phone company. Each week, she receives a batch of phones that need repairs. The number of phones that she has left to fix at the end of each day can be estimated with the equation $P = 108 - 23d$, where P is the number of phones left and d is the number of days she has worked that week. What is the meaning of the value 108 in this equation?

A) Kathy will complete the repairs within 108 days.

B) Kathy starts each week with 108 phones to fix.

C) Kathy repairs phones at a rate of 108 per hour.

D) Kathy repairs phones at a rate of 108 per day.

CONTINUE

5

$$(x^2y - 3y^2 + 5xy^2) - (-x^2y + 3xy^2 - 3y^2)$$

Which of the following is equivalent to the expression above?

A) $4x^2y^2$

B) $8xy^2 - 6y^2$

C) $2x^2y + 2xy^2$

D) $2x^2y + 8xy^2 - 6y^2$

6

$$h = 3a + 28.6$$

A pediatrician uses the model above to estimate the height h of a boy, in inches, in terms of the boy's age a, in years, between the ages of 2 and 5. Based on the model, what is the estimated increase, in inches, of a boy's height each year?

A) 3

B) 5.7

C) 9.5

D) 14.3

7

$$m = \frac{\left(\frac{r}{1{,}200}\right)\left(1 + \frac{r}{1{,}200}\right)^N}{\left(1 + \frac{r}{1{,}200}\right)^N - 1} P$$

The formula above gives the monthly payment m needed to pay off a loan of P dollars at r percent annual interest over N months. Which of the following gives P in terms of m, r, and N ?

A) $P = \frac{\left(\frac{r}{1{,}200}\right)\left(1 + \frac{r}{1{,}200}\right)^N}{\left(1 + \frac{r}{1{,}200}\right)^N - 1} m$

B) $P = \frac{\left(1 + \frac{r}{1{,}200}\right)^N - 1}{\left(\frac{r}{1{,}200}\right)\left(1 + \frac{r}{1{,}200}\right)^N} m$

C) $P = \left(\frac{r}{1{,}200}\right) m$

D) $P = \left(\frac{1{,}200}{r}\right) m$

CONTINUE

8

If $\frac{a}{b} = 2$, what is the value of $\frac{4b}{a}$?

A) 0
B) 1
C) 2
D) 4

9

$$3x + 4y = -23$$
$$2y - x = -19$$

What is the solution (x, y) to the system of equations above?

A) $(-5, -2)$
B) $(3, -8)$
C) $(4, -6)$
D) $(9, -6)$

10

$$g(x) = ax^2 + 24$$

For the function g defined above, a is a constant and $g(4) = 8$. What is the value of $g(-4)$?

A) 8
B) 0
C) -1
D) -8

11

$$b = 2.35 + 0.25x$$
$$c = 1.75 + 0.40x$$

In the equations above, b and c represent the price per pound, in dollars, of beef and chicken, respectively, x weeks after July 1 during last summer. What was the price per pound of beef when it was equal to the price per pound of chicken?

A) \$2.60
B) \$2.85
C) \$2.95
D) \$3.35

12

A line in the xy-plane passes through the origin and has a slope of $\frac{1}{7}$. Which of the following points lies on the line?

A) $(0, 7)$
B) $(1, 7)$
C) $(7, 7)$
D) $(14, 2)$

CONTINUE

13

If $x > 3$, which of the following is equivalent to $\dfrac{1}{\dfrac{1}{x+2}+\dfrac{1}{x+3}}$?

A) $\dfrac{2x+5}{x^2+5x+6}$

B) $\dfrac{x^2+5x+6}{2x+5}$

C) $2x+5$

D) x^2+5x+6

14

If $3x - y = 12$, what is the value of $\dfrac{8^x}{2^y}$?

A) 2^{12}

B) 4^4

C) 8^2

D) The value cannot be determined from the information given.

15

If $(ax+2)(bx+7) = 15x^2 + cx + 14$ for all values of x, and $a + b = 8$, what are the two possible values for c ?

A) 3 and 5

B) 6 and 35

C) 10 and 21

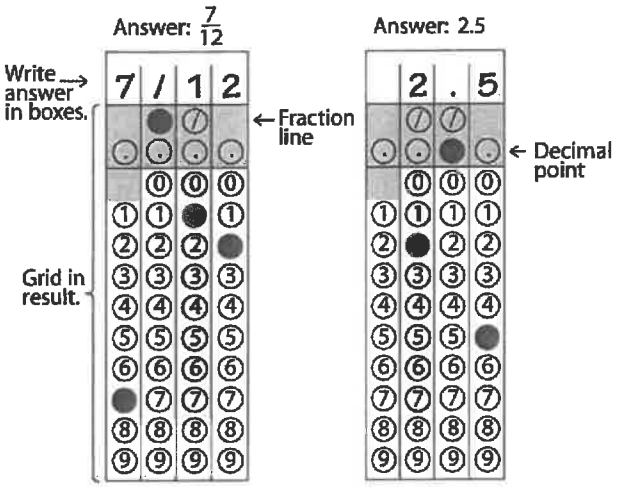
D) 31 and 41

CONTINUE

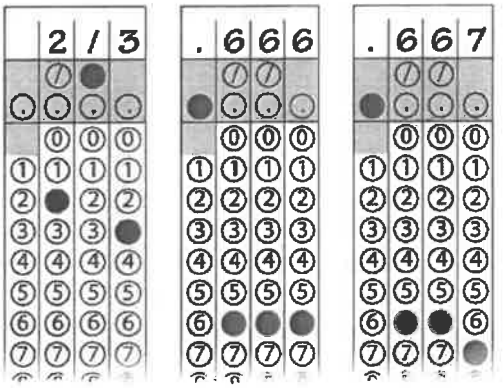
DIRECTIONS

For questions 16–20, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

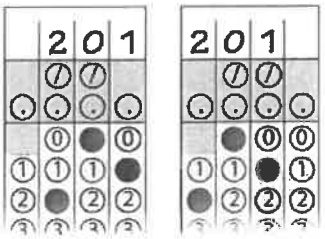
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If  is entered into the grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)
6. **Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.



Acceptable ways to grid $\frac{2}{3}$ are:



Answer: 201 – either position is correct



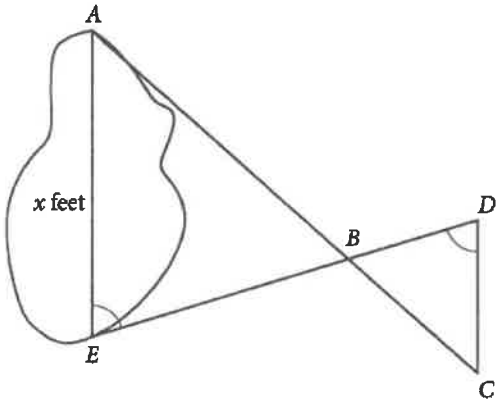
NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

CONTINUE

16

If $t > 0$ and $t^2 - 4 = 0$, what is the value of t ?

17



A summer camp counselor wants to find a length, x, in feet, across a lake as represented in the sketch above. The lengths represented by AB, EB, BD, and CD on the sketch were determined to be 1800 feet, 1400 feet, 700 feet, and 800 feet, respectively. Segments AC and DE intersect at B, and $\angle AEB$ and $\angle CDB$ have the same measure. What is the value of x ?

18

$$x + y = -9$$
$$x + 2y = -25$$

According to the system of equations above, what is the value of x ?

19

In a right triangle, one angle measures $x°$, where $\sin x° = \frac{4}{5}$. What is $\cos(90° - x°)$?

20

If $a = 5\sqrt{2}$ and $2a = \sqrt{2x}$, what is the value of x ?

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section.

Name | Quiz | Class

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1 (A) (B) (C) (D)
2 (A) (B) (C) (D)
3 (A) (B) (C) (D)
4 (A) (B) (C) (D)
5 (A) (B) (C) (D)
6 (A) (B) (C) (D)
7 (A) (B) (C) (D)
8 (A) (B) (C) (D)
9 (A) (B) (C) (D)
10 (A) (B) (C) (D)
11 (A) (B) (C) (D)
12 (A) (B) (C) (D)

16 | 18 | 20

16				18				20			
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0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
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4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9

Summer HW SAT Section 3 (0409)

13 (A) (B) (C) (D)
14 (A) (B) (C) (D)
15 (A) (B) (C) (D)

17				19			
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.	.	.	.	.	.	.	.
0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

No Test Material On This Page

Math Test – Calculator

55 MINUTES, 38 QUESTIONS

Turn to Section 4 of your answer sheet to answer the questions in this section.

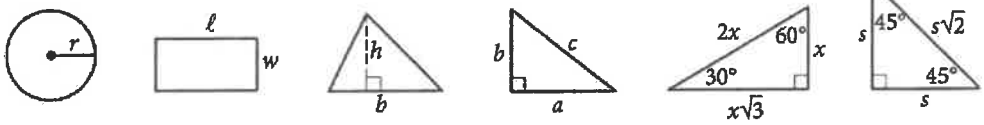
DIRECTIONS

For questions 1-30, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 31-38,** solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 31 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

NOTES

1. The use of a calculator **is permitted.**
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE



$A = \pi r^2$
$C = 2\pi r$

$A = \ell w$

$A = \frac{1}{2}bh$

$c^2 = a^2 + b^2$

Special Right Triangles

$V = \ell wh$

$V = \pi r^2 h$

$V = \frac{4}{3}\pi r^3$

$V = \frac{1}{3}\pi r^2 h$

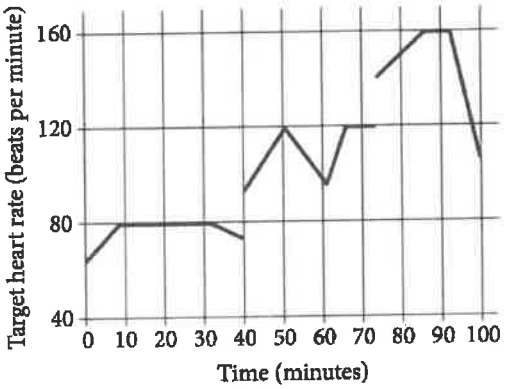
$V = \frac{1}{3}\ell wh$

The number of degrees of arc in a circle is 360.
The number of radians of arc in a circle is 2π.
The sum of the measures in degrees of the angles of a triangle is 180.

CONTINUE

1

John runs at different speeds as part of his training program. The graph shows his target heart rate at different times during his workout. On which interval is the target heart rate strictly increasing then strictly decreasing?



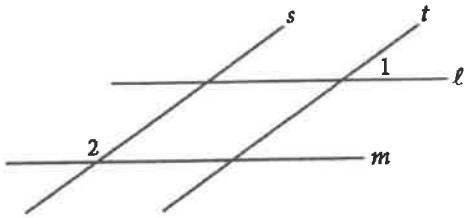
A) Between 0 and 30 minutes
B) Between 40 and 60 minutes
C) Between 50 and 65 minutes
D) Between 70 and 90 minutes

2

If $y = kx$, where k is a constant, and $y = 24$ when $x = 6$, what is the value of y when $x = 5$?

A) 6
B) 15
C) 20
D) 23

3



In the figure above, lines ℓ and m are parallel and lines s and t are parallel. If the measure of $\angle 1$ is 35°, what is the measure of $\angle 2$?

A) 35°
B) 55°
C) 70°
D) 145°

4

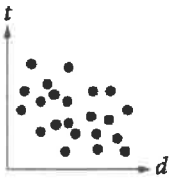
If $16 + 4x$ is 10 more than 14, what is the value of $8x$?

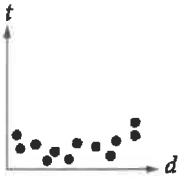
A) 2
B) 6
C) 16
D) 80

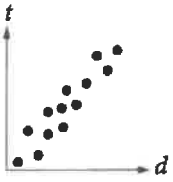
CONTINUE

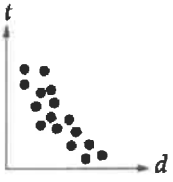
5

Which of the following graphs best shows a strong negative association between d and t ?

A) 

B) 

C) 

D) 

6

1 decagram = 10 grams
1,000 milligrams = 1 gram

A hospital stores one type of medicine in 2-decagram containers. Based on the information given in the box above, how many 1-milligram doses are there in one 2-decagram container?

A) 0.002

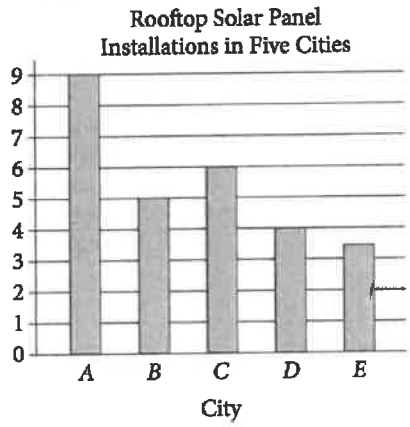
B) 200

C) 2,000

D) 20,000

CONTINUE

7



The number of rooftops with solar panel installations in 5 cities is shown in the graph above. If the total number of installations is 27,500, what is an appropriate label for the vertical axis of the graph?

A) Number of installations (in tens)

B) Number of installations (in hundreds)

C) Number of installations (in thousands)

D) Number of installations (in tens of thousands)

8

For what value of n is $|n-1|+1$ equal to 0 ?

A) 0

B) 1

C) 2

D) There is no such value of n.

CONTINUE

Questions 9 and 10 refer to the following information.

$$a = 1{,}052 + 1.08t$$

The speed of a sound wave in air depends on the air temperature. The formula above shows the relationship between a, the speed of a sound wave, in feet per second, and t, the air temperature, in degrees Fahrenheit (°F).

9

Which of the following expresses the air temperature in terms of the speed of a sound wave?

A) $t = \dfrac{a - 1{,}052}{1.08}$

B) $t = \dfrac{a + 1{,}052}{1.08}$

C) $t = \dfrac{1{,}052 - a}{1.08}$

D) $t = \dfrac{1.08}{a + 1{,}052}$

10

At which of the following air temperatures will the speed of a sound wave be closest to 1,000 feet per second?

A) −46°F

B) −48°F

C) −49°F

D) −50°F

11

Which of the following numbers is NOT a solution of the inequality $3x - 5 \geq 4x - 3$?

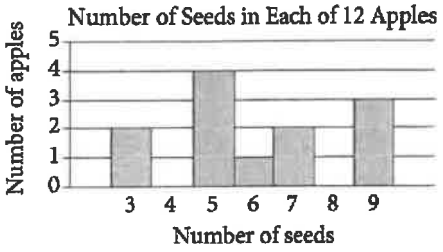
A) −1

B) −2

C) −3

D) −5

12



Based on the histogram above, of the following, which is closest to the average (arithmetic mean) number of seeds per apple?

A) 4

B) 5

C) 6

D) 7

CONTINUE

13

		Course			
		Algebra I	Geometry	Algebra II	Total
Gender	Female	35	53	62	150
	Male	44	59	57	160
	Total	79	112	119	310

A group of tenth-grade students responded to a survey that asked which math course they were currently enrolled in. The survey data were broken down as shown in the table above. Which of the following categories accounts for approximately 19 percent of all the survey respondents?

A) Females taking Geometry

B) Females taking Algebra II

C) Males taking Geometry

D) Males taking Algebra I

14

Lengths of Fish (in inches)						
8	9	9	9	10	10	11
11	12	12	12	12	13	13
13	14	14	15	15	16	24

The table above lists the lengths, to the nearest inch, of a random sample of 21 brown bullhead fish. The outlier measurement of 24 inches is an error. Of the mean, median, and range of the values listed, which will change the most if the 24-inch measurement is removed from the data?

A) Mean

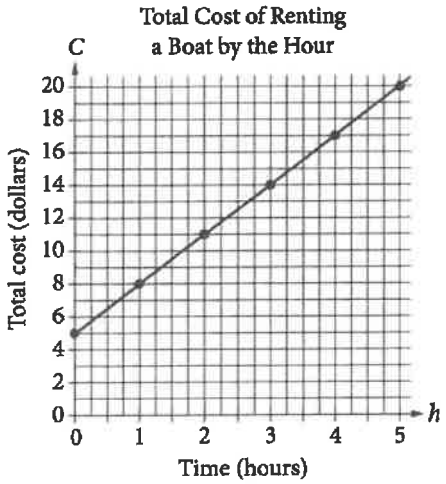
B) Median

C) Range

D) They will all change by the same amount.

CONTINUE

Questions 15 and 16 refer to the following information.



The graph above displays the total cost C, in dollars, of renting a boat for h hours.

15

What does the C-intercept represent in the graph?

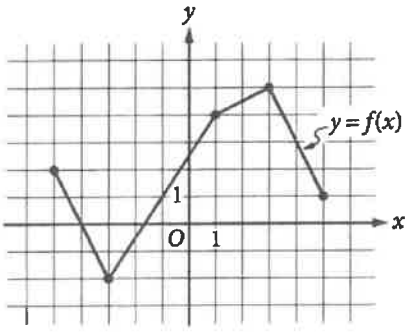
A) The initial cost of renting the boat
B) The total number of boats rented
C) The total number of hours the boat is rented
D) The increase in cost to rent the boat for each additional hour

16

Which of the following represents the relationship between h and C ?

A) $C = 5h$
B) $C = \frac{3}{4}h + 5$
C) $C = 3h + 5$
D) $h = 3C$

17



The complete graph of the function f is shown in the xy-plane above. For what value of x is the value of $f(x)$ at its minimum?

A) -5
B) -3
C) -2
D) 3

CONTINUE

18

$$y < -x + a$$
$$y > x + b$$

In the xy-plane, if $(0, 0)$ is a solution to the system of inequalities above, which of the following relationships between a and b must be true?

A) $a > b$

B) $b > a$

C) $|a| > |b|$

D) $a = -b$

19

A food truck sells salads for \$6.50 each and drinks for \$2.00 each. The food truck's revenue from selling a total of 209 salads and drinks in one day was \$836.50. How many salads were sold that day?

A) 77

B) 93

C) 99

D) 105

CONTINUE

20

Alma bought a laptop computer at a store that gave a 20 percent discount off its original price. The total amount she paid to the cashier was p dollars, including an 8 percent sales tax on the discounted price. Which of the following represents the original price of the computer in terms of p ?

A) $0.88p$

B) $\frac{p}{0.88}$

C) $(0.8)(1.08)p$

D) $\frac{p}{(0.8)(1.08)}$

21

Dreams Recalled during One Week

	None	1 to 4	5 or more	Total
Group X	15	28	57	100
Group Y	21	11	68	100
Total	36	39	125	200

The data in the table above were produced by a sleep researcher studying the number of dreams people recall when asked to record their dreams for one week. Group X consisted of 100 people who observed early bedtimes, and Group Y consisted of 100 people who observed later bedtimes. If a person is chosen at random from those who recalled at least 1 dream, what is the probability that the person belonged to Group Y ?

A) $\frac{68}{100}$

B) $\frac{79}{100}$

C) $\frac{79}{164}$

D) $\frac{164}{200}$

CONTINUE

Questions 22 and 23 refer to the following information.

Annual Budgets for Different Programs in Kansas, 2007 to 2010

Program	Year			
	2007	2008	2009	2010
Agriculture/natural resources	373,904	358,708	485,807	488,106
Education	2,164,607	2,413,984	2,274,514	3,008,036
General government	14,347,325	12,554,845	10,392,107	14,716,155
Highways and transportation	1,468,482	1,665,636	1,539,480	1,773,893
Human resources	4,051,050	4,099,067	4,618,444	5,921,379
Public safety	263,463	398,326	355,935	464,233

The table above lists the annual budget, in thousands of dollars, for each of six different state programs in Kansas from 2007 to 2010.

22

Which of the following best approximates the average rate of change in the annual budget for agriculture/natural resources in Kansas from 2008 to 2010?

A) $50,000,000 per year
B) $65,000,000 per year
C) $75,000,000 per year
D) $130,000,000 per year

23

Of the following, which program's ratio of its 2007 budget to its 2010 budget is closest to the human resources program's ratio of its 2007 budget to its 2010 budget?

A) Agriculture/natural resources
B) Education
C) Highways and transportation
D) Public safety

CONTINUE

24

Which of the following is an equation of a circle in the xy-plane with center $(0, 4)$ and a radius with endpoint $\left(\frac{4}{3}, 5\right)$?

A) $x^2 + (y-4)^2 = \frac{25}{9}$

B) $x^2 + (y+4)^2 = \frac{25}{9}$

C) $x^2 + (y-4)^2 = \frac{5}{3}$

D) $x^2 + (y+4)^2 = \frac{3}{5}$

25

$$h = -4.9t^2 + 25t$$

The equation above expresses the approximate height h, in meters, of a ball t seconds after it is launched vertically upward from the ground with an initial velocity of 25 meters per second. After approximately how many seconds will the ball hit the ground?

A) 3.5

B) 4.0

C) 4.5

D) 5.0

26

Katarina is a botanist studying the production of pears by two types of pear trees. She noticed that Type A trees produced 20 percent more pears than Type B trees did. Based on Katarina's observation, if the Type A trees produced 144 pears, how many pears did the Type B trees produce?

A) 115

B) 120

C) 124

D) 173

27

A square field measures 10 meters by 10 meters. Ten students each mark off a randomly selected region of the field; each region is square and has side lengths of 1 meter, and no two regions overlap. The students count the earthworms contained in the soil to a depth of 5 centimeters beneath the ground's surface in each region. The results are shown in the table below.

Region	Number of earthworms	Region	Number of earthworms
A	107	F	141
B	147	G	150
C	146	H	154
D	135	I	176
E	149	J	166

Which of the following is a reasonable approximation of the number of earthworms to a depth of 5 centimeters beneath the ground's surface in the entire field?

A) 150

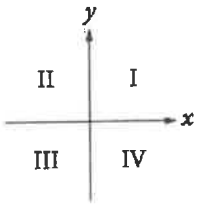
B) 1,500

C) 15,000

D) 150,000

CONTINUE

28



If the system of inequalities $y \geq 2x + 1$ and $y > \frac{1}{2}x - 1$ is graphed in the xy-plane above, which quadrant contains no solutions to the system?

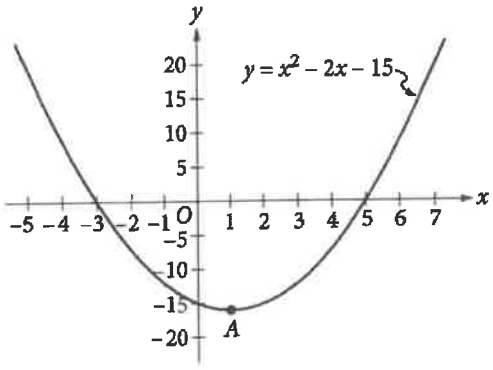
A) Quadrant II
B) Quadrant III
C) Quadrant IV
D) There are solutions in all four quadrants.

29

For a polynomial $p(x)$, the value of $p(3)$ is -2. Which of the following must be true about $p(x)$?

A) $x - 5$ is a factor of $p(x)$.
B) $x - 2$ is a factor of $p(x)$.
C) $x + 2$ is a factor of $p(x)$.
D) The remainder when $p(x)$ is divided by $x - 3$ is -2.

30



Which of the following is an equivalent form of the equation of the graph shown in the xy-plane above, from which the coordinates of vertex A can be identified as constants in the equation?

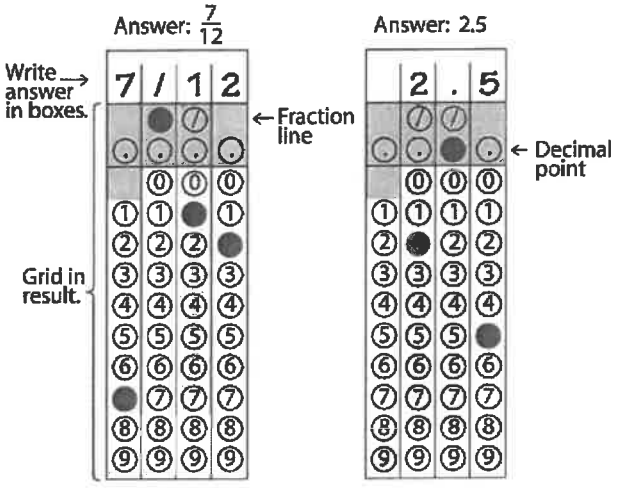
A) $y = (x + 3)(x - 5)$
B) $y = (x - 3)(x + 5)$
C) $y = x(x - 2) - 15$
D) $y = (x - 1)^2 - 16$

CONTINUE

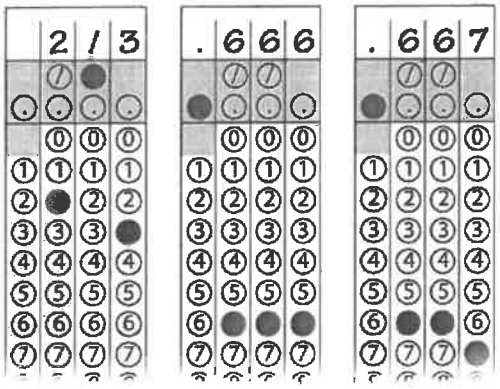
DIRECTIONS

For questions 31–38, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

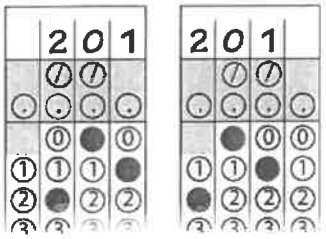
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If  is entered into the grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)
6. **Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.



Acceptable ways to grid $\frac{2}{3}$ are:



Answer: 201 – either position is correct



NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

CONTINUE

31

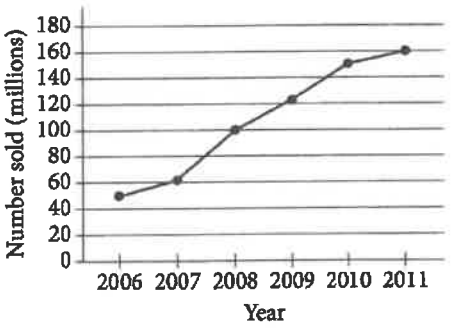
Wyatt can husk at least 12 dozen ears of corn per hour and at most 18 dozen ears of corn per hour. Based on this information, what is a possible amount of time, in hours, that it could take Wyatt to husk 72 dozen ears of corn?

32

The posted weight limit for a covered wooden bridge in Pennsylvania is 6000 pounds. A delivery truck that is carrying x identical boxes each weighing 14 pounds will pass over the bridge. If the combined weight of the empty delivery truck and its driver is 4500 pounds, what is the maximum possible value for x that will keep the combined weight of the truck, driver, and boxes below the bridge's posted weight limit?

33

Number of Portable Media Players Sold Worldwide Each Year from 2006 to 2011



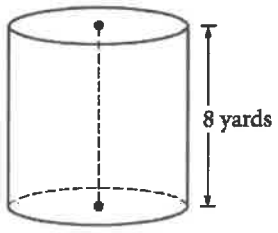
According to the line graph above, the number of portable media players sold in 2008 is what fraction of the number sold in 2011 ?

34

A local television station sells time slots for programs in 30-minute intervals. If the station operates 24 hours per day, every day of the week, what is the total number of 30-minute time slots the station can sell for Tuesday and Wednesday?

CONTINUE

35



A dairy farmer uses a storage silo that is in the shape of the right circular cylinder above. If the volume of the silo is 72π cubic yards, what is the diameter of the base of the cylinder, in yards?

36

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

For what value of x is the function h above undefined?

Questions 37 and 38 refer to the following information.

Jessica opened a bank account that earns 2 percent interest compounded annually. Her initial deposit was \$100, and she uses the expression $\$100(x)^t$ to find the value of the account after t years.

37

What is the value of x in the expression?

38

Jessica's friend Tyshaun found an account that earns 2.5 percent interest compounded annually. Tyshaun made an initial deposit of \$100 into this account at the same time Jessica made a deposit of \$100 into her account. After 10 years, how much more money will Tyshaun's initial deposit have earned than Jessica's initial deposit? (Round your answer to the nearest cent and ignore the dollar sign when gridding your response.)

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section.

Name

Quiz

Class

ZIPGRADE.COM

Summer HW SAT Section 4 (8200)

1 A B C D
2 A B C D
3 A B C D
4 A B C D
5 A B C D
6 A B C D
7 A B C D
8 A B C D
9 A B C D
10 A B C D
11 A B C D
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27 A B C D
28 A B C D
29 A B C D
30 A B C D
31
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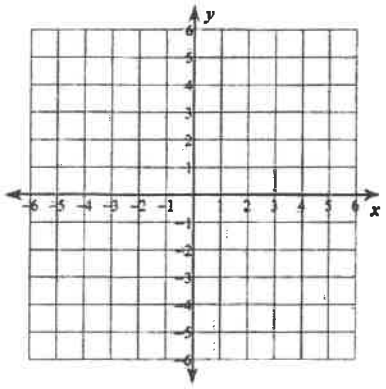
37
38

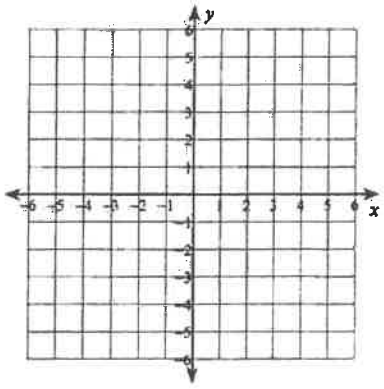
Review: Graphing and Writing Linear Equations

Sketch the graph of each line.

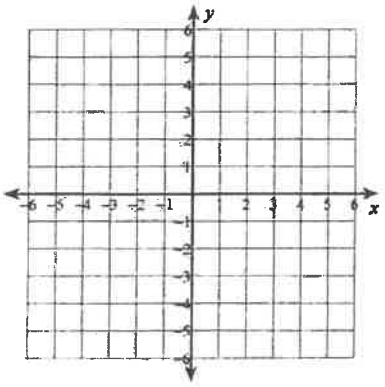
1) x-intercept $= -2$, y-intercept $= -4$



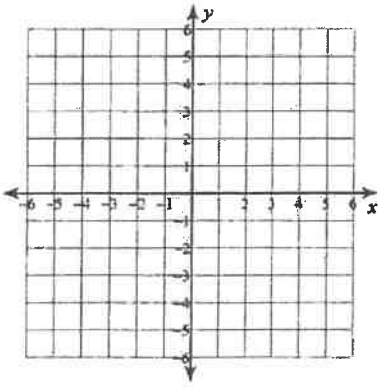
2) x-intercept $= -5$, y-intercept $= -5$



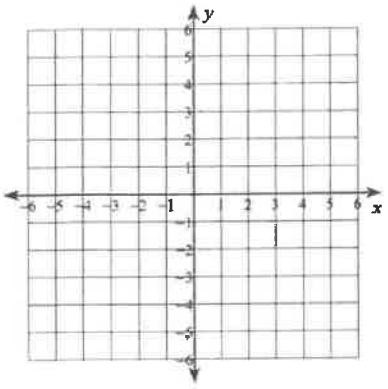
3) $x + 2y = -6$



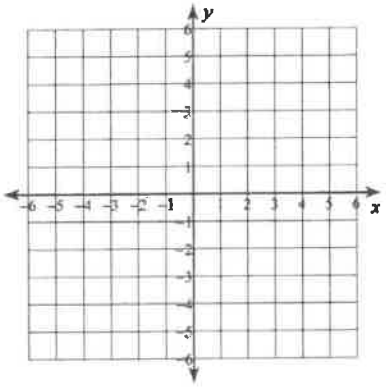
4) $y = -1$



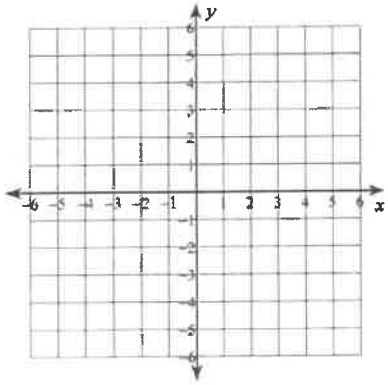
5) $y = 5x + 1$



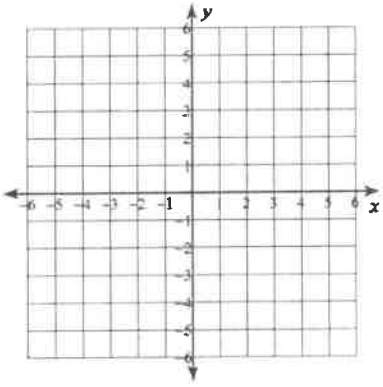
6) $y = -2x + 3$



7) $5y = 3x - 20$

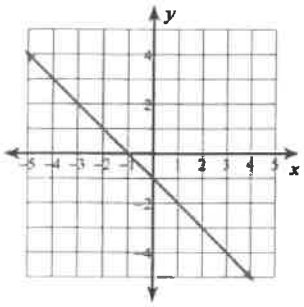


8) $-x = -1$

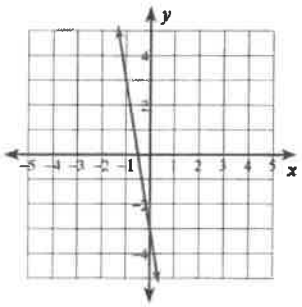


Write the slope-intercept form of the equation of each line.

9)

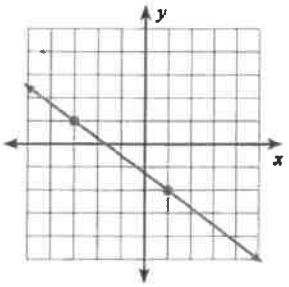


10)

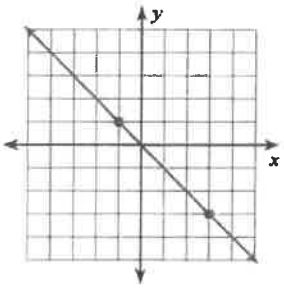


Find the slope of each line.

11)



12)



Find the slope of the line through each pair of points.

13) (14, 20), (19, 4)

14) (–14, 0), (–13, –20)

Write the slope-intercept form of the equation of each line.

15) $x + 8 = -2y$

16) $-9 = -x - 3y$

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

18) $y = \frac{2}{3}(x - 3)$

Write the slope-intercept form of the equation of each line given the slope and y-intercept.

19) Slope $= -\frac{5}{3}$, y-intercept = 4

20) Slope = 5, y-intercept = 5

Write the point-slope form of the equation of the line through the given point with the given slope.

21) through: $(-1, 3)$, slope = –2

22) through: $(2, -5)$, slope = –3

Write the slope-intercept form of the equation of the line through the given points.

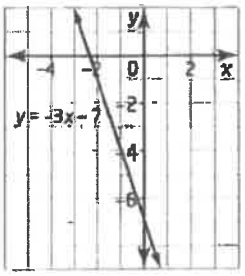
23) through: $(-4, 3)$ and $(-2, 3)$

24) through: $(5, 3)$ and $(-5, -4)$

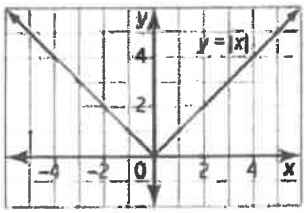
Functions, Domain, and Range - Worksheet

1) Which graphs represent functions? Justify your answer.

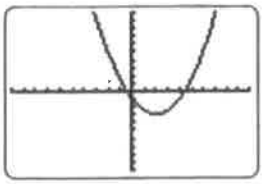
a)



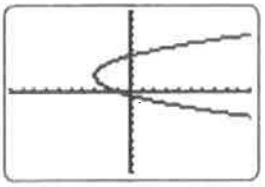
b)



c)



d)



2) Is each relation a function? Explain and make a rough sketch of the graph of each.

a) $y = x - 5$ **b)** $y = 2(x-1)^2 - 2$ **c)** $x^2 + y^2 = 4$

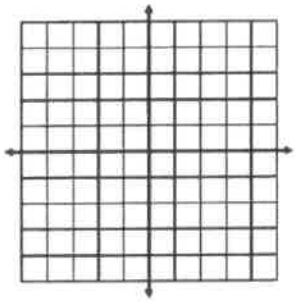
3) State the domain and range. Represent as a table and graph. Then state if it is a function.

a) {(-5, 4), (-4, -1), (-2, 1), (0, 4), (1, 3)}

x	y

Domain:

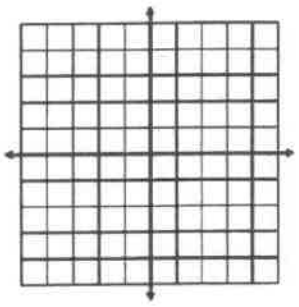
Range:



Is this relation a function?

b) {(-3, -4), (-1, 2), (0, 0), (-3, 5), (2, 4)}

x	y



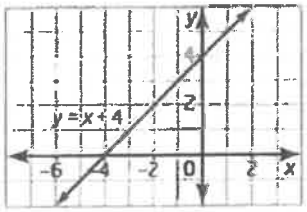
Domain:

Range:

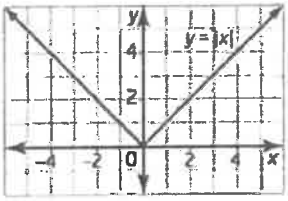
Is this relation a function?

4) State the domain and range of each relation. Then state if the relation is a function.

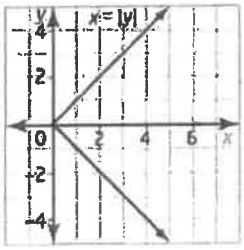
a)



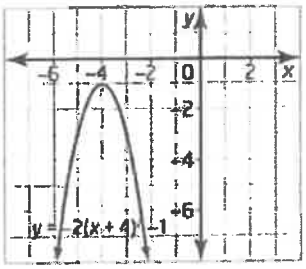
b)



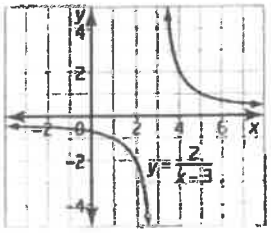
c)



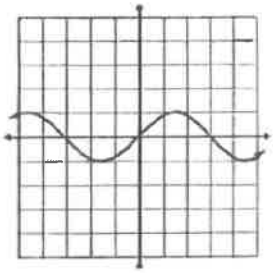
d)



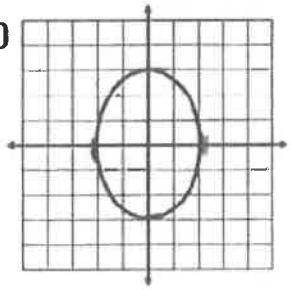
e)



f)



g)

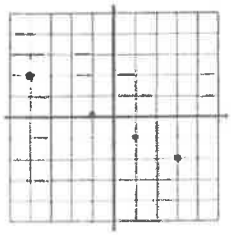


5) Which of the following relations are functions?

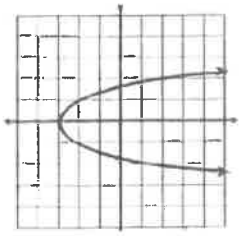
a)

x	y
2	−3
−1	0
5	5
3	2
2	1

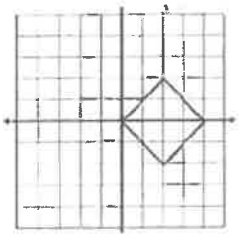
b)



c)



d)



6) Determine the domain and range of each of the following relations. Use a graphing calculator or a graphing app to help if necessary. Make a rough sketch of the graph.

a) $y = -x + 3$

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

c) $y = -3x^2 + 1$

d) $x^2 + y^2 = 9$

e) $y = \frac{1}{x+3}$

f) $y = \sqrt{2x + 1}$

Simplifying Radical Expressions

Simplify.

1) $\sqrt{125n}$

2) $\sqrt{216v}$

3) $\sqrt{512k^2}$

4) $\sqrt{512m^3}$

5) $\sqrt{216k^4}$

6) $\sqrt{100v^3}$

7) $\sqrt{80p^3}$

8) $\sqrt{45p^2}$

9) $\sqrt{147m^3n^3}$

10) $\sqrt{200m^4n}$

11) $\sqrt{75x^2y}$

12) $\sqrt{64m^3n^3}$

13) $\sqrt{16u^4v^3}$

14) $\sqrt{28x^3y^3}$

15) $\sqrt{36x^2y^3}$

16) $\sqrt{384x^4y^3}$

17) $7\sqrt{96m^3}$

18) $6\sqrt{72x^2}$

19) $-6\sqrt{150r}$

20) $5\sqrt{80a^2}$

21) $2\sqrt{125v}$

22) $-8\sqrt{24k^3}$

23) $-4\sqrt{192x}$

24) $2\sqrt{8p^2q^3r}$

25) $-4\sqrt{216x^2y^2z}$

26) $-3\sqrt{24a^4b^2c^3}$

27) $3\sqrt{16x^4y^4z}$

28) $-2\sqrt{48a^3b^4c^2}$

29) $6\sqrt{75mp^2q^3}$

30) $4\sqrt{36x^2y^3z^4}$

Factoring Practice

I. Greatest Common Factor (GCF)

Find the GCF of the numbers.

$$\begin{gathered}18,\ 30\\ 18 = 2\cdot 3\cdot 3\\ 30 = 2\cdot 3\cdot 5\\ 2\cdot 3 = 6\\ 6 = GCF\end{gathered}$$

1. 12, 18
2. 10, 35
3. 8, 30
4. 16, 24
5. 28, 49
6. 27, 63
7. 30, 45
8. 48, 72

II. Greatest Common Monomial Factor

Factor, write prime if prime.

$$12a^3b + 15ab^3 = 3ab(4a^2 + 5b^2)$$

1. $6x + 3$
2. $24x^2 - 8x$
3. $6x - 12$
4. $2x^2 + 8x$
5. $4x + 10$
6. $10x^2 + 35x$
7. $10x^2y - 15xy^2$
8. $12x^2 - 9x + 15$
9. $3n^3 - 12n^2 - 30n$
10. $9m^2 - 4n + 12$
11. $2x^3 - 3x^2 + 5x$
12. $13m + 26m^2 - 39m^3$
13. $17x^2 + 34x + 51$
14. $18m^2n^4 - 12m^2n^3 + 24m^2n^2$

III. Factoring the Difference of Two Squares

$$a^2 - 36 = (a + 6)(a - 6)$$
$$3x^2 - 48 = 3(x^2 - 16) = 3(x + 4)(x - 4)$$

Factor, write prime if prime.

1. $x^2 - 1$
2. $x^2 - 9$
3. $x^2 + 4$
4. $x^2 - 25$
5. $9y^2 - 16$
6. $4x^2 - 25$
7. $9x^2 - 1$
8. $a^2 - x^2$
9. $25 - m^2$
10. $x^2 - 16y^2$
11. $25m^2 - n^2$
12. $-x^2 + 16$
13. $36m^2 - 121$
14. $2x^2 - 8$
15. $25 + 4x^2$
16. $4a^2 - 81b^2$
17. $12x^2 - 75$
18. $a^2b - b^3$
19. $-98 + 2x^2$
20. $5x^2 - 45y^2$
21. $9x^4 - 4$
22. $16x^4 - y^2$

IV. Factoring Perfect Square Trinomials

$$x^2 - 14x + 49 = (x-7)^2$$

Factor, write prime if prime.

1. $x^2 + 8x + 16$
2. $x^2 - 16x + 64$
3. $y^2 + 12y + 36$
4. $a^2 - 10a + 25$
5. $16y^2 + 8y + 1$
11. $25a^2 + 60a + 36$
12. $16 + 40x + 25x^2$
13. $16x^2 + 24x + 9$
14. $49x^2 - 14x + 1$
15. $9y^2 - 30y + 25$
6. $9x^2 - 6x + 1$
7. $25x^2 + 10x + 1$
8. $n^2 - 14n + 49$
9. $81x^2 - 90x + 25$
10. $4y^2 - 20y + 25$
16. $n^2 + 2n + 4$
17. $b^2 + 2b + 1$
18. $36x^2 + 84x + 49$
19. $81 - 18x + x^2$
20. $4 - 12y + 9y^2$

V. Special Factoring - Challenge

Factor, write prime if prime.

1. $a^2 - 36$
2. $9x^2 - 49$
3. $169m^2 - 4u^2$
4. $x^2y^2 - 9z^4$
5. $\frac{1}{4}x^2 - 25y^2$
6. $\frac{1}{9}x^2 - 16$
7. $64 - a^4b^4$
8. $y^6 - 100$
9. $\frac{4}{9}x^2y^2 - \frac{25}{36}z^2$
10. $y^8 - 81$
11. $1 - 8u + 16u^2$
12. $a^2b^2 + 6ab + 9$
13. $x^2 + 2xy + y^2$
14. $4x^2 + 12xy + 9y^2$
15. $100h^2 + 20h + 1$
16. $9a^2 - 24a + 16$
17. $4a^3 + 8a^2 + 4a$
18. $5c + 20c^2 + 20c^3$
19. $(x+4)^2 - (y+1)^2$
20. $(x-1)^2 - 10(x-1) + 25$

VI. Factoring Trinomials: $x^2 + bx + c$

$$x^2 + 7x + 10 = (x)^2 + (2+5)x + (2)(5) = (x+2)(x+5)$$

Factor, write prime if prime.

1. $x^2 + 6x + 8$
2. $c^2 + 5c + 6$
3. $y^2 - 9y + 14$
4. $x^2 - 10x + 16$
5. $a^2 + 12a + 27$
6. $x^2 - 14x + 24$
7. $x^2 - 15x + 36$
8. $y^2 + 21y + 54$
9. $m^2 + 13m - 36$
10. $x^2 - 8x + 15$
11. $y^2 - 4y - 32$
12. $x^2 - x - 6$
13. $y^2 + 3y - 18$
14. $b^2 + 7b - 18$
15. $a^2 + a - 56$
16. $c^2 - 4c - 12$
17. $x^2 - 9x - 36$
18. $y^2 + 4y - 21$
19. $x^2 - 22x - 75$
20. $x^2 - 3x - 40$
21. $45 + 14y + y^2$
22. $x^2 - 13x + 36$

VII. ...More Factoring Trinomials: $x^2 + bx + c$

$$k^2 - k - 20 = (k)^2 + (4 + -5)k + (4)(-5) = (k+4)(k-5)$$

Factor, write prime if prime.

1. $x^2 + 7x + 12$
2. $m^2 + 10m + 21$
3. $y^2 - 7y - 8$
4. $x^2 - 6x + 5$
5. $x^2 + 4x - 32$
6. $x^2 - 2x - 15$
7. $x^2 - 6x + 8$
8. $y^2 + 9y + 18$
9. $3 - 4t + t^2$
10. $v^2 + 12v + 20$
11. $51 - 20k + k^2$
12. $a^2 - 14ab + 24b^2$
13. $y^2 + 6y - 72$
14. $x^2 - 11xy - 60y^2$
15. $15r^2 + 2rs - s^2$
16. $3x^2 + 21xy - 54y^2$ (Hint: Check for GCF)
17. $x^2 - 5xy - 6y^2$
18. $x^2 + 8xy + 12y^2$
19. $y^2 - 7xy + 10x^2$
20. $a^2 - 11ab - 60b^2$

VIII. Factoring Trinomials: $ax^2 + bx + c$

$$2x^2 - 5x - 3 = (2x+1)(x-3)$$

Factor, write prime if prime.

1. $2x^2 - 5x - 3$
2. $3x^2 + 10x - 8$
3. $2y^2 + 15y + 7$
4. $7a^2 - 11a + 4$
5. $5n^2 + 17n + 6$
6. $4y^2 + 8y + 3$
7. $3x^2 + 4x - 7$
8. $2x^2 + 13x + 15$
9. $9y^2 + 6y - 8$
10. $6x^2 - 7x - 20$
11. $2n^2 - 3n - 14$
12. $5n^2 + 2n + 7$
13. $10x^2 + 13x - 30$
14. $12y^2 + 7y + 1$
15. $2n^2 + 9n - 5$
16. $2x^2 + 7x + 6$
17. $5a^2 - 42a - 27$
18. $15x^2 - 28x - 32$
19. $8a^2 - 10a + 3$
20. $2y^2 - 3y - 20$

IX. ...More Factoring Trinomials: $ax^2 + bx + c$

Factor, write prime if prime.

1. $3x^2 + 4x + x$
2. $5z^2 + 7z + 2$
3. $2n^2 - 11n + 5$
4. $3z^2 + z - 2$
5. $5h^2 - 2h - 7$
6. $8s^2 - 10st + 3t^2$
7. $6x^2 + 19x + 15$
8. $28a^2 + 5ab - 12b^2$
9. $2a^2 + 7ab - 15b^2$
10. $12x^2 + 17x + 6$
11. $4a^2 - 4ab - 5b^2$
12. $56y^2 + 15y - 56$
13. $12x^2 - 29xy + 14y^2$
14. $64x^2 + 32xy - 21y^2$
15. $16x^2 + 56xy + 49y^2$
16. $18x^2 - 57x + 35$

X. Factoring: Putting It All Together

$$5x^2 + 20x - 60 = 5(x^2 + 4x - 12) = 5(x+6)(x-2)$$

Factor Completely, write prime if prime.

1. $2x^2 - 8$
2. $2x^2 + 8x + 6$
3. $3n^2 + 9n - 30$
4. $6x^2 - 26x - 20$
5. $2x^2 + 12x - 80$
6. $5t^2 + 15t + 10$
7. $8n^2 - 18$
8. $14x^2 + 7x - 21$
9. $4x^2 + 16x + 16$
10. $18x + 12x^2 + 2x^3$
11. $2x - 2xy^2$
12. $3t^3 - 27t$
13. $24a^2 - 30a + 9$
14. $10x^2 + 15x - 10$
15. $3x^2 - 42x + 147$
16. $4x^4 - 4x^2$

XI. ...More Factoring: Putting It All Together

1. $16x^2 - 40x - 24$
2. $27x^2 - 36x + 12$
3. $5x^2 - 60x - 140$
4. $6m^3 + 54m^2 - 6m$
5. $5k^4 + 8k^3 - 4k^2$
6. $x^2y^4 - x^6$
7. $y^4 - 6y^2 - 16$
8. $x^4 - 3x^2 - 4$
9. $h^2 - (a^2 - 6a + 9)$
10. $81x^4 - 16y^4$
11. $4mn^2 - 4m^2n^2 + m^3n^2$
12. $(2a+3)^2 - (a-1)^2$
13. $16d^8 - 8d^4 + 1$
14. $x^2(x^2-4) + 4x(x^2-4) + 4(x^2-4)$

XII. Extra: Factoring by Grouping

$$\begin{aligned} 6ax - 2b - 3a + 4bx &= 6ax - 3a + 4bx - 2b \\ &= 3a(2x-1) + 2b(2x-1) \\ &= (2x-1)(3a+2b) \end{aligned}$$

1. $x^2 + 2x + xy + 2y$
2. $3a^2 - 2b - 6a + ab$
3. $t^3 - t^2 + t - 1$ Hint: $t - 1 = 1(t-1)$
4. $10 + 2t - 5s - st$
5. $\frac{2}{3}bc - \frac{14}{3}b + c - 7$
6. $4u^2 + v + 2uv + 2u$
7. $ad + 3a - d^2 - 3d$
8. $n^2 + 2n + 3mn + 6m$
9. $2ax^2 + bx^2 - 2ay^2 - by^2$
10. $yz^2 - y^3 + z^3 - y^2z$
11. $y^3 - y^2 - 4y + 4$
12. $x^2a + x^2b - 16a - 16b$
13. $x^3 + x^2 - x - 1$
14. $a^3 - a^2 - 8a + 8$

Algebra Review Solving Quadratics

I. Solve by Factoring

1.) $x^2 - 64 = 0$

2.) $x^2 - 6x - 16 = 0$

3.) $x^2 + 3x = 40$

4.) $2x^2 + 3x + 1 = 0$

5.) $x^2 - 100 = 0$

6.) $x^2 + 6x = 0$

II. Solve by Square Roots

7.) $x^2 = 64$

8.) $4x^2 = 81$

9.) $x^2 + 7 = -300$

10.) $(x - 5)^2 = 36$

III. Solve by using the **quadratic formula:**

11. $x^2 + 3x + 2 = 0$

12. $4x^2 - 8x = 1$

13. $x^2 + 8x = 0$

Solve each equation any way you want. Show your work.

14. $x^2 + 11x + 18 = 0$

15. $x^2 + 2x + 1 = 15$

16. $7x^2 - 9x + 1 = 0$

17. $(x + 2)^2 = 36$

18. $x^2 - 10x + 25 = 0$

19. $x^2 + 3x + 7 = 0$

20. $x^2 = 36$ 21. $x^2 - 6x + 2 = 0$ 22. $x^2 - 5x + 4 = 0$

REASONING:

20.) Explain why $\mathbf{x^2 = -81}$ DOES NOT have a solution.

21.) Which method can't you use to solve this problem? $\mathbf{x^2 - 47 = 0}$

Circle one: Factoring Square Roots Quadratic Formula

Explain why:

22.) Which method can't you use to solve this problem? $x^2 + 7x = 0$

Circle one: Factoring Square Roots Quadratic Formula

Explain why:

23.) Which method can you use to solve all quadratic equations?

Circle one: Factoring Square Roots Quadratic Formula

Explain why:

24.) What are the **two mistakes** in setting up the quadratic formula:

Solve: $2x^2 - x - 6 = 0$ $x = \dfrac{-1 \pm \sqrt{(-1)^2 - 4(2)(6)}}{2(2)}$

EXERCISES

A. Solve by rewriting each side with the same base:

1) $2^x = 16$

2) $4^x = 128$

3) $3^x = 1$

4) $5^{x-2} = 1$

5) $2^{2x+3} - 1 = 0$

6) $9^{2-x} = 81^{6x}$

7) $5^x = \frac{1}{125}$

8) $5^{4x-7} = 125$

9) $4^{3x+5} = 16$

10) $4^x = 8^{x-1}$

11) $3^{2x^2} \cdot 3^{5x} = 27$

12) $2^{x^2} \cdot 2^{6x} = \frac{1}{32}$

B. Solve, and round to three decimal places when necessary:

1) $3^{4-x} - 7 = 74$

2) $2^x = 11$

3) $2^x = 44$

4) $2.8^x = 41$

5) $1.7^x = 20$

6) $2^{x+3} = 5$

7) $4^{2x-1} = 5^{x+2}$

8) $5^{2x+2} = 3^{5x-1}$

9) $3^{x-1} = 4 \cdot 5^{1-3x}$

10) $6^{x-1} = 3^{2x-3}$

C. Solve:

1) $\log (x - 1) = 2$

2) $\log x + \log (x + 9) = 1$

3) $\log (x - 9) + \log x = 1$

4) $\log (x + 3) - \log x = 1$

5) $\log (x + 4) - \log x = 2$

6) $\log (3x^2 + 2x - 4) = 0$

7) $\log (x + 3) = \log x + \log 3$

8) $-\log (x - 2) = 1 - \log (x^2 - 4)$

9) $\log_4 x = -\frac{3}{2}$

10) $(\log x)^2 - \log x^2 + 1 = 0$

11) $\log_3 \sqrt{x} = 1$

12) $4 \log \sqrt{x} - 5\sqrt{\log x} - 3 = 0$

13) $\log (x^2 - 1) = 1 + \log (x - 1)$

14) $\log_2 (2 - 2x) + \log_2 (1 - x) = 5$

15) $\log_x \frac{9}{4} = -\frac{2}{3}$

16) $\log_{x-1}(4x - 4) = 2$