



## 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. What is  $|5 - x|$  when  $x = 9$ ?

- A. -14
- B. -4
- C. 4
- D. 9
- E. 14

2. The length of a rectangle is 12 feet. The width of the rectangle is  $\frac{1}{2}$  the length. What is the perimeter of the rectangle, in feet?

- F. 18
- G. 24
- H. 30
- J. 36
- K. 72

3.  $(9m - 4n) - (2n + 5m)$  is equivalent to:

- A.  $4m - 6n$
- B.  $4m - 2n$
- C.  $5m + 3n$
- D.  $7m - 9n$
- E.  $7m + n$

4. Which of the following numbers has the greatest value?

- F.  $0.\overline{3}$
- G. 0.3
- H. 0.33
- J. 0.333
- K. 0.3333

**DO YOUR FIGURING HERE.**



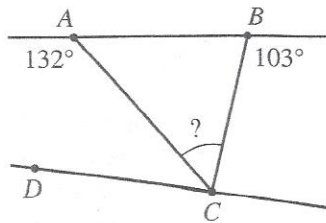
DO YOUR FIGURING HERE.

5. At a grocery store, Jo Ellen received \$1.60 when she returned her cans, glass bottles, and plastic bottles. Jo Ellen received \$0.05 for each can, \$0.10 for each glass bottle, and \$0.05 for each plastic bottle. She knew she had returned 6 cans and 8 glass bottles. How many plastic bottles did Jo Ellen return to the store?
- A. 8  
B. 9  
C. 10  
D. 12  
E. 18
6. Pablo recorded the noon temperature, in degrees Celsius, on 4 consecutive days as part of a science project. On the 1st day, the noon temperature was  $-4^{\circ}\text{C}$ . On the 4th day, the noon temperature was  $12^{\circ}\text{C}$ . What was the change in the noon temperature from the 1st day to the 4th day?
- F.  $-16^{\circ}\text{C}$   
G.  $-4^{\circ}\text{C}$   
H.  $4^{\circ}\text{C}$   
J.  $8^{\circ}\text{C}$   
K.  $16^{\circ}\text{C}$
7. Sienna will be paid \$75, plus 25% of her total weekly sales, for the hours she is scheduled to work next week. Let  $w$  represent Sienna's total weekly sales, in dollars, for next week. Which of the following expressions gives Sienna's pay, in dollars, for the hours she is scheduled to work next week?
- A.  $0.25w + 75$   
B.  $0.25w + 0.75$   
C.  $0.75w + 0.25$   
D.  $25w + 75$   
E.  $75w + 0.25$
8. Which of the following augmented matrices represents the system of linear equations below?
- $$\begin{aligned} 3x + 5y &= 20 \\ 2x - y &= 9 \end{aligned}$$
- F.  $\left[ \begin{array}{cc|c} 3 & 5 & -20 \\ 2 & -1 & -9 \end{array} \right]$   
G.  $\left[ \begin{array}{cc|c} 3 & 5 & 20 \\ 2 & -1 & 9 \end{array} \right]$   
H.  $\left[ \begin{array}{cc|c} 3 & 5 & 20 \\ 2 & 0 & 9 \end{array} \right]$   
J.  $\left[ \begin{array}{cc|c} 3 & 5 & 20 \\ 2 & 1 & 9 \end{array} \right]$   
K.  $\left[ \begin{array}{cc|c} 3 & 2 & 20 \\ 5 & -1 & 9 \end{array} \right]$
9. If  $g(x) = 2x^2 - 3x + 4$ , then  $g(-3) = ?$
- A. -23  
B. -5  
C. 1  
D. 13  
E. 31



10. The figure below shows lines  $\overleftrightarrow{AB}$  and  $\overleftrightarrow{DC}$ , line segments  $\overline{AC}$  and  $\overline{BC}$ , and 2 angle measures. What is the measure of  $\angle ACB$ ?

- F.  $38\frac{1}{2}^\circ$   
 G.  $42^\circ$   
 H.  $48^\circ$   
 J.  $55^\circ$   
 K.  $77^\circ$

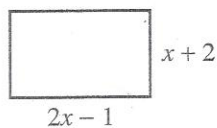


DO YOUR FIGURING HERE.

11. Marietta purchased a car that had a purchase price of \$10,400, which included all other costs and tax. She paid \$2,000 as a down payment and got a loan for the rest of the purchase price. Marietta paid off the loan by making 48 payments of \$225 each. The total of all her payments, including the down payment, was how much more than the car's purchase price?

- A. \$ 400  
 B. \$ 2,400  
 C. \$ 8,400  
 D. \$10,800  
 E. \$12,800

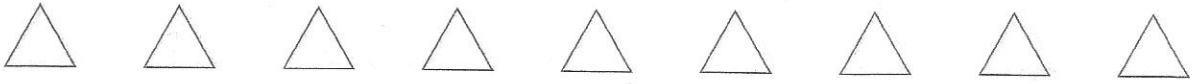
12. The dimensions of the rectangle shown below are given in inches. Which of the following expressions gives the area, in square inches, of the rectangle?



- F.  $6x + 2$   
 G.  $x^2 + 3x - 2$   
 H.  $2x^2 - 2$   
 J.  $2x^2 + 3x - 2$   
 K.  $2x^2 + 5x + 2$

13. The population of a particular town is modeled by the equation  $P = 120,000(1.1)^t$ , where  $t$  is the number of years after January 1, 2011. Based on the model, which of the following numbers is closest to the population of the town on January 1, 2013?

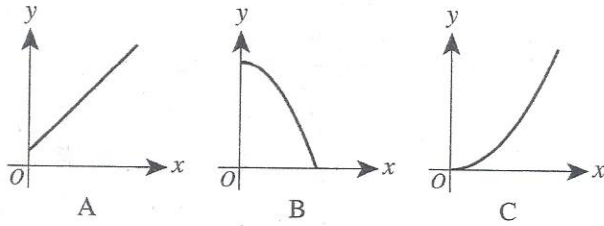
- A. 132,000  
 B. 145,000  
 C. 160,000  
 D. 264,000  
 E. 396,000



14. The phrases below represent 3 types of measurements as functions of time.

- I. The height of an object falling toward the ground
- II. The height of a plant growing at a constant rate
- III. The distance a car travels while increasing its velocity

Graphs A, B, and C below each represent one of these functions. For all graphs, the  $x$ -axis represents time. Which graph is of which function?

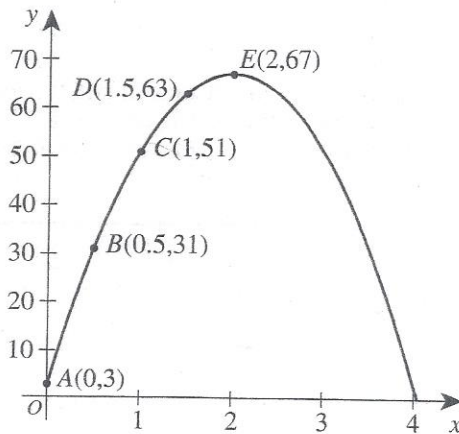


	Graph A	Graph B	Graph C
F.	I	II	III
G.	II	I	III
H.	II	III	I
J.	III	I	II
K.	III	II	I

DO YOUR FIGURING HERE.

15. In the standard  $(x,y)$  coordinate plane below, 5 points are labeled on a parabola. Which of the following lines has the slope of *least* value?

- A.  $\overleftrightarrow{AB}$
- B.  $\overleftrightarrow{AE}$
- C.  $\overleftrightarrow{BC}$
- D.  $\overleftrightarrow{CD}$
- E.  $\overleftrightarrow{DE}$



16. Jamal earned scores of 70, 75, 85, and 94 points on the first 4 history projects, and he has 1 more project to complete. What is the minimum score Jamal needs to earn on the 5th project so that the mean of his scores on all 5 projects is at least 2 points more than the mean of the scores he earned on the first 4 projects?

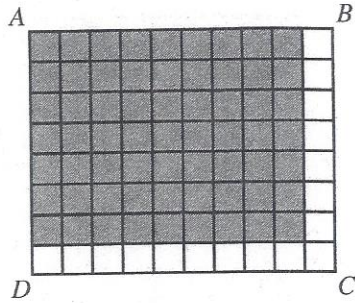
- F. 80
- G. 81
- H. 83
- J. 91
- K. 96



DO YOUR FIGURING HERE.

17. In the figure below, all of the small squares are equal in area, and the area of rectangle  $ABCD$  is 1 square unit. Which of the following expressions represents the area, in square units, of the shaded region?

- A.  $\frac{1}{10} \cdot \frac{1}{8}$   
 B.  $\frac{1}{10} \cdot \frac{7}{8}$   
 C.  $\frac{1}{10} \cdot \frac{9}{10}$   
 D.  $\frac{9}{10} \cdot \frac{1}{8}$   
 E.  $\frac{9}{10} \cdot \frac{7}{8}$



18. What is the median of the list of numbers below?

6, 3, 5, 7, 12, 9, 5, 5, 11

- F. 5  
 G. 6  
 H. 7  
 J. 9  
 K. 12

19. A batch of 100 defective computer chips consisting of 2 types (I and II) and made by 2 companies (A and B) was selected, and it was determined how many of each type of chip was made by each company. The results are displayed in the table below.

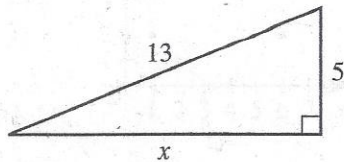
Type of chip	Number of chips made by Company:	
	A	B
I	14	30
II	36	20

What is the probability that a randomly selected chip from this batch of 100 is Type I and manufactured by Company B?

- A.  $\frac{30}{100}$   
 B.  $\frac{30}{50}$   
 C.  $\frac{30}{44}$   
 D.  $\frac{14}{100}$   
 E.  $\frac{14}{44}$



20. Carpenters use the term *pitch* to describe the slope of a roof. For example, a roof with a pitch of  $\frac{1}{4}$  means the roof has 1 foot of vertical rise for every 4 feet of horizontal distance. The figure below shows a 13-foot-long roof with 5 feet of vertical rise and  $x$  feet of horizontal distance. What is the pitch of this roof?



- F.  $\frac{1}{6}$   
 G.  $\frac{5}{8}$   
 H.  $\frac{5}{12}$   
 J.  $\frac{5}{14}$   
 K.  $\frac{5}{18}$
21. Given that  $x \leq 2$  and  $x + y \geq 4$ , what is the LEAST value that  $y$  can have?
- A. -6  
 B. -2  
 C. 0  
 D. 2  
 E. 6
22. As shown below,  $A$ ,  $B$ ,  $C$ , and  $D$  are collinear, with  $B$  between  $A$  and  $C$  and with  $C$  between  $B$  and  $D$ . Given  $AC = BD = 12$  cm and given  $BC = 3$  cm, what is  $AD$ , in centimeters?



- F. 9  
 G. 15  
 H. 18  
 J. 21  
 K. 27
23. Keanu bought a new laptop computer and paid a discount price that was 20% less than the \$1,000 list price. He also paid tax on the laptop equal to 6% of the discount price. What is the total amount Keanu paid for the laptop computer?
- A. \$752  
 B. \$806  
 C. \$848  
 D. \$860  
 E. \$986

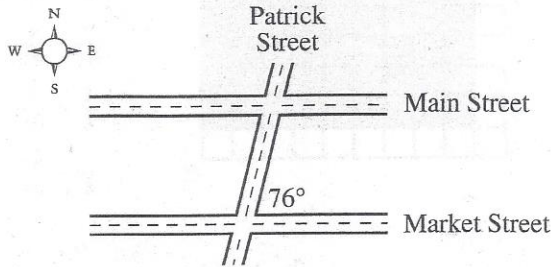
DO YOUR FIGURING HERE.





24. In Middletown, Main Street and Market Street are parallel to each other. Patrick Street intersects Market Street to form a  $76^\circ$  angle at the northeast corner, as shown in the figure below. What is the measure of the angle formed at the southeast corner of Main Street and Patrick Street?

(Note: Each street is straight and has the same uniform width.)



- F.  $76^\circ$   
 G.  $90^\circ$   
 H.  $104^\circ$   
 J.  $142^\circ$   
 K.  $152^\circ$
25. Of the 900 students enrolled at Sierra Elementary School, 45% live south of Highway R. Of the students who live south of Highway R, 20% do NOT ride the bus to school. How many students who live south of Highway R ride the bus to school?
- A. 81  
 B. 180  
 C. 324  
 D. 585  
 E. 720
26. Which of the following equations represents the line in the standard  $(x,y)$  coordinate plane that passes through  $(2,-3)$  and has a slope of  $-\frac{1}{2}$ ?
- F.  $y = -2x + 1$   
 G.  $y = -\frac{1}{2}x - 2$   
 H.  $y = -\frac{1}{2}x + 4$   
 J.  $y = \frac{1}{2}x - 4$   
 K.  $y = 2x - 7$

DO YOUR FIGURING HERE.

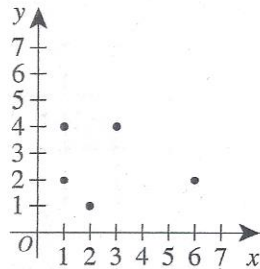




27. The entire graph of the relation  $R$  of the ordered pairs  $(x,y)$  is shown in the standard  $(x,y)$  coordinate plane below. One of the following sets is the domain of the relation  $R$ . Which set is it?

DO YOUR FIGURING HERE.

- A.  $\{1, 2, 4\}$   
 B.  $\{1, 2, 3, 4\}$   
 C.  $\{1, 2, 3, 6\}$   
 D.  $\{1, 2, 4, 6\}$   
 E.  $\{1, 2, 3, 4, 5, 6\}$



28. On Friday night, the Morrison family set up camp in the Ocala National Forest. On Saturday morning they hiked to a wilderness area 3 miles due north and 4 miles due east of their campsite. The elevation of the wilderness area is the same as the elevation of the campsite. To the nearest 0.1 mile, what is the straight-line distance from the wilderness area to the Morrisons' campsite?

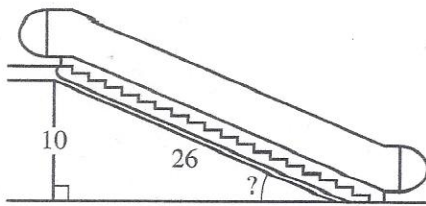
- F. 3.5  
 G. 3.7  
 H. 5.0  
 J. 5.5  
 K. 7.0

29. What positive number when divided by its reciprocal has a result of  $\frac{4}{25}$ ?

- A.  $\frac{2}{5}$   
 B.  $\frac{2}{25}$   
 C.  $\frac{5}{2}$   
 D.  $\frac{8}{25}$   
 E.  $\frac{25}{8}$

30. The base of an escalator in a store is 26 meters long and has a vertical lift of 10 meters as shown below. Which of the following expressions is closest to the angle of inclination between the base of the escalator and the horizontal floor?

- F.  $\sin^{-1}\left(\frac{10}{26}\right)$   
 G.  $\sin^{-1}\left(\frac{26}{10}\right)$   
 H.  $\cos^{-1}\left(\frac{10}{26}\right)$   
 J.  $\tan^{-1}\left(\frac{10}{26}\right)$   
 K.  $\tan^{-1}\left(\frac{26}{10}\right)$



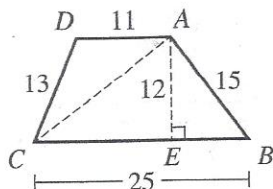




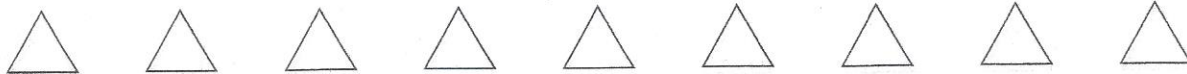
DO YOUR FIGURING HERE.

Use the following information to answer questions 31–33.

In the figure shown below, trapezoid  $ABCD$  is formed by  $\triangle ABC$  and  $\triangle ACD$ . The lengths are given in inches.

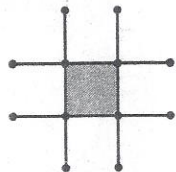


31. What is the area of  $\triangle ABC$ , in square inches?
- A. 64  
B. 66  
C. 90  
D. 132  
E. 150
32. Which of the following ratios is equal to  $\cos \angle B$  ?  
(Note:  $FG$  denotes the length of  $\overline{FG}$ .)
- F.  $\frac{AC}{AB}$   
G.  $\frac{AC}{BC}$   
H.  $\frac{AE}{AB}$   
J.  $\frac{AE}{BE}$   
K.  $\frac{BE}{AB}$
33. Suppose  $ABCD$  is placed in the standard  $(x,y)$  coordinate plane such that  $C$  is at  $(0,0)$ ,  $B$  is at  $(25,0)$ , and  $A$  and  $D$  have positive  $x$ - and  $y$ -coordinates. What is the  $x$ -coordinate of  $D$  ?
- A. 1  
B. 2  
C. 5  
D. 12  
E. 14
- 
34. A family will rent a picnic shelter for \$200 for a reunion. The cost of the shelter will be distributed equally among the people who plan to attend. The current cost per person will decrease by \$1 if 10 more people plan to attend the reunion. How many people are currently planning to attend the reunion?
- F. 10  
G. 20  
H. 40  
J. 50  
K. 63



35. The figure below shows 12 congruent line segments, each determined by a pair of adjacent points. The sum of the lengths of the 12 line segments is 36 centimeters. Each intersection of 4 of the line segments forms 4 right angles. What is the area, in square centimeters, of the shaded region?

- A. 4  
B. 6  
C. 9  
D. 12  
E. 16



DO YOUR FIGURING HERE.

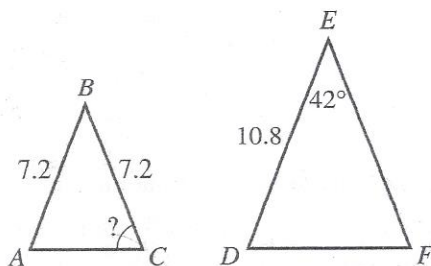
36. What is the value of  $b$  in the solution of the system of equations below?

$$\begin{aligned} 6a + 3b &= 12 \\ -2a + b &= -8 \end{aligned}$$

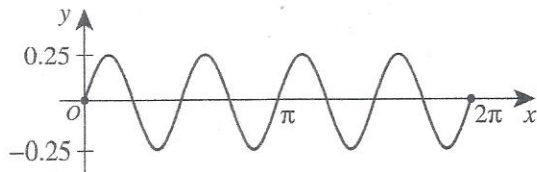
- F. -2  
G. 1  
H. 3  
J. 4  
K. 10

37. In the figure shown below,  $\triangle ABC \sim \triangle DEF$ , sides  $\overline{AB}$  and  $\overline{BC}$  are each 7.2 cm long, side  $\overline{DE}$  is 10.8 cm long, and the measure of  $\angle E$  is  $42^\circ$ . What is the measure of  $\angle C$ ?

- A.  $42^\circ$   
B.  $46^\circ$   
C.  $60^\circ$   
D.  $63^\circ$   
E.  $69^\circ$



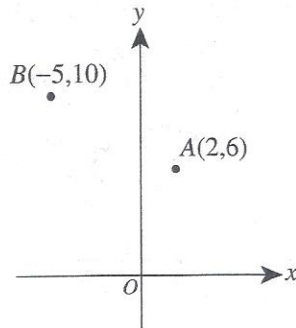
38. The function  $f(x) = 0.25 \sin(4x)$  is graphed below for  $0 \leq x \leq 2\pi$ . What is the period of the function?



- F.  $\frac{\pi}{2}$   
G.  $\frac{\pi}{4}$   
H.  $\frac{\pi}{8}$   
J.  $\pi$   
K.  $2\pi$



39. Point  $A$  lies at  $(2,6)$  and point  $B$  lies at  $(-5,10)$  in the standard  $(x,y)$  coordinate plane below. What is the length, in coordinate units, of  $\overline{AB}$ ?



- A.  $\sqrt{40}$   
 B.  $\sqrt{65}$   
 C.  $\sqrt{125}$   
 D. 13  
 E. 17

40. Each student's project in a history seminar is given a point score by the teacher and by each of the other students in the seminar. A student's project grade,  $g$ , is determined by the formula  $g = \frac{3t+s}{3+n}$ , where  $t$  is the score the teacher gives,  $s$  is the sum of the scores the students give, and  $n$  is the number of students in the seminar. What is  $t$  in terms of  $g$ ,  $s$ , and  $n$ ?

- F.  $t = g - n - s$   
 G.  $t = gn + g - s$   
 H.  $t = \frac{3gn - s}{9}$   
 J.  $t = \frac{gn - s}{3}$   
 K.  $t = \frac{3g + gn - s}{3}$

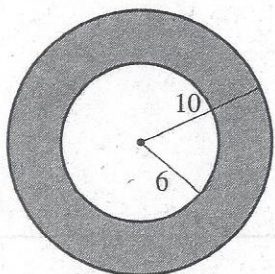
41. For all  $x \neq -2$ , which of the following expressions is equal to  $\frac{x^2 + 5x + 6}{x + 2} + x + 5$ ?

- A.  $x + 8$   
 B.  $2x + 8$   
 C.  $x^2 + 8x + 15$   
 D.  $\frac{2x + 8}{x + 2}$   
 E.  $\frac{x^2 + 6x + 11}{x + 2}$

DO YOUR FIGURING HERE.



42. Two concentric circles are shown below. The radius of the larger circle is 10 feet and the radius of the smaller circle is 6 feet. What is the area, in square feet, of the shaded region bounded by the circles?



- F.  $8\pi$   
 G.  $16\pi$   
 H.  $36\pi$   
 J.  $64\pi$   
 K.  $100\pi$

43. For  $i = \sqrt{-1}$ ,  $(1 + 2i)^2 = ?$

- A.  $-3 + 4i$   
 B.  $2 + 2i$   
 C.  $2 + 4i$   
 D.  $-4$   
 E.  $-3$

44. A box contains a combination of solid-colored tickets:  $\frac{1}{10}$  of the tickets are green,  $\frac{1}{2}$  are red,  $\frac{1}{4}$  are blue, and the remaining 30 tickets are white. How many blue tickets are in the box?

- F. 10  
 G. 20  
 H. 50  
 J. 100  
 K. 200

45. Which of the following expressions is the greatest monomial factor of  $80x^3y + 48x^2y^2$ ?

- A.  $16x^2y$   
 B.  $16x^3y^2$   
 C.  $16x^5y^3$   
 D.  $240x^3y^2$   
 E.  $240x^5y^3$

### DO YOUR FIGURING HERE.

Use the following information to answer Questions 46–48.

The points graphed in the standard  $xy$ -coordinate plane below are the vertices of a triangle. The origin is at the intersection of the  $x$ -axis and the  $y$ -axis. The  $x$ -axis and the  $y$ -axis are shown. The  $x$ -axis is labeled with the integers from -10 to 10, and the  $y$ -axis is labeled with the integers from -10 to 10. The distance from the origin to the point  $A$  is approximately 1.4 units, the distance from the origin to the point  $B$  is approximately 1.4 units, and the distance from the origin to the point  $C$  is approximately 1.4 units.



46. Because points  $A$ ,  $B$ ,  $C$ ,  $D$ , and  $E$  have the same mass, the position determined by the average of the  $x$ -coordinates and the average of the  $y$ -coordinates of those points approximates the center of mass of those 5 points. What is the  $x$ -coordinate of this position?

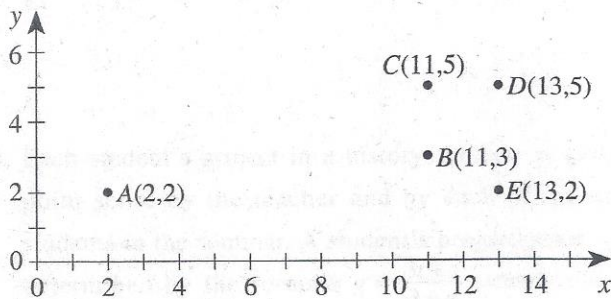
- F.  $(1.4, 1.4)$   
 G.  $(1.4, 2.8)$   
 H.  $(2.8, 1.4)$   
 J.  $(2.8, 2.8)$   
 K.  $(0, 2.8)$



Use the following information to answer questions 46–48.

DO YOUR FIGURING HERE.

The points graphed in the standard  $(x,y)$  coordinate plane below show the positions of 5 stars in a plane relative to a point represented by the origin, where each coordinate unit equals 1 light-year. A *light-year* is the distance that light travels in 1 year, and 1 light-year  $\approx 5.9 \times 10^{12}$  miles. The distance from Star A to Star D is approximately 11.4 light-years. Star A has a mass of 3 solar masses; and Stars B, C, D, and E each have a mass of 1 solar mass.



46. Because Stars B, C, D, and E have the same mass, the position determined by the average of the  $x$ -coordinates and the average of the  $y$ -coordinates of those stars approximates the center of mass of those 4 stars. What are the coordinates of this position?

- F.  $(10, 3\frac{1}{3})$   
 G.  $(10, 3\frac{2}{5})$   
 H.  $(10, 3\frac{3}{4})$   
 J.  $(12, 3\frac{1}{3})$   
 K.  $(12, 3\frac{3}{4})$

47. What is the tangent of the angle formed by  $\vec{CD}$  and  $\vec{CE}$  in the graph?

- A.  $\frac{2}{\sqrt{13}}$   
 B.  $\frac{3}{\sqrt{13}}$   
 C.  $\frac{2}{3}$   
 D.  $\frac{3}{2}$   
 E.  $\frac{5}{2}$



48. Which of the following values is closest to the number of miles between Stars A and D ?

F.  $2.0 \times 10^{10}$   
 G.  $5.2 \times 10^{11}$   
 H.  $1.9 \times 10^{12}$   
 J.  $6.7 \times 10^{13}$   
 K.  $8.6 \times 10^{21}$

DO YOUR FIGURING HERE.

49. In the standard  $(x,y)$  coordinate plane, for what value(s) of  $x$ , if any, is there NO value of  $y$  such that

$(x,y)$  is on the graph of  $y = \frac{x-3}{(x+3)(x+2)(x-2)}$  ?

A.  $-3, -2,$  and  $2$  only  
 B.  $-2, 2,$  and  $3$  only  
 C.  $-3$  only  
 D.  $3$  only  
 E. There are no such values of  $x$ .

50. Which of the following number properties is illustrated in the statement below?

$$3 + (5 + 4) = (5 + 4) + 3$$

F. Associative:  $a + (b + c) = (a + b) + c$   
 G. Commutative:  $a + b = b + a$   
 H. Distributive:  $a(b + c) = ab + ac$   
 J. Identity:  $a + 0 = a$   
 K. Inverse:  $a + (-a) = 0$

51. The volume of a right circular cone with radius  $r$  and height  $h$  is  $\frac{1}{3}\pi r^2 h$ , where  $r$  and  $h$  have the same unit of measure. Cones A and B are both right circular cones. The radius of Cone B is 2 times the radius of Cone A. Cone B's height is  $\frac{1}{2}$  Cone A's height. Compared to the volume of Cone A, the volume of Cone B is:

A. the same.  
 B.  $\frac{1}{2}$  as great.  
 C.  $\frac{2}{3}$  as great.  
 D. 2 times as great.  
 E. 4 times as great.

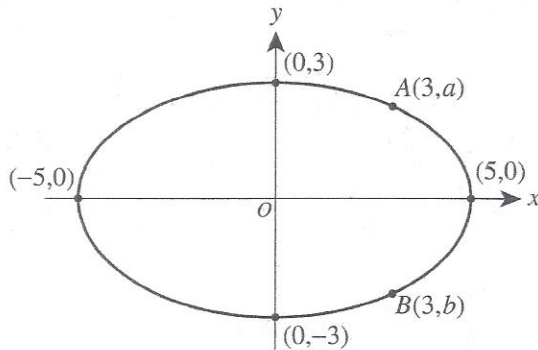


DO YOUR FIGURING HERE.

52. From point  $A$  outside a circle and in the same plane as the circle, 2 rays are drawn tangent to the circle with the points of tangency labeled  $B$  and  $C$ , respectively. Segment  $\overline{BC}$  is then drawn to form  $\triangle ABC$ . If  $\angle A$  measures  $70^\circ$ , what is the measure of  $\angle ABC$ ?

- F.  $70^\circ$   
 G.  $55^\circ$   
 H.  $40^\circ$   
 J.  $35^\circ$   
 K. Cannot be determined from the given information

53. Graphed in the standard  $(x,y)$  coordinate plane below is an ellipse. The center of the ellipse is  $(0,0)$ , and points  $(-5,0)$ ,  $(0,3)$ ,  $(5,0)$ ,  $(0,-3)$ ,  $A(3,a)$ , and  $B(3,b)$  lie on the ellipse. What is the distance, in coordinate units, from  $A$  to  $B$ ?



- A. 2.4  
 B. 3  
 C. 4  
 D. 4.8  
 E. 6
54. Which of the following lists of numbers could be the side lengths, in inches, of a triangle?
- F. 1, 2, 3  
 G. 2, 5, 7  
 H. 3, 7, 11  
 J. 4, 9, 16  
 K. 5, 8, 10
55. Carrie and Manuel are side by side when they begin to run at the same time in the same direction around a track. Carrie runs at a constant rate of 30 seconds per lap, while Manuel runs at a constant rate of 50 seconds per lap. How many seconds after beginning to run will Carrie have run exactly 1 more lap than Manuel?
- A. 20  
 B. 40  
 C. 75  
 D. 80  
 E. 125
56. If  $a$  is a positive even integer and  $b$  is a positive odd integer, then  $[(-3)(+3)]^{ab}$  is:
- F. positive and even.  
 G. positive and odd.  
 H. zero.  
 J. negative and even.  
 K. negative and odd.



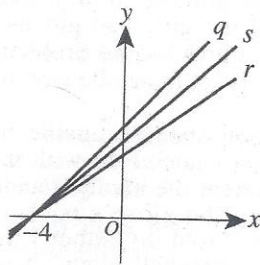
57. Consider the fractions  $\frac{1}{a}$ ,  $\frac{1}{b}$ , and  $\frac{1}{c}$ , where  $a$  and  $b$  are distinct prime numbers greater than 3 and  $c = 3a$ . Suppose that  $a \cdot b \cdot c$  is used as the common denominator when finding the sum of these fractions. In order for the sum to be in lowest terms, its numerator and denominator must be reduced by a factor of which of the following?

A. 3  
 B.  $a$   
 C.  $b$   
 D.  $c$   
 E.  $ab$

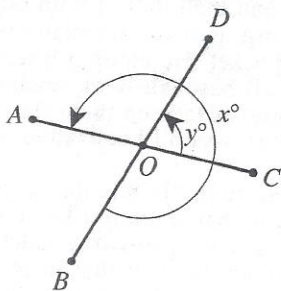
58. If  $x$  and  $a$  are positive rational numbers such that  $x^{2a} = 3$ , then  $x^{6a} = ?$
- F. 6  
 G. 9  
 H. 12  
 J. 18  
 K. 27

59. In the standard  $(x,y)$  coordinate plane below, lines  $q$ ,  $r$ , and  $s$  all have an  $x$ -intercept of  $-4$ . The slope of line  $q$  is 1, the slope of line  $r$  is  $\frac{2}{3}$ , and the slope of line  $s$  is the average of the slopes of lines  $q$  and  $r$ . What is the  $y$ -intercept of line  $s$ ?

A.  $\frac{5}{6}$   
 B.  $\frac{8}{3}$   
 C. 3  
 D.  $\frac{10}{3}$   
 E. 4



60. As shown in the figure below,  $\overline{AC}$  and  $\overline{BD}$  intersect at  $O$ . Given that  $180^\circ < x^\circ < 360^\circ$  and that  $x = 4y$ , what is the value of  $y$ ?



F. 54  
 G. 60  
 H. 67.5  
 J. 72  
 K. 75

DO YOUR FIGURING HERE.

END OF TEST 2

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

DO NOT RETURN TO THE PREVIOUS TEST.