

# **Post Analysis**

## **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.

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### 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.

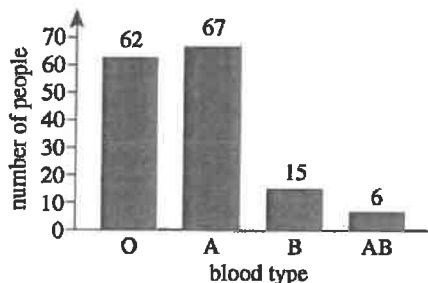
You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

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.

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

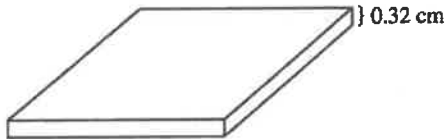
7. The first term is 1 in the geometric sequence 1, -3, 9, -27, ... What is the SEVENTH term of the geometric sequence?
- A. -243  
 B. -30  
 C. 81  
 D. 189  
 E. 729

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

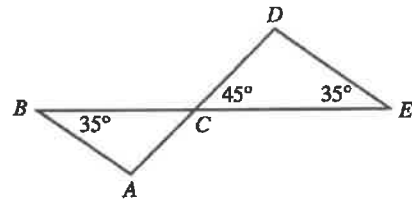
11. Students studying motion observed a cart rolling at a constant rate along a straight line. The table below gives the distance,  $d$  feet, the cart was from a reference point at 1-second intervals from  $t = 0$  seconds to  $t = 5$  seconds.

$t$	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.  $d = 34t$

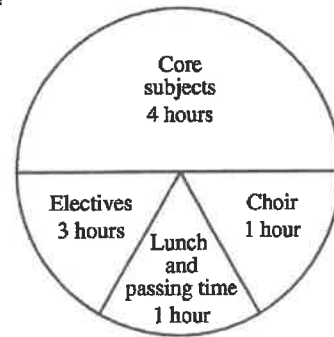
12. The length of a rectangle with area 54 square centimeters is 9 centimeters. What is the perimeter of the rectangle, in centimeters?
- F. 6  
 G. 12  
 H. 15  
 J. 24  
 K. 30

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.  $80^\circ$   
 B.  $100^\circ$   
 C.  $110^\circ$   
 D.  $115^\circ$   
 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.  $72^\circ$   
 G.  $80^\circ$   
 H.  $160^\circ$   
 J.  $200^\circ$   
 K.  $288^\circ$



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  $47^\circ$ . What is the measure of  $\angle BAD$ ?

- A.  $43^\circ$
- B.  $47^\circ$
- C.  $94^\circ$
- D.  $133^\circ$
- E.  $137^\circ$

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

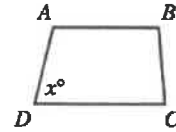
- F.  $\frac{1}{2} < \frac{5}{8} < \frac{5}{6}$
- G.  $\frac{5}{6} < \frac{1}{2} < \frac{5}{8}$
- H.  $\frac{5}{6} < \frac{5}{8} < \frac{1}{2}$
- J.  $\frac{5}{8} < \frac{1}{2} < \frac{5}{6}$
- K.  $\frac{5}{8} < \frac{5}{6} < \frac{1}{2}$

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

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

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  $x^\circ$ . What is the degree measure of  $\angle A$  in terms of  $x$ ?

- F.  $(180 - x)^\circ$
- G.  $(180 - 0.5x)^\circ$
- H.  $(180 + 0.5x)^\circ$
- J.  $(180 + x)^\circ$
- K.  $x^\circ$



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.  $(ac)^{b^2}$

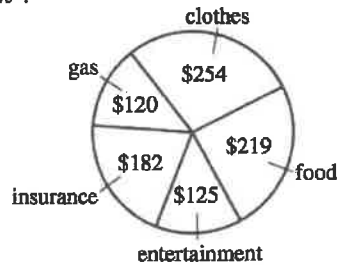
23. Which of the following expressions is equivalent to  $\frac{1}{2}y^2(6x + 2y + 12x - 2y)$ ?

- 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?

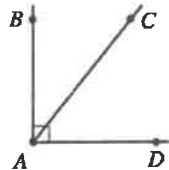
- F. 100
- G. 150
- H. 200
- J. 300
- K. 600

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  $(x + 20)^\circ$  and the measure of  $\angle BAD$  is  $90^\circ$ . What is the measure of  $\angle CAD$  ?



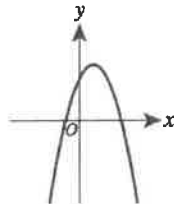
- F.  $(x - 70)^\circ$   
 G.  $(70 - x)^\circ$   
 H.  $(70 + x)^\circ$   
 J.  $(160 - x)^\circ$   
 K.  $(160 + x)^\circ$

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  $x$  ?

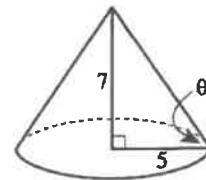


- F. 2 distinct positive real solutions  
 G. 2 distinct negative real solutions  
 H. 1 positive real solution and 1 negative real solution  
 J. 2 real solutions that are not distinct  
 K. 2 distinct solutions that are not real

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,  $\theta$ , 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  $\frac{3}{4}$  ?

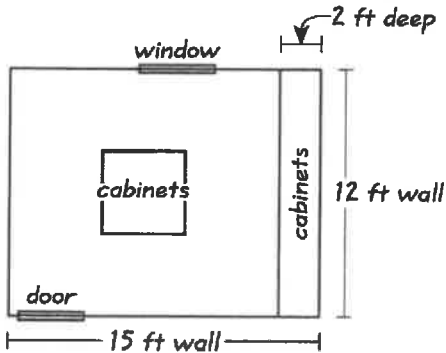
- F.  $\frac{3}{5}$   
 G.  $\frac{5}{6}$   
 H.  $\frac{7}{12}$   
 J.  $\frac{9}{16}$   
 K.  $\frac{17}{24}$





Use the following information to answer questions 33–35.

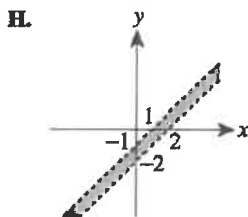
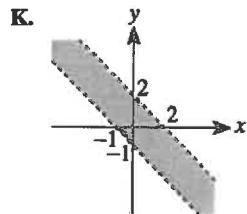
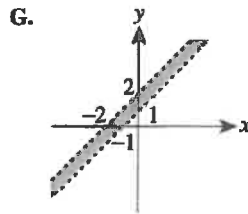
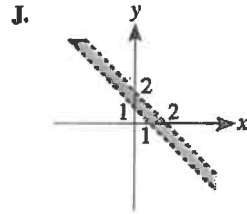
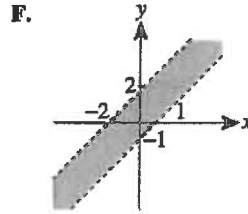
Gianna is converting a 12-foot-by-15-foot room in her house to a craft room. Gianna will install tile herself but will have CC Installations build and install the cabinets. The scale drawing shown below displays the location of the cabinets in the craft room (0.25 inch represents 2 feet).



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

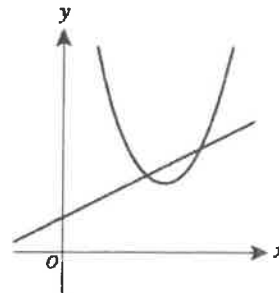
36. Which of the following is the graph of the region  $1 < x + y < 2$  in the standard  $(x, y)$  coordinate plane?



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?

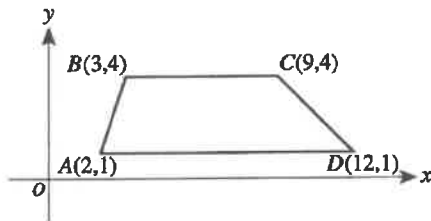


- F.  $f(x) = g(x)$  for exactly 2 values of  $x$   
G.  $f(x) = g(x)$  for exactly 1 value of  $x$   
H.  $f(x) < g(x)$  for all  $x$   
J.  $f(x) > g(x)$  for all  $x$   
K.  $f(x)$  is the inverse of  $g(x)$



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.  $x = 6.5$

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.  $\frac{3}{2}$

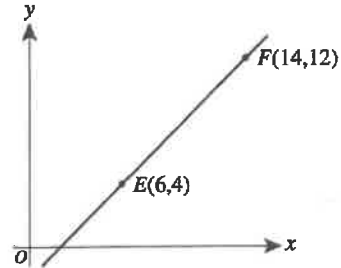
43. A formula to estimate the monthly payment,  $p$  dollars, on a short-term loan is

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

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?

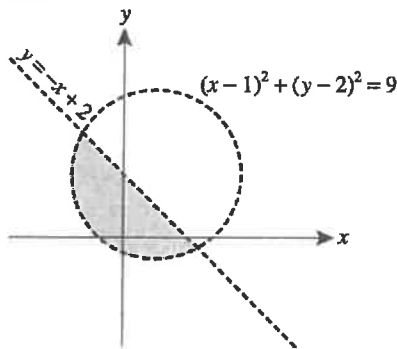
- F.  $13\frac{1}{3}$
- G.  $13\frac{1}{2}$
- H.  $15$
- J.  $16$
- K.  $40$

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  $x:z$ ?

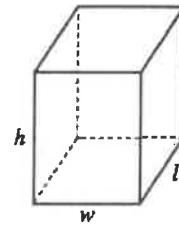
- A. 3:1
- B. 3:5
- C. 5:3
- D. 8:4
- E. 15:4

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.

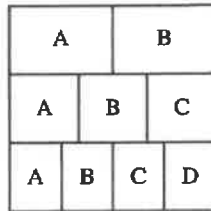
Question	Yes	No
1. Have you skied either cross-country or downhill?	65	55
2. If you answered Yes to Question 1, did you ski downhill?	28	37
3. If you answered Yes to Question 1, did you ski cross-country?	45	20

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?

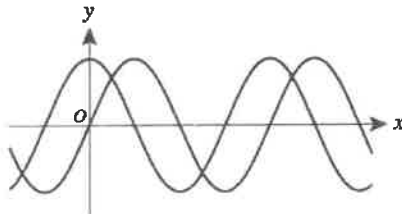
- A. 73
- B. 65
- C. 47
- D. 18
- E. 8

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  $\theta$ , 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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- 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)

Summer HW ACT Section 2 (7480)







## Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

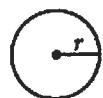
### DIRECTIONS

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

- The use of a calculator is not permitted.
- All variables and expressions used represent real numbers unless otherwise indicated.
- Figures provided in this test are drawn to scale unless otherwise indicated.
- All figures lie in a plane unless otherwise indicated.
- 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

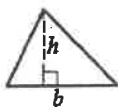


$$A = \pi r^2$$

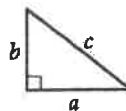
$$C = 2\pi r$$



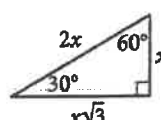
$$A = \ell w$$



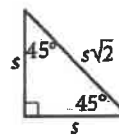
$$A = \frac{1}{2}bh$$



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



Special Right Triangles



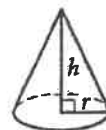
$$V = \ell wh$$



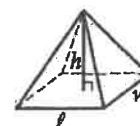
$$V = \pi r^2 h$$



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



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



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

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

The sum of the measures in degrees of the angles of a triangle is 180.





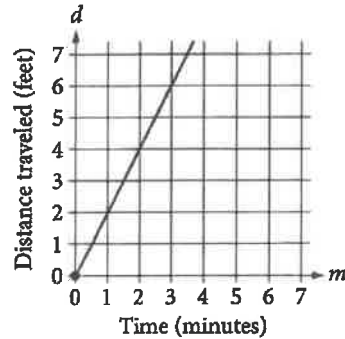
1

$$3x + x + x + x - 3 - 2 = 7 + x + x$$

In the equation above, what is the value of  $x$  ?

- A)  $-\frac{5}{7}$
- B) 1
- C)  $\frac{12}{7}$
- D) 3

2



The graph above shows the distance traveled  $d$ , in feet, by a product on a conveyor belt  $m$  minutes after the product is placed on the belt. Which of the following equations correctly relates  $d$  and  $m$  ?

- A)  $d = 2m$
- B)  $d = \frac{1}{2}m$
- C)  $d = m + 2$
- D)  $d = 2m + 2$



3

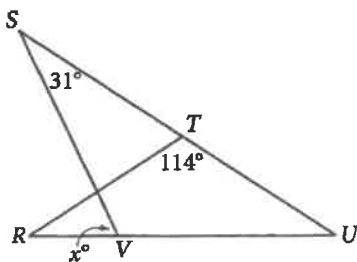
The formula below is often used by project managers to compute  $E$ , the estimated time to complete a job, where  $O$  is the shortest completion time,  $P$  is the longest completion time, and  $M$  is the most likely completion time.

$$E = \frac{O + 4M + P}{6}$$

Which of the following correctly gives  $P$  in terms of  $E$ ,  $O$ , and  $M$ ?

- A)  $P = 6E - O - 4M$
- B)  $P = -6E + O + 4M$
- C)  $P = \frac{O + 4M + E}{6}$
- D)  $P = \frac{O + 4M - E}{6}$

4



In the figure above,  $RT = TU$ . What is the value of  $x$ ?

- A) 72
- B) 66
- C) 64
- D) 58

5

The width of a rectangular dance floor is  $w$  feet. The length of the floor is 6 feet longer than its width. Which of the following expresses the perimeter, in feet, of the dance floor in terms of  $w$ ?

- A)  $2w + 6$
- B)  $4w + 12$
- C)  $w^2 + 6$
- D)  $w^2 + 6w$

6

$$y > 2x - 1$$

$$2x > 5$$

Which of the following consists of the  $y$ -coordinates of all the points that satisfy the system of inequalities above?

- A)  $y > 6$
- B)  $y > 4$
- C)  $y > \frac{5}{2}$
- D)  $y > \frac{3}{2}$



7

$$\sqrt{2x+6} + 4 = x + 3$$

What is the solution set of the equation above?

- A)  $\{-1\}$
- B)  $\{5\}$
- C)  $\{-1, 5\}$
- D)  $\{0, -1, 5\}$

8

$$f(x) = x^3 - 9x$$

$$g(x) = x^2 - 2x - 3$$

Which of the following expressions is equivalent to

$$\frac{f(x)}{g(x)}, \text{ for } x > 3?$$

- A)  $\frac{1}{x+1}$
- B)  $\frac{x+3}{x+1}$
- C)  $\frac{x(x-3)}{x+1}$
- D)  $\frac{x(x+3)}{x+1}$

9

$$(x-6)^2 + (y+5)^2 = 16$$

In the  $xy$ -plane, the graph of the equation above is a circle. Point  $P$  is on the circle and has coordinates  $(10, -5)$ . If  $\overline{PQ}$  is a diameter of the circle, what are the coordinates of point  $Q$ ?

- A)  $(2, -5)$
- B)  $(6, -1)$
- C)  $(6, -5)$
- D)  $(6, -9)$

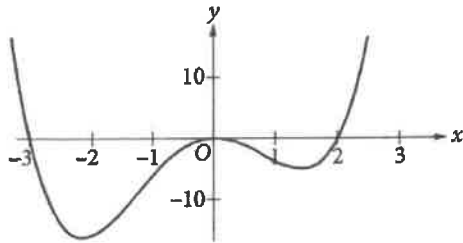
10

A group of 202 people went on an overnight camping trip, taking 60 tents with them. Some of the tents held 2 people each, and the rest held 4 people each. Assuming all the tents were filled to capacity and every person got to sleep in a tent, exactly how many of the tents were 2-person tents?

- A) 30
- B) 20
- C) 19
- D) 18



11



Which of the following could be the equation of the graph above?

- A)  $y = x(x - 2)(x + 3)$
- B)  $y = x^2(x - 2)(x + 3)$
- C)  $y = x(x + 2)(x - 3)$
- D)  $y = x^2(x + 2)(x - 3)$

12

If  $\frac{2a}{b} = \frac{1}{2}$ , what is the value of  $\frac{b}{a}$ ?

- A)  $\frac{1}{8}$
- B)  $\frac{1}{4}$
- C) 2
- D) 4

13

Oil and gas production in a certain area dropped from 4 million barrels in 2000 to 1.9 million barrels in 2013. Assuming that the oil and gas production decreased at a constant rate, which of the following linear functions  $f$  best models the production, in millions of barrels,  $t$  years after the year 2000?

- A)  $f(t) = \frac{21}{130}t + 4$
- B)  $f(t) = \frac{19}{130}t + 4$
- C)  $f(t) = -\frac{21}{130}t + 4$
- D)  $f(t) = -\frac{19}{130}t + 4$



14

$$y = x^2 + 3x - 7$$
$$y - 5x + 8 = 0$$

How many solutions are there to the system of equations above?

- A) There are exactly 4 solutions.
- B) There are exactly 2 solutions.
- C) There is exactly 1 solution.
- D) There are no solutions.

15

$$g(x) = 2x - 1$$
$$h(x) = 1 - g(x)$$

The functions  $g$  and  $h$  are defined above. What is the value of  $h(0)$  ?

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

**DIRECTIONS**

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

- 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.
- Mark no more than one circle in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- Mixed numbers** such as  $3\frac{1}{2}$  must be gridded as 3.5 or 7/2. (If  $\begin{array}{|c|c|c|c|} \hline 3 & 1 & / & 2 \\ \hline \bigcirc & \bigcirc & \bigcirc & \bigcirc \\ \hline \end{array}$  is entered into the grid, it will be interpreted as  $\frac{31}{2}$ , not  $3\frac{1}{2}$ .)
- 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.

Write answer in boxes. →

Grid in result. ←

Answer:  $\frac{7}{12}$

7	/	1	2
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

← Fraction line

Answer: 2.5

2	.	5	
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

← Decimal point

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

2	/	3	
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

.	6	6	6
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

.	6	6	7
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

Answer: 201 – either position is correct

2	0	1	
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③

2	0	1	
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③

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



16

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

If  $a$  is a solution of the equation above and  $a > 0$ , what is the value of  $a$ ?

17

The sum of  $-2x^2 + x + 31$  and  $3x^2 + 7x - 8$  can be written in the form  $ax^2 + bx + c$ , where  $a$ ,  $b$ , and  $c$  are constants. What is the value of  $a + b + c$ ?

18

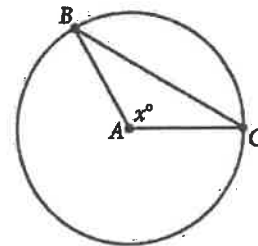
$$\begin{aligned} -x + y &= -3.5 \\ x + 3y &= 9.5 \end{aligned}$$

If  $(x, y)$  satisfies the system of equations above, what is the value of  $y$ ?

19

A start-up company opened with 8 employees. The company's growth plan assumes that 2 new employees will be hired each quarter (every 3 months) for the first 5 years. If an equation is written in the form  $y = ax + b$  to represent the number of employees,  $y$ , employed by the company  $x$  quarters after the company opened, what is the value of  $b$ ?

20



Note: Figure not drawn to scale.

In the circle above, point  $A$  is the center and the length of arc  $\widehat{BC}$  is  $\frac{2}{5}$  of the circumference of the circle. 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) 16
- 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)

/	/	/	/
.	.	.	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

/	/	/	/
.	.	.	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

/	/	/	/
.	.	.	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

- 13 (A) (B) (C) (D) 17
- 14 (A) (B) (C) (D)
- 15 (A) (B) (C) (D)

/	/	/	/
.	.	.	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

/	/	/	/
.	.	.	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Summer HW SAT Section 3 (0409)









## Math Test – Calculator

55 MINUTES, 38 QUESTIONS

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

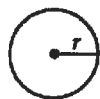
### DIRECTIONS

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

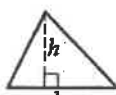


$$A = \pi r^2$$

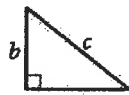
$$C = 2\pi r$$



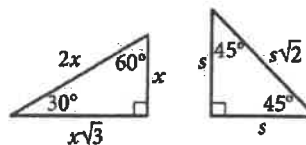
$$A = \ell w$$



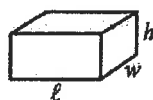
$$A = \frac{1}{2}bh$$



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



Special Right Triangles



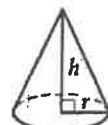
$$V = \ell wh$$



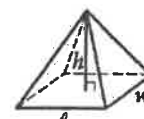
$$V = \pi r^2 h$$



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



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



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

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

The sum of the measures in degrees of the angles of a triangle is 180.



1

One pound of grapes costs \$2. At this rate, how many dollars will  $c$  pounds of grapes cost?

- A)  $2c$
- B)  $2 + c$
- C)  $\frac{2}{c}$
- D)  $\frac{c}{2}$

2

Tracy collects, sells, and trades figurines, and she tracks the number of figurines in her collection on the graph below.



On what interval did the number of figurines decrease the fastest?

- A) Between 1 and 2 months
- B) Between 2 and 3 months
- C) Between 3 and 4 months
- D) Between 4 and 5 months

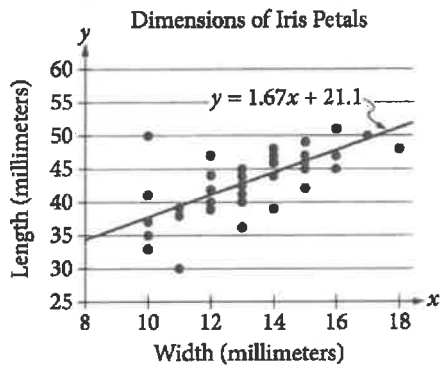


3

In a random sample of 200 cars of a particular model, 3 have a manufacturing defect. At this rate, how many of 10,000 cars of the same model will have a manufacturing defect?

- A) 150
- B) 200
- C) 250
- D) 300

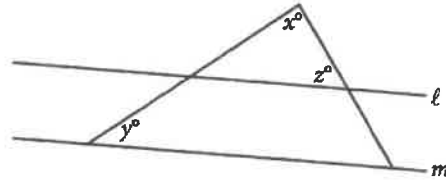
4



The scatterplot above shows data collected on the lengths and widths of *Iris setosa* petals. A line of best fit for the data is also shown. Based on the line of best fit, if the width of an *Iris setosa* petal is 19 millimeters, what is the predicted length, in millimeters, of the petal?

- A) 21.10
- B) 31.73
- C) 52.83
- D) 55.27

5



Note: Figure not drawn to scale.

In the figure above, lines  $\ell$  and  $m$  are parallel,  $y = 20$ , and  $z = 60$ . What is the value of  $x$ ?

- A) 120
- B) 100
- C) 90
- D) 80



6

Two types of tickets were sold for a concert held at an amphitheater. Tickets to sit on a bench during the concert cost \$75 each, and tickets to sit on the lawn during the concert cost \$40 each. Organizers of the concert announced that 350 tickets had been sold and that \$19,250 had been raised through ticket sales alone. Which of the following systems of equations could be used to find the number of tickets for bench seats,  $B$ , and the number of tickets for lawn seats,  $L$ , that were sold for the concert?

- A)  $(75B)(40L) = 1,950$   
 $B + L = 350$
- B)  $40B + 75L = 19,250$   
 $B + L = 350$
- C)  $75B + 40L = 350$   
 $B + L = 19,250$
- D)  $75B + 40L = 19,250$   
 $B + L = 350$

7

In the  $xy$ -plane, the graph of which of the following equations is a line with a slope of 3?

- A)  $y = \frac{1}{3}x$
- B)  $y = x - 3$
- C)  $y = 3x + 2$
- D)  $y = 6x + 3$

8

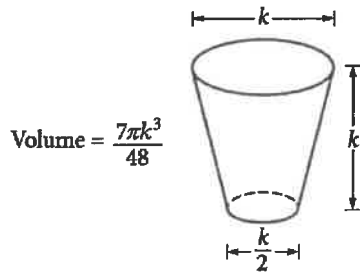
$$x + 1 = \frac{2}{x + 1}$$

In the equation above, which of the following is a possible value of  $x + 1$ ?

- A)  $1 - \sqrt{2}$
- B)  $\sqrt{2}$
- C) 2
- D) 4



Questions 9-11 refer to the following information.



The glass pictured above can hold a maximum volume of 473 cubic centimeters, which is approximately 16 fluid ounces.

9

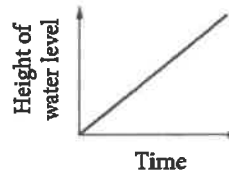
What is the value of  $k$ , in centimeters?

- A) 2.52
- B) 7.67
- C) 7.79
- D) 10.11

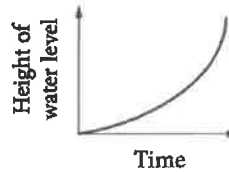
10

Water pours into the glass slowly and at a constant rate. Which of the following graphs best illustrates the height of the water level in the glass as it fills?

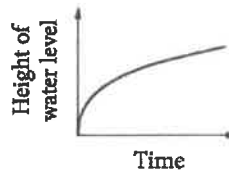
A)



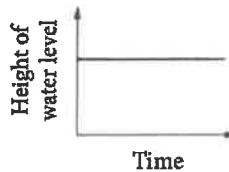
B)



C)



D)







11

Jenny has a pitcher that contains 1 gallon of water. How many times could Jenny completely fill the glass with 1 gallon of water? (1 gallon = 128 fluid ounces)

- A) 16
- B) 8
- C) 4
- D) 3

12

Roberto is an insurance agent who sells two types of policies: a \$50,000 policy and a \$100,000 policy. Last month, his goal was to sell at least 57 insurance policies. While he did not meet his goal, the total value of the policies he sold was over \$3,000,000. Which of the following systems of inequalities describes  $x$ , the possible number of \$50,000 policies, and  $y$ , the possible number of \$100,000 policies, that Roberto sold last month?

- A)  $x + y < 57$   
 $50,000x + 100,000y < 3,000,000$
- B)  $x + y > 57$   
 $50,000x + 100,000y > 3,000,000$
- C)  $x + y < 57$   
 $50,000x + 100,000y > 3,000,000$
- D)  $x + y > 57$   
 $50,000x + 100,000y < 3,000,000$

13

If  $a^{-\frac{1}{2}} = x$ , where  $a > 0$ , what is  $a$  in terms of  $x$ ?

- A)  $\sqrt{x}$
- B)  $-\sqrt{x}$
- C)  $\frac{1}{x^2}$
- D)  $-\frac{1}{x^2}$

14

Which of the following is a value of  $x$  for which the

expression  $\frac{-3}{x^2 + 3x - 10}$  is undefined?

- A) -3
- B) -2
- C) 0
- D) 2



15

A granite block in the shape of a right rectangular prism has dimensions 30 centimeters by 40 centimeters by 50 centimeters. The block has a density of 2.8 grams per cubic centimeter. What is the mass of the block, in grams? (Density is mass per unit volume.)

- A) 336
- B) 3,360
- C) 16,800
- D) 168,000

16

Number of Adults Contracting Colds

	Cold	No cold	Total
Vitamin C	21	129	150
Sugar pill	33	117	150
Total	54	246	300

The table shows the results of a research study that investigated the therapeutic value of vitamin C in preventing colds. A random sample of 300 adults received either a vitamin C pill or a sugar pill each day during a 2-week period, and the adults reported whether they contracted a cold during that time period. What proportion of adults who received a sugar pill reported contracting a cold?

- A)  $\frac{11}{18}$
- B)  $\frac{11}{50}$
- C)  $\frac{9}{50}$
- D)  $\frac{11}{100}$

17

Ages of 20 Students Enrolled in a College Class

Age	Frequency
18	6
19	5
20	4
21	2
22	1
23	1
30	1

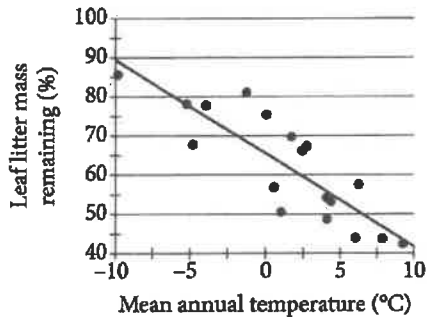
The table above shows the distribution of ages of the 20 students enrolled in a college class. Which of the following gives the correct order of the mean, median, and mode of the ages?

- A) mode < median < mean
- B) mode < mean < median
- C) median < mode < mean
- D) mean < mode < median



18

The figure below shows the relationship between the percent of leaf litter mass remaining after decomposing for 3 years and the mean annual temperature, in degrees Celsius ( $^{\circ}\text{C}$ ), in 18 forests in Canada. A line of best fit is also shown.

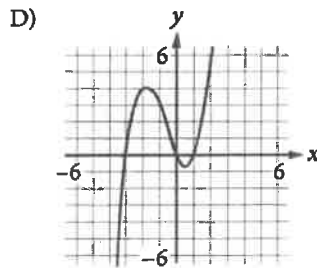
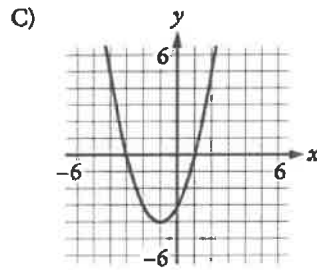
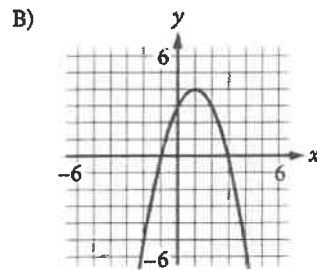
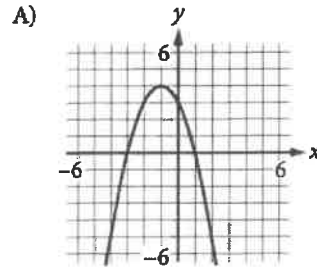


A particular forest in Canada, whose data is not included in the figure, had a mean annual temperature of  $-2^{\circ}\text{C}$ . Based on the line of best fit, which of the following is closest to the predicted percent of leaf litter mass remaining in this particular forest after decomposing for 3 years?

- A) 50%
- B) 63%
- C) 70%
- D) 82%

19

The range of the polynomial function  $f$  is the set of real numbers less than or equal to 4. If the zeros of  $f$  are  $-3$  and  $1$ , which of the following could be the graph of  $y = f(x)$  in the  $xy$ -plane?





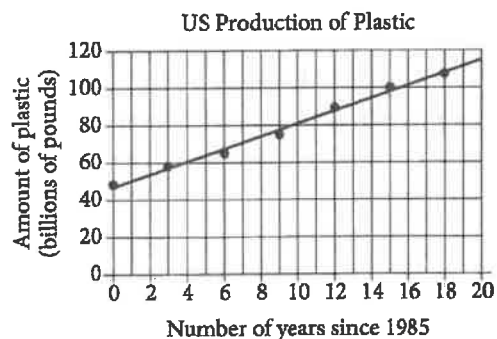
20

The average annual energy cost for a certain home is \$4,334. The homeowner plans to spend \$25,000 to install a geothermal heating system. The homeowner estimates that the average annual energy cost will then be \$2,712. Which of the following inequalities can be solved to find  $t$ , the number of years after installation at which the total amount of energy cost savings will exceed the installation cost?

- A)  $25,000 > (4,334 - 2,712)t$
- B)  $25,000 < (4,334 - 2,712)t$
- C)  $25,000 - 4,334 > 2,712t$
- D)  $25,000 > \frac{4,332}{2,712}t$

Questions 21 and 22 refer to the following information.

Between 1985 and 2003, data were collected every three years on the amount of plastic produced annually in the United States, in billions of pounds. The graph below shows the data and a line of best fit. The equation of the line of best fit is  $y = 3.39x + 46.89$ , where  $x$  is the number of years since 1985 and  $y$  is the amount of plastic produced annually, in billions of pounds.



21

Which of the following is the best interpretation of the number 3.39 in the context of the problem?

- A) The amount of plastic, in billions of pounds, produced in the United States during the year 1985
- B) The number of years it took the United States to produce 1 billion pounds of plastic
- C) The average annual plastic production, in billions of pounds, in the United States from 1985 to 2003
- D) The average annual increase, in billions of pounds, of plastic produced per year in the United States from 1985 to 2003



22

Which of the following is closest to the percent increase in the billions of pounds of plastic produced in the United States from 2000 to 2003?

- A) 10%
- B) 44%
- C) 77%
- D) 110%

23

$$M = 1,800(1.02)^t$$

The equation above models the number of members,  $M$ , of a gym  $t$  years after the gym opens. Of the following, which equation models the number of members of the gym  $q$  quarter years after the gym opens?

- A)  $M = 1,800(1.02)^{\frac{q}{4}}$
- B)  $M = 1,800(1.02)^{4q}$
- C)  $M = 1,800(1.005)^{4q}$
- D)  $M = 1,800(1.082)^q$

24

For the finale of a TV show, viewers could use either social media or a text message to vote for their favorite of two contestants. The contestant receiving more than 50% of the vote won. An estimated 10% of the viewers voted, and 30% of the votes were cast on social media. Contestant 2 earned 70% of the votes cast using social media and 40% of the votes cast using a text message. Based on this information, which of the following is an accurate conclusion?

- A) If all viewers had voted, Contestant 2 would have won.
- B) Viewers voting by social media were likely to be younger than viewers voting by text message.
- C) If all viewers who voted had voted by social media instead of by text message, Contestant 2 would have won.
- D) Viewers voting by social media were more likely to prefer Contestant 2 than were viewers voting by text message.



25

Population of Greenleaf, Idaho

Year	Population
2000	862
2010	846

The table above shows the population of Greenleaf, Idaho, for the years 2000 and 2010. If the relationship between population and year is linear, which of the following functions  $P$  models the population of Greenleaf  $t$  years after 2000?

- A)  $P(t) = 862 - 1.6t$
- B)  $P(t) = 862 - 16t$
- C)  $P(t) = 862 + 16(t - 2,000)$
- D)  $P(t) = 862 - 1.6(t - 2,000)$

26

To determine the mean number of children per household in a community, Tabitha surveyed 20 families at a playground. For the 20 families surveyed, the mean number of children per household was 2.4. Which of the following statements must be true?

- A) The mean number of children per household in the community is 2.4.
- B) A determination about the mean number of children per household in the community should not be made because the sample size is too small.
- C) The sampling method is flawed and may produce a biased estimate of the mean number of children per household in the community.
- D) The sampling method is not flawed and is likely to produce an unbiased estimate of the mean number of children per household in the community.



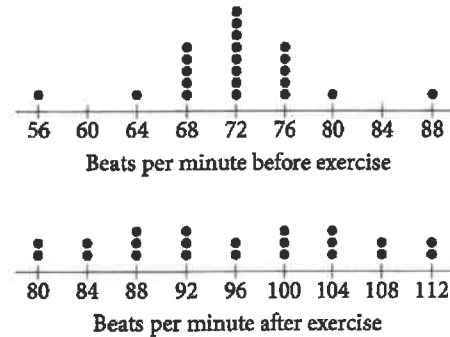
27

In the  $xy$ -plane, the point  $(p, r)$  lies on the line with equation  $y = x + b$ , where  $b$  is a constant. The point with coordinates  $(2p, 5r)$  lies on the line with equation  $y = 2x + b$ . If  $p \neq 0$ , what is the value of  $\frac{r}{p}$ ?

- A)  $\frac{2}{5}$   
 B)  $\frac{3}{4}$   
 C)  $\frac{4}{3}$   
 D)  $\frac{5}{2}$

28

The 22 students in a health class conducted an experiment in which they each recorded their pulse rates, in beats per minute, before and after completing a light exercise routine. The dot plots below display the results.



Let  $s_1$  and  $r_1$  be the standard deviation and range, respectively, of the data before exercise, and let  $s_2$  and  $r_2$  be the standard deviation and range, respectively, of the data after exercise. Which of the following is true?

- A)  $s_1 = s_2$  and  $r_1 = r_2$   
 B)  $s_1 < s_2$  and  $r_1 < r_2$   
 C)  $s_1 > s_2$  and  $r_1 > r_2$   
 D)  $s_1 \neq s_2$  and  $r_1 = r_2$

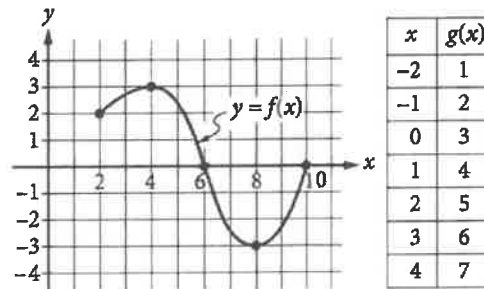


29

A photocopy machine is initially loaded with 5,000 sheets of paper. The machine starts a large job and copies at a constant rate. After 20 minutes, it has used 30% of the paper. Which of the following equations models the number of sheets of paper,  $p$ , remaining in the machine  $m$  minutes after the machine started printing?

- A)  $p = 5,000 - 20m$
- B)  $p = 5,000 - 75m$
- C)  $p = 5,000(0.3)^{\frac{m}{20}}$
- D)  $p = 5,000(0.7)^{\frac{m}{20}}$

30



The complete graph of the function  $f$  and a table of values for the function  $g$  are shown above. The maximum value of  $f$  is  $k$ . What is the value of  $g(k)$ ?

- A) 7
- B) 6
- C) 3
- D) 0



**DIRECTIONS**

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

- 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.
- Mark no more than one circle in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- Mixed numbers** such as  $3\frac{1}{2}$  must be gridded as 3.5 or 7/2. (If  $\begin{array}{|c|c|c|} \hline 3 & 1 & 2 \\ \hline \circ & \circ & \circ \\ \hline \end{array}$  is entered into the grid, it will be interpreted as  $\frac{31}{2}$ , not  $3\frac{1}{2}$ .)
- 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.

Write answer in boxes. →

← Fraction line

← Decimal point

Grid in result.

Answer:  $\frac{7}{12}$

7	/	1	2
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

Answer: 2.5

	2	.	5
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

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

	2	/	3
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

.	6	6	6
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

.	6	6	7
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

Answer: 201 – either position is correct

	2	0	1
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

	2	0	1
○	○	○	○
○	○	○	○
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

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



31

There are two atoms of hydrogen and one atom of oxygen in one molecule of water. How many atoms of hydrogen are there in 51 molecules of water?

32

$$x - \frac{1}{2}a = 0$$

If  $x = 1$  in the equation above, what is the value of  $a$ ?

33

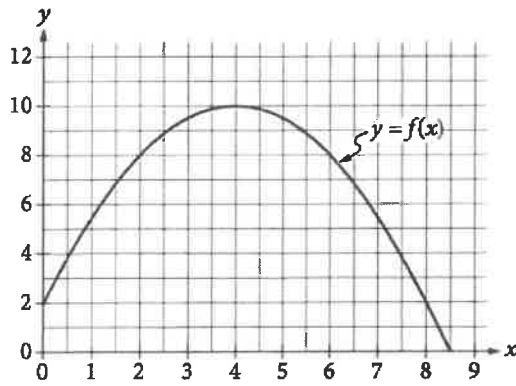
In the  $xy$ -plane, the equations  $x + 2y = 10$  and  $3x + 6y = c$  represent the same line for some constant  $c$ . What is the value of  $c$ ?

34

On April 18, 1775, Paul Revere set off on his midnight ride from Charlestown to Lexington. If he had ridden straight to Lexington without stopping, he would have traveled 11 miles in 26 minutes. In such a ride, what would the average speed of his horse have been, to the nearest tenth of a mile per hour?



35



The graph of the function  $f$ , defined by

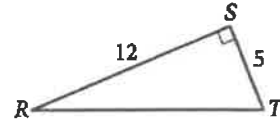
$$f(x) = -\frac{1}{2}(x-4)^2 + 10, \text{ is shown in the } xy\text{-plane}$$

above. If the function  $g$  (not shown) is defined by

$$g(x) = -x + 10, \text{ what is one possible value of } a \text{ such}$$

that  $f(a) = g(a)$  ?

36

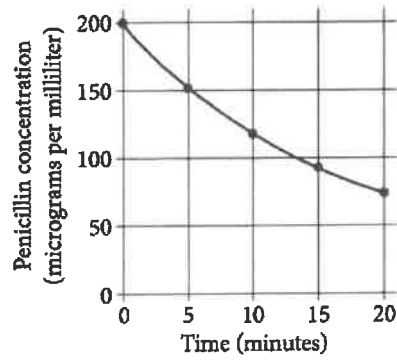


In triangle  $RST$  above, point  $W$  (not shown) lies on  $\overline{RT}$ . What is the value of  $\cos(\angle RSW) - \sin(\angle WST)$  ?



Questions 37 and 38 refer to the following information.

Minutes after injection	Penicillin concentration (micrograms per milliliter)
0	200
5	152
10	118
15	93
20	74



When a patient receives a penicillin injection, the kidneys begin removing the penicillin from the body. The table and graph above show the penicillin concentration in a patient's bloodstream at 5-minute intervals for the 20 minutes immediately following a one-time penicillin injection.



37

According to the table, how many more micrograms of penicillin are present in 10 milliliters of blood drawn from the patient 5 minutes after the injection than are present in 8 milliliters of blood drawn 10 minutes after the injection?

38

The penicillin concentration, in micrograms per milliliter, in the patient's bloodstream  $t$  minutes after the penicillin injection is modeled by the function  $P$  defined by  $P(t) = 200b^{\frac{t}{5}}$ . If  $P$  approximates the values in the table to within 10 micrograms per milliliter, what is the value of  $b$ , rounded to the nearest tenth?

---

**STOP**

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







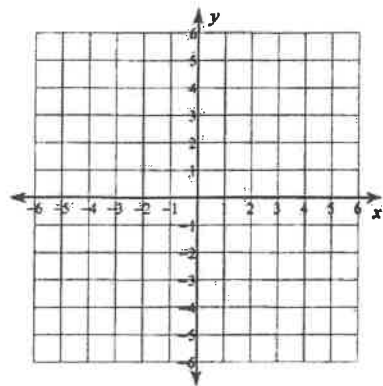




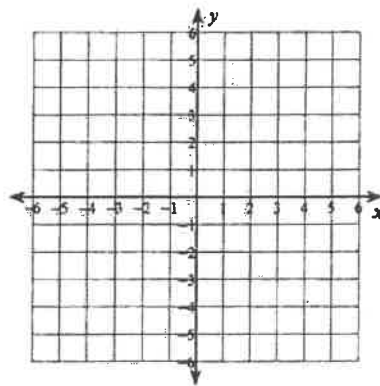
## Review: Graphing and Writing Linear Equations

Sketch the graph of each line.

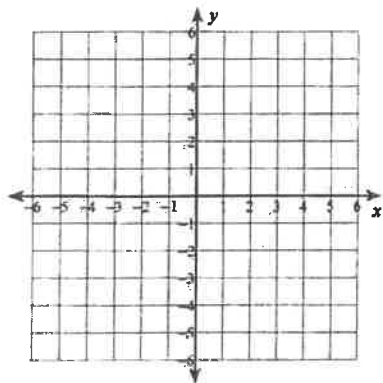
1)  $x$ -intercept =  $-2$ ,  $y$ -intercept =  $-4$



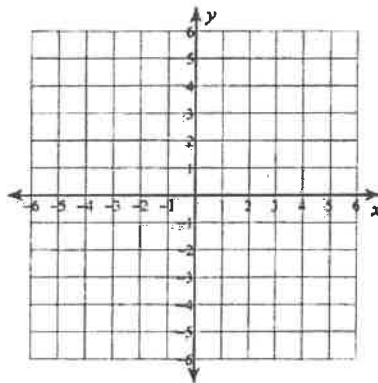
2)  $x$ -intercept =  $-5$ ,  $y$ -intercept =  $-5$



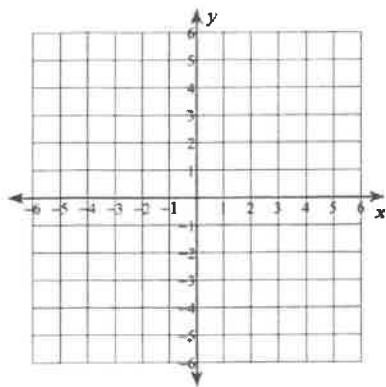
3)  $x + 2y = -6$



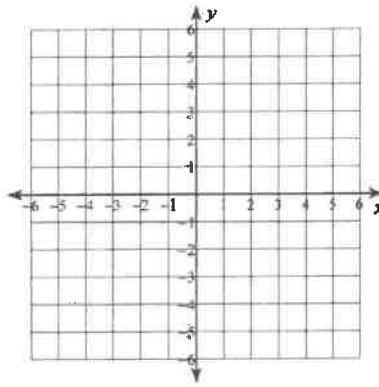
4)  $y = -1$



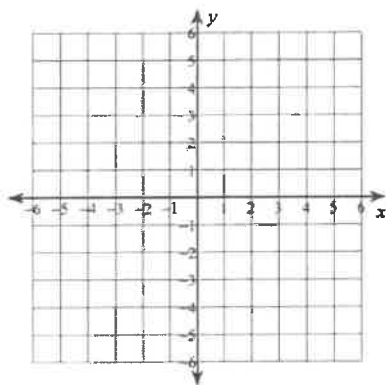
5)  $y = 5x + 1$



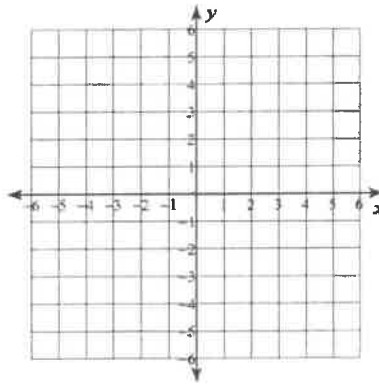
6)  $y = -2x + 3$



7)  $5y = 3x - 20$

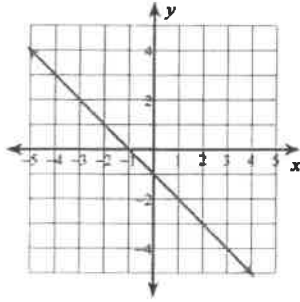


8)  $-x = -1$

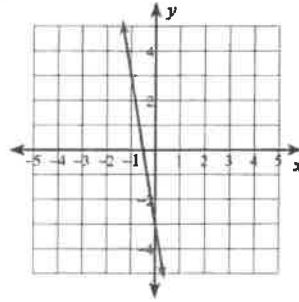


Write the slope-intercept form of the equation of each line.

9)

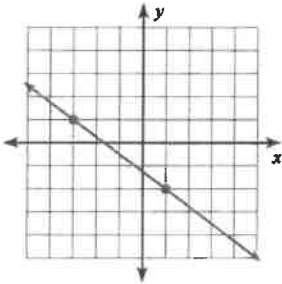


10)

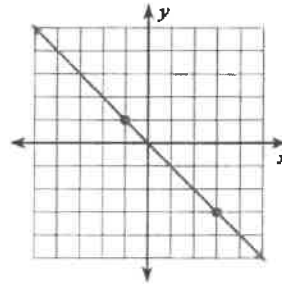


Find the slope of each line.

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

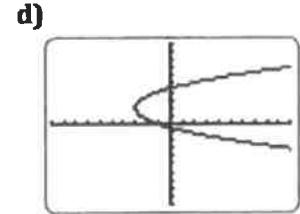
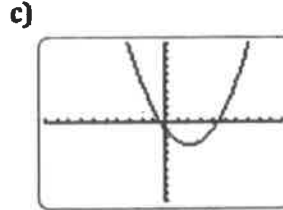
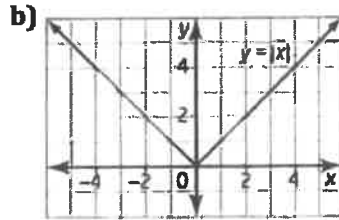
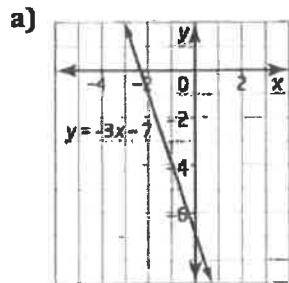
**Write the slope-intercept form of the equation of the line through the given points.**

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.



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

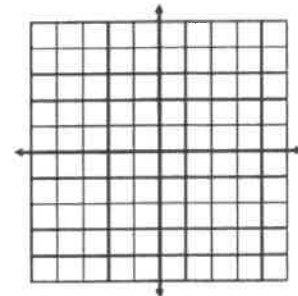
3) State the domain and range. Represent as a table and graph. Then state if it is a function.

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

Domain:

Range:

$x$	$y$



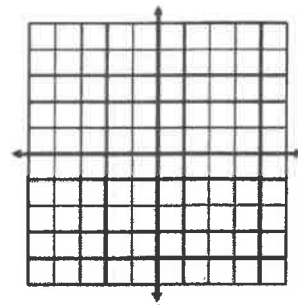
Is this relation a function?

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

Domain:

Range:

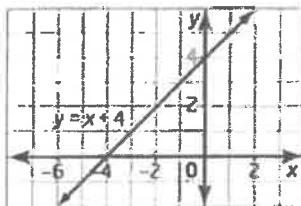
x	y



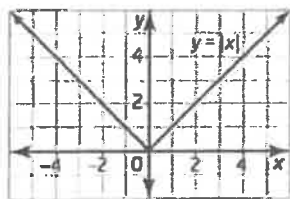
Is this relation a function?

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

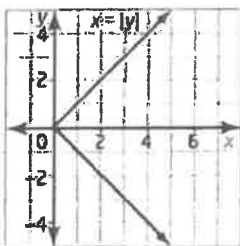
a)



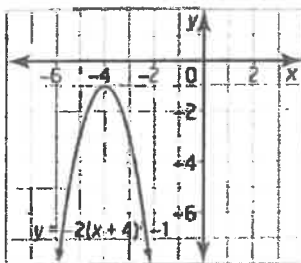
b)

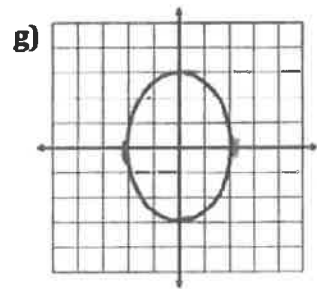
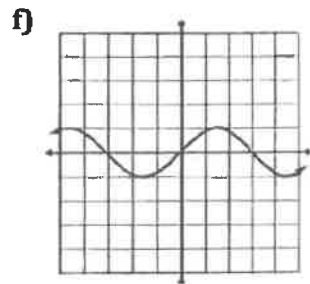
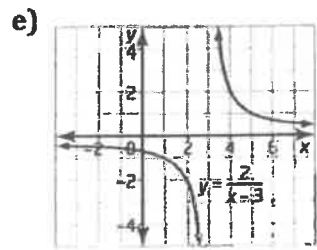


c)



d)

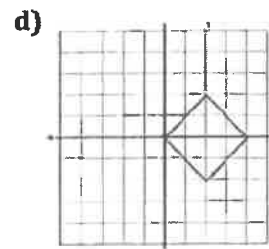
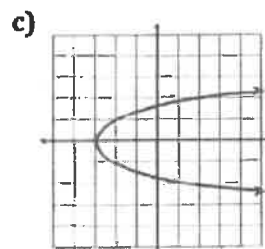
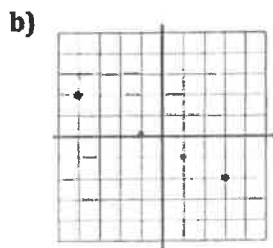




5) Which of the following relations are functions?

a)

$x$	$y$
2	-3
-1	0
5	5
3	2
2	1





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

## Factoring Practice

### I. Greatest Common Factor (GCF)

Find the GCF of the numbers.

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

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

$$\begin{aligned} &a^2 - 36 = (a + 6)(a - 6) \\ &3x^2 - 48 = 3(x^2 - 16) = 3(x + 4)(x - 4) \end{aligned}$$

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.

- $x^2 + 8x + 16$
- $x^2 - 16x + 64$
- $y^2 + 12y + 36$
- $a^2 - 10a + 25$
- $16y^2 + 8y + 1$
- $25a^2 + 60a + 36$
- $16 + 40x + 25x^2$
- $16x^2 + 24x + 9$
- $49x^2 - 14x + 1$
- $9y^2 - 30y + 25$
- $9x^2 - 6x + 1$
- $25x^2 + 10x + 1$
- $n^2 - 14n + 49$
- $81x^2 - 90x + 25$
- $4y^2 - 20y + 25$
- $n^2 + 2n + 4$
- $b^2 + 2b + 1$
- $36x^2 + 84x + 49$
- $81 - 18x + x^2$
- $4 - 12y + 9y^2$

#### V. Special Factoring - Challenge

Factor, write prime if prime.

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

#### 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.

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

**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. $x^2 + 7x + 12$   | 11. $51 - 20k + k^2$                            |
| 2. $m^2 + 10m + 21$  | 12. $a^2 - 14ab + 24b^2$                        |
| 3. $y^2 - 7y - 8$    | 13. $y^2 + 6y - 72$                             |
| 4. $x^2 - 6x + 5$    | 14. $x^2 - 11xy - 60y^2$                        |
| 5. $x^2 + 4x - 32$   | 15. $15r^2 + 2rs - s^2$                         |
| 6. $x^2 - 2x - 15$   | 16. $3x^2 + 21xy - 54y^2$ (Hint: Check for GCF) |
| 7. $x^2 - 6x + 8$    | 17. $x^2 - 5xy - 6y^2$                          |
| 8. $y^2 + 9y + 18$   | 18. $x^2 + 8xy + 12y^2$                         |
| 9. $3 - 4t + t^2$    | 19. $y^2 - 7xy + 10x^2$                         |
| 10. $v^2 + 12v + 20$ | 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. $2x^2 - 5x - 3$   | 11. $2n^2 - 3n - 14$   |
| 2. $3x^2 + 10x - 8$  | 12. $5n^2 + 2n + 7$    |
| 3. $2y^2 + 15y + 7$  | 13. $10x^2 + 13x - 30$ |
| 4. $7a^2 - 11a + 4$  | 14. $12y^2 + 7y + 1$   |
| 5. $5n^2 + 17n + 6$  | 15. $2n^2 + 9n - 5$    |
| 6. $4y^2 + 8y + 3$   | 16. $2x^2 + 7x + 6$    |
| 7. $3x^2 + 4x - 7$   | 17. $5a^2 - 42a - 27$  |
| 8. $2x^2 + 13x + 15$ | 18. $15x^2 - 28x - 32$ |
| 9. $9y^2 + 6y - 8$   | 19. $8a^2 - 10a + 3$   |
| 10. $6x^2 - 7x - 20$ | 20. $2y^2 - 3y - 20$   |

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

Factor, write prime if prime.

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

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

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

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

### XII. Extra: Factoring by Grouping

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

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

# 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  $x^2 = -81$  DOES NOT have a solution.

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

**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:  $2x^2 - x - 6 = 0$

$$x = \frac{-1 \pm \sqrt{(-1)^2 - 4(2)(6)}}{2(2)}$$

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

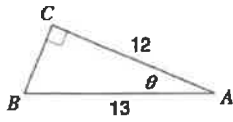
29)  $6\sqrt{75mp^2q^3}$

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

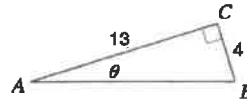
## Right Triangle Trig. - Finding Missing Sides and Angles

Find the measure of each angle indicated. Round to the nearest tenth.

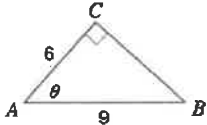
1)



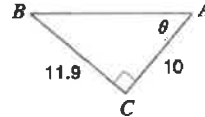
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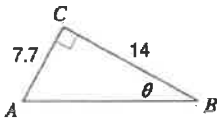
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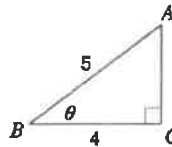
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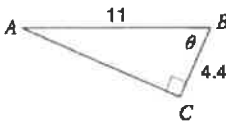
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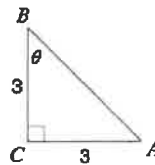
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7)

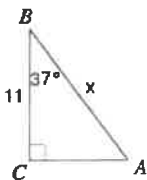


8)

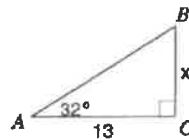


Find the measure of each side indicated. Round to the nearest tenth.

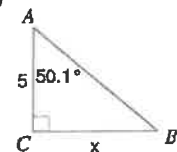
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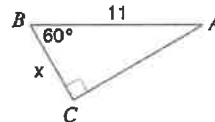
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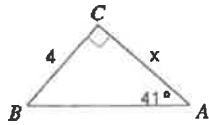
11)



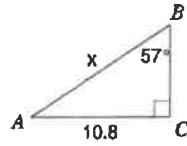
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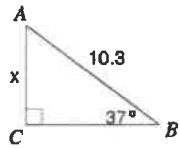
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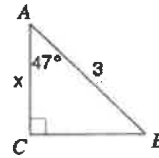
14)



15)

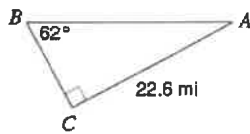


16)

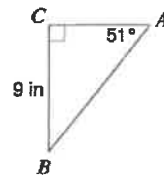


Solve each triangle. Round answers to the nearest tenth.

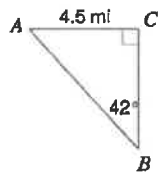
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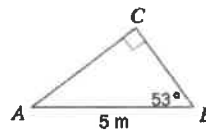
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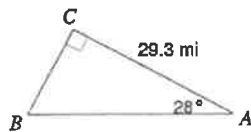
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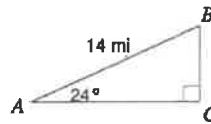
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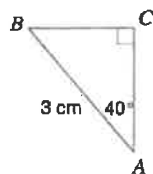
21)



22)



23)



24)

