DO YOUR FIGURING HERE

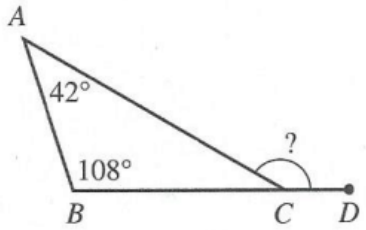
1. A calculator has a regular price of \$59.95 before taxes. It goes on sale at 20% below the regular price. Before taxes are added, what is the sale price of the calculator?

   A. \$11.99
   B. \$29.98
   C. \$39.95
   D. \$47.96
   E. \$54.95

2. Given $r = 6$, $b = 4$, and $g = -9$, $(r + b - g)(b + g) =$?

   F. -95
   G. - 5
   H. 5
   I. 13
   J. 14

3. In the figure below, C is on $\overline{BD}$, $\angle BAC$ measures 42°, and $\angle ABC$ measures 108° . What is the measure of $\angle ACD$?



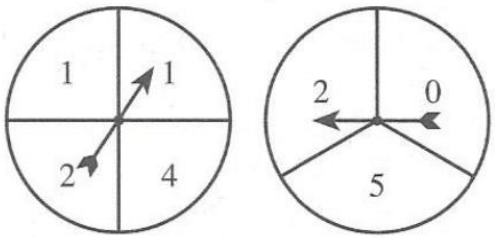
   A. 108°
   B. 120°
   C. 132°
   D. 138°
   E. 150°

4. If $\frac{3}{5}x + 10 = 17$, the $x =$?

   F. $-\frac{35}{3}$
   G. $\frac{5}{3}$
   H. $\frac{35}{3}$
   I. $\frac{21}{5}$
   J. 45

DO YOUR FIGURING HERE

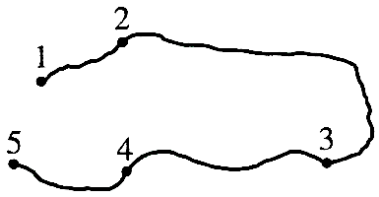
5. What is the length, in inches, of the hypotenuse of a right triangle with a leg that is 9 inches long and a leg that is 2 inches long?
   A. $\sqrt{22}$
   B. $\sqrt{77}$
   C. $\sqrt{85}$
   D. 5.5
   E. 11
6. A bag contains exactly 18 solid-colored buttons: 3 reds, 5 blue, and 10 white. What is the probability of randomly selecting 1 button that is NOT white?
   A. $\frac{1}{18}$
   B. $\frac{1}{8}$
   C. $\frac{4}{9}$
   D. $\frac{2}{3}$
   E. $\frac{4}{5}$
7. What is the sum of 3 consecutive odd integers whose mean is 27?
   A. 39
   B. 75
   C. 81
   D. 87
   E. 93
8. Two dials are shown below. When the arrow on each dial is spun, it is equally likely to point at any of the numbered sectors on its dial after it has stopped spinning. After the arrows are next spun, the numbers in the sectors the arrows point at after they stop spinning will be added together. Which of the following values is NOT a possible sum of those 2 numbers?



   F. 1
   G. 4
   H. 6
   I. 7
   J. 8

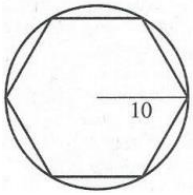
DO YOUR FIGURING HERE

9. On a bike trail there are 5 checkpoints numbered in order, Checkpoint 1 through Checkpoint 5, as shown in the figure below. Some distances along the trail between 2 checkpoints are given: 6.6 miles between 1 and 3; 4.5 miles between 2 and 3; and 9.7 miles between 2 and 5. Which of the following values is closest to the distance, in miles, along the trail between Checkpoint 1 and Checkpoint 5?



A. 432
B. 424
C. 414
D. 396
E. 369

10. In the figure below, a circle with a radius of 10 meters circumscribes a regular hexagon. What is the perimeter, in meters, of hexagon?



F. 30
G. $30\sqrt{3}$
H. 60
I. $60\sqrt{2}$
J. $60\sqrt{3}$

11. To produce aluminum softball bats, it costs the Recreation Equipment Supply Company \$3,500 for overhead, plus \$2 per softball bad produced. What is the maximum number of bats that can be produced by the company for \$15,000?

A. 1,750
B. 3,502
C. 5,000
D. 5,750
E. 7,500

12. Given that $3x + 2 = 4$ and $2y + 6 = 5$, what is $x + y$?

F. $-\frac{1}{2}$
G. $\frac{1}{6}$
H. $\frac{2}{3}$
I. $\frac{7}{6}$
J. $\frac{15}{2}$

13. For all x such that $x \neq 0$, which of the following expressions is equivalent to $\frac{15x^2+25x}{5x}$?

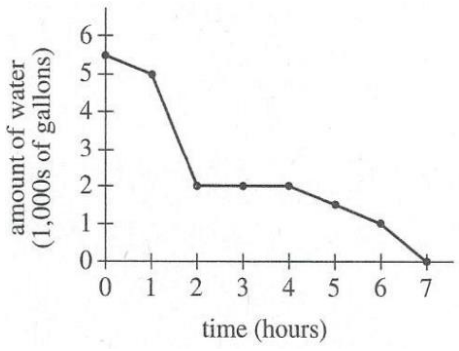
A. $8x$
B. $28x$
C. $3x + 5$
D. $3x^2 + 5$
E. $15x^2 + 5$

DO YOUR FIGURING HERE

14. What is the value of the expression $\frac{|-3-2|^2+(-1)^3}{16\div4\times2-5}$?
    F. -8
    G. $-\frac{2}{3}$
    H. $\frac{2}{3}$
    I. $\frac{26}{3}$
    J. 8

15. Karen invested $2,000 in a special savings account. The balance of this special savings account will double every 5 years. Assuming that Karen makes no other deposits and no withdrawals, what will be the balance of Karen's investment at the end of 40 years?
    A. $ 80,000
    B. $ 256,000
    C. $ 400,000
    D. $ 512,000
    E. $1,024,000

16. The graph below shows the amount of water in a pond over a period of 7 hours. One of the following values is the number of hours the amount of water in the pond remained constant. Which one?



    F. 2
    G. 3
    H. 3.5
    I. 4
    J. 7

17. If it rains in Franklin City on particular day, the probability that it will rain there the following day is 0.70. If it does not rain in Franklin City on a particular day, the probability that it will rain there the following day is 0.10. Given that it rained in Franklin City on Monday, what is the probability that it will NOT rain in Franklin City on Tuesday of the same week?
    A. 0.10
    B. 0.30
    C. 0.60
    D. 0.70
    E. 0.90

DO YOUR FIGURING HERE

18. In the standard (x, y) coordinate plane, what is the slope of the line given by the equation $5x = 9y + 18$?

F. $-\frac{5}{9}$

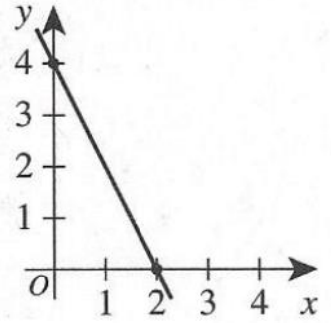
G. $\frac{5}{9}$

H. $\frac{9}{5}$

I. 5

J. 9

19. One of the following equations represents the line graphed in the standard (x, y) coordinate plane below. Which one?



A. $y = -2x + 2$

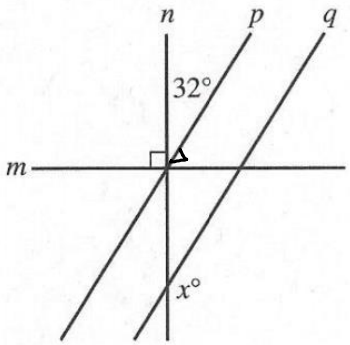
B. $y = -2x + 4$

C. $y = 2x + 4$

D. $y = 4x - 2$

E. $y = 4x + 2$

20. In the figure below, line m is perpendicular to line n, and line p is parallel to line q. Lines m, n, and p intersect at a single point. Some angle measures are given. What is the value of x?



F. 32

G. 58

H. 122

I. 148

J. 158

21. A bag contains 12 solid colored marbles of the same size: 4 green, 3 red, 2 yellow, and 3 blue. Which of the following expressions gives the probability of drawing, at random and without replacement, a green on 1st draw, red one 2nd draw, yellow on 3rd draw?

A. $\left(\frac{4}{12}\right)\left(\frac{3}{12}\right)\left(\frac{3}{12}\right)$

B. $\left(\frac{2}{12}\right)\left(\frac{3}{11}\right)\left(\frac{4}{10}\right)$

C. $\left(\frac{4}{12}\right)\left(\frac{3}{11}\right)\left(\frac{3}{10}\right)$

D. $\left(\frac{4}{12}\right)\left(\frac{3}{12}\right)\left(\frac{2}{12}\right)$

E. $\left(\frac{4}{12}\right)\left(\frac{3}{11}\right)\left(\frac{2}{10}\right)$

DO YOUR FIGURING HERE

22. A physical education teacher recorded the distances, in inches, that her students jumped during long jump lesson. The distances of 1 jump by each of the students are represented in the stem-and-leaf plot below.

Stem	Leaf
3	7 8
4	3 5 6 7
5	2 4 5 8 9
6	0 1 2 3 6
7	0 1 2

Key: 5 | 2 = 52 *inches*

What is the probability that a student chosen at random from the class will have jumped at most 50 inches?

F. $\frac{7}{24}$

G. $\frac{6}{24}$

H. $\frac{13}{19}$

I. $\frac{6}{19}$

J. $\frac{7}{19}$

23. Given that the function f defined as $f(x) = x^2 + 1$ has domain $\{-1,2,4\}$, what is the range of f?

A. $\{-1,0,2\}$

B. $\{-1,5,9\}$

C. $\{-1,2,5\}$

D. $\{0,3,5\}$

E. $\{2,5,17\}$

24. To the nearest 1 foot, what is the height of a rectangular prism with a base length of 20 feet, a base width of $2\frac{1}{2}$ feet, and a volume of 150 cubic feet?

F. 2

G. 3

H. 8

I. 60

J. 70

DO YOUR FIGURING HERE.

25. Tables of values for 2 functions f and g are shown below. What is the value of $f(g(-3))$?

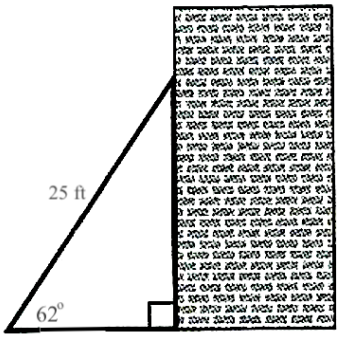
x	$f(x)$
-7	9
-3	-7
1	5
5	3

x	$g(x)$
-3	5
-7	-1
3	-5
5	-7

A. -21
B. -7
C. 5
D. 3
E. 9

26. In the figure shown below, a ladder 25 feet long forms an angle of 62° with the level ground as it leans against the vertical side of a building. The distance from the bottom of the ladder, in feet, to the bottom of the building is equal to which of the following expression?

F. $\frac{25}{2}$
G. $\frac{25\sqrt{3}}{2}$
H. $\frac{25}{2}$
I. $25 \sin 62^o$
J. $25 \cos 62^o$
K. $25 \tan 62^o$



27. The isotope iodine-131 has a half-life of 10 days, which means that the amount of iodine-131 remaining after t days is $N\left(\frac{1}{2}\right)^{\frac{t}{10}}$, where N is the number of grams of iodine-131 at $t=0$. How many grams of iodine-131 will remain after 40 days if there were 64 grams of iodine-131 at $t=0$?

A. 0
B. 4
C. 8
D. 16
E. 128

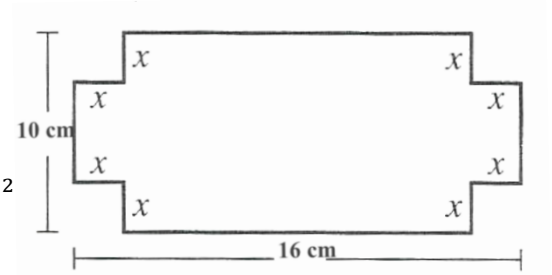
28. Which of the following expressions is equivalent to $\sqrt[3]{27x^{12}}$?

F. $3x^9$
G. $3x^4$
H. $9x^4$
I. $9x^9$
J. $27x^4$

DO YOUR FIGURING HERE.

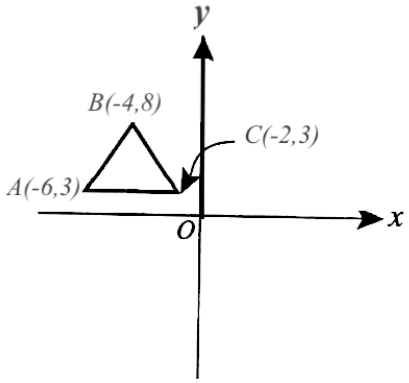
29. Two concentric circles have radii of 8 centimeters and 4 centimeters, respectively. How many centimeters longer is the circumference of the larger circle than that of the smaller circle?
    A. 1
    B. π
    C. 4π
    D. 8π
    E. 16π

30. Squares with sides of length x cm have been removed from each corner of a rectangle measuring 10 cm by 16 cm, resulting in the figure shown below. In terms of x, what is the area, in square centimeters, of the figure?



    F. $40 - 4x^2$
    G. $160 - 4x^2$
    H. $160 + 4x^2$
    I. $160 - 52x + 4x^2$
    J. $160 - 26x + x^2$

31. In the standard *(x,y)* coordinate plane below, ΔABC will be translated 8 units up and then resulting image will be reflected over the x-axis. What will be the coordinates of the final image of C resulting from both transformations?



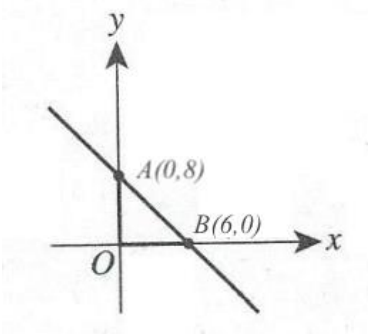
    A. $(\ 2,\ 11)$
    B. $(-2,-11)$
    C. $(\ -2,\ 11)$
    D. $(\ 11,-2)$
    E. $(-11,-2)$

32. Olivia, Ashton, and Jane are standing on a soccer field such that Olivia is 40 meters due west of Ashton and Jane is 30 meters due north of Ashton. Their positions are at the vertices of a triangle. Which of the following expressions gives the degree measure of the angle of the triangle at the vertex where Jane is standing?
    F. $cos^{-1}\left(\frac{40}{30}\right)$
    G. $sin^{-1}\left(\frac{40}{30}\right)$
    H. $sin^{-1}\left(\frac{30}{40}\right)$
    I. $tan^{-1}\left(\frac{40}{30}\right)$
    J. $tan^{-1}\left(\frac{30}{40}\right)$

Use the following information to answer questions 33-35

DO YOUR FIGURING HERE.

In the standard (x, y) coordinate plane, below, ΔAOB is formed by $\overleftrightarrow{AB}$, the x-axis, and then y-axis.



33. What is the area of ΔAOB in square coordinate units?
    A. $8\sqrt{2}$
    B. 10
    C. 24
    D. 32
    E. 48

34. What is the length of $\overline{AB}$ in coordinate units?
    F. 5
    G. $8\sqrt{3}$
    H. $6\sqrt{3}$
    I. 10
    J. 12

35. Which of the following is an equation of $\overleftrightarrow{AB}$?
    A. $y = 6x$
    B. $y = 8x$
    C. $y = -\frac{4}{3}x + 8$
    D. $y = \frac{3}{4}x + 8$
    E. $y = \frac{4}{3}x + 8$

36. Which of the following arranges the numbers $\frac{3}{2}$, $\overline{1.5}$, 1.05, and $\overline{1.05}$ into ascending order? (Note: The overbar notation shows that the digits under the bar will repeat. For example, $\overline{1.73} = 1.73737373$ ...)
    F. $1.08 < \overline{1.08} < \frac{3}{2} < \overline{1.5}$
    G. $\overline{1.08} < 1.08 < \frac{3}{2} < \overline{1.5}$
    H. $1.08 < \overline{1.08} < \overline{1.5} < \frac{3}{2}$
    I. $\overline{1.5} << \frac{3}{2} < \overline{1.08} < 1.08$
    J. $\frac{3}{2} < \overline{1.5} < 1.08 < \overline{1.08}$

DO YOUR FIGURING HERE.

37. Supreme asked 24 customers to rate their clothes. The table below summarizes 24 customers ratings.

Rating	Number of Customers
3	6
2	4
1	4
0	10

Which of the following values is closest to the mean of the 24 customer ratings?

A. 1.3
B. 1.5
C. 2.0
D. 2.7
E. 3.3

38. Which of the following operations will produce the largest result when substituted for the blank in the expression $\frac{1}{4}$___(-6)?

F. Plus
G. Minus
H. Divided by
I. Multiplied by
J. Average with

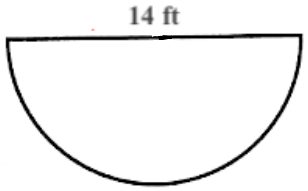
39. A local bowling league established its handicap for bowlers who have an average of 150 or less as 65% the sum between 150 and the bowler's average score. If H represents the handicap of a such a bowler and A represents his or her average score, which of the following equations givens H in terms of A?

A. $H = 52 + A$
B. $H = A + 52$
C. $H = 150 + \frac{A}{0.65}$
D. $H = 0.65(150 + A)$
E. $H = 0.65A + 150$

40. The equation $t = -0.0080a + 20$ models the dawn temperature, t degrees Celsius, a meter above sea level, on a certain day on Laurel Mountain. According to this equation, what would be the dawn temperature for that certain day on Laurel Mountain at sea level?

F. 0°C
G. 0.0080°C
H. 19.992°C
I. 20.0080°C
J. 20°C

41. The semicircular top surface of Ron's patio is shown below. What is the area, in square feet, of the top of the surface of the patio? (Rounded to the nearest whole number)



42. Which of the following equations is that of a circle that is in the standard (x, y) coordinate plane, has center $(-3,2)$, and has a radius of 6 coordinate units?

F. $(x-3)+(y+2)=6$
G. $(x+3)+(y-2)=6$
H. $(x-3)^2+(y+2)^2=\sqrt{6}$
I. $(x-3)^2+(y+2)^2=36$
J. $(x+3)^2+(y-2)^2=36$

43. What is the smallest positive integer having exactly 5 different positive integer divisors?
A. 5
B. 6
C. 12
D. 16
E. 18

44. If $3^a = 27$and $3^{a+b} = \frac{1}{9}$, then b =?

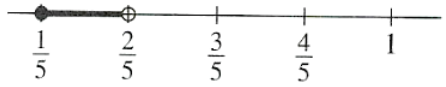
45. Florencia has 80 feet of fencing and a 4-foot-wide gate to use to enclose a dog pen. Among the following, a dog pen of which shape and dimensions will have the largest area if only the fencing and the gate are used to enclose it?

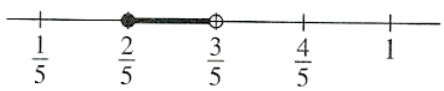
A. A square with a side length of 20 feet
B. A square with a side length of 21 feet
C. A rectangle with a side length of 19 feet and a width of 21 feet
D. A rectangle with a side length of 20 feet and a width of 22 feet.
E. A rectangle with a side length of 20 feet and a width of 21 feet.

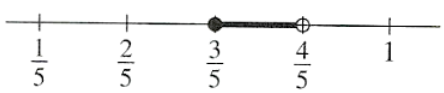
DO YOUR FIGURING HERE.

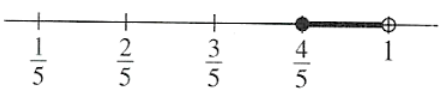
DO YOUR FIGURING HERE.

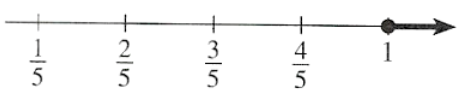
46. The difference $\frac{3}{4} - \frac{2}{7}$ lies in which of the following intervals graphed on the real number line?

F.


G.


H.


J.


K.


47. The recursive formula for a sequence is given below, where a_n, is the value of nth term.

$$a_1 = 8$$
$$a_n = a_{n-1} + 4$$

A. $a_n = -4n + 8$
B. $a_n = 4n + 4$
C. $a_n = 4n + 8$
D. $a_n = 8n - 4$
E. $a_n = 8n + 4$

48. The probabilities that each of 2 independent events will occur are given in the table below.

Event	Probability
A	0.30
B	0.50

What is the probability that both Events A and B will occur-that is, $P(A \text{ and } B)$?

49. What is the solution set of the equation $x^4 - 5x^2 - 36 = 0$?
A. $\{-3,3,-2i,2i\}$
B. $\{-2,2,-3i,3i\}$
C. $\{-2,2,-3,3\}$
D. $\{-4,-3,3\}$
E. $\{-4,-9\}$

DO YOUR FIGURING HERE

Use the following information to answer questions 50-52.

Skyline Tours is offering hot air balloon tours. The tables below give information about the balloon, the equipment, and the tours offered.

Hot-air balloon information	
Volume of balloon	80,000 cubic feet
Maximum capacity of basket	8 people
Weight of balloon	200 pounds
Weight of basket	150 pounds
Weight of burner	50 pounds

Tour information			
Tour	Ticket price	Duration, in minutes	Maximum altitude, in feet
A	$100	45	500
B	$125	60	600
C	$200	90	1,000

50. Jarrod is looking up at a hot air balloon. The balloon is currently at the maximum altitude during Tour B. The angle of elevation from the horizon is 37°, as shown in the figure below. Which of the following expressions is closest to the distance, d feet, from Jarrod to the basket?

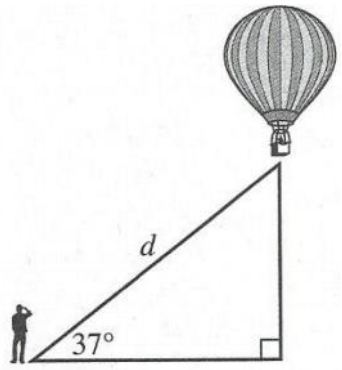
F. $\frac{600}{\cos(37^o)}$

G. $\frac{600}{\sin(37^o)}$

H. $1{,}000 \sin(37^o)$

I. $1{,}000 \cos(37^o)$

J. $1{,}000 \tan(37^o)$



51. Skyline Tours made $4,350 in 1 day by selling a total of 30 tickets for Tours A, B, and C. They sold twice as many tickets for Tour A as for Tour B. How many tickets were sold for Tour C?

A. 4
B. 6
C. 8
D. 12
E. 16


2
2

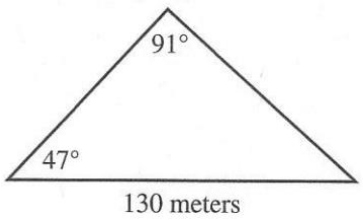
DO YOUR FIGURING HERE

52. Jarrod went on Tour A, and his trip covered a distance of 9 miles. Bhumi went to Tour C, and her trip covered a distance of 10.5 miles. Which of the following values is the difference, in miles per hour, of the average speeds of their balloons during their tours?

F. 0
G. 2
H. 5
I. 8
J. 9

---

53. A forest fire is contained within a triangular region, which is shown below. The supervising firefighter plans to fight the fire by positioning a firefighter about every 4 meters along the perimeter of the triangle. Among the following, which expression best estimates the planned number of firefighters along the perimeter?
(Note: The law of sines states that in every triangle, the 3 ratios of length of a side to the sine of the angle opposite that side are equal.)



A. $\frac{130+\left(\frac{130 \sin 42^o}{\sin 91^o}\right)+\left(\frac{130 \sin 47^o}{\sin 91^o}\right)}{4}$

B. $\frac{130+\left(\frac{130 \sin 91^o}{\sin 42^o}\right)+\left(\frac{130 \sin 91^o}{\sin 47^o}\right)}{4}$

C. $130+\left(\frac{130 \sin 42^o}{\sin 91^o}\right)+\left(\frac{130 \sin 47^o}{\sin 91^o}\right)$

D. $\frac{\frac{1}{2}\left(\frac{130 \sin 47^o}{\sin 91^o}\right)}{4}$

E. $\frac{\frac{1}{2}(130)}{4}$

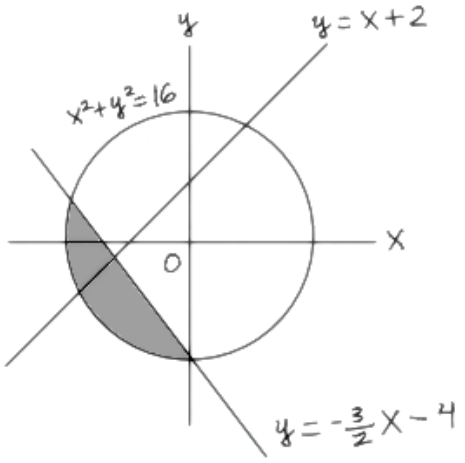
54. How many integers between, but not including, 10 and 20 have a prime factorization with exactly 3 factors that are NOT necessarily unique? (Note: 1 is NOT a prime number.)

F. 1
G. 2
H. 3
I. 4
J. 5


2
2

DO YOUR FIGURING HERE

55. The graphs of $y = x + 2$, $y = -\frac{3}{2}x + 2$, and $x^2 + y^2 = 16$ are shown in the standard (x, y) coordinate plane below. The shaded region is the solution set to one of the following systems of inequalities. Which system is it?



A. $\begin{matrix} y \le -\frac{3}{2}x - 4 \\ x^2 + y^2 \ge 16 \end{matrix}$

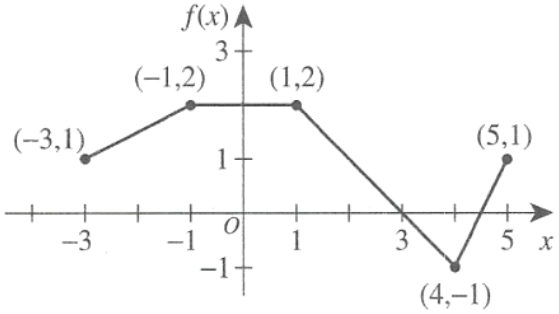
B. $\begin{matrix} y \le -\frac{3}{2}x - 4 \\ x^2 + y^2 \le 16 \end{matrix}$

C. $\begin{matrix} y \le x + 2 \\ x^2 + y^2 \le 16 \end{matrix}$

D. $\begin{matrix} y \ge -\frac{3}{2}x - 4 \\ x^2 + y^2 \le 16 \end{matrix}$

E. $\begin{matrix} y \ge x + 2 \\ x^2 + y^2 \ge 16 \end{matrix}$

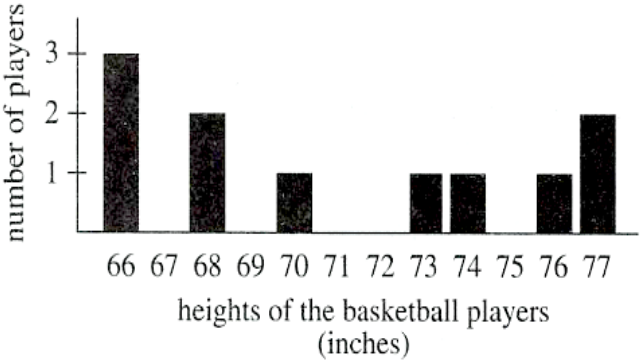
56. The function *f(x)* is shown below with several points labeled. Another function, *g(x),* is defined such that $g(x) = -[f(x) + 3]$. What is $g(4)$?



57. The ratio of *a* to *b* is 3 to 1, and the ratio of *b* to *c* is 5 to 1. What is the value of $\frac{2a+3b}{4b+3c}$?

DO YOUR FIGURING HERE

58. The frequency histogram below shows the distribution of heights, in inches, of 11 basketball players.



Using the data from the frequency histogram, what is the sum of the mean and median of this distribution?

59. In the standard (x, y) coordinate plane, what is the y-intercept of the graph of the function $y = f(x)$ defined below?

$$f(x) = \begin{cases} x^2 - 1 \; for \; x < -3 \\ 2x - 3 \; for \; -3 \leq x \leq 2 \\ |x - 3| \; for \; x > 2 \end{cases}$$

A. -5
B. -3
C. -1
D. 2.5
E. 3

60. What is the matrix product $\begin{bmatrix} 2 & 4 \\ 6 & 5 \end{bmatrix} \begin{bmatrix} a & b \\ c & d \end{bmatrix}$?

G. $\begin{bmatrix} 2a & 4b \\ 6c & 5d \end{bmatrix}$

H. $\begin{bmatrix} (2a + 4b) \\ (6c + 5d) \end{bmatrix}$

I. $[(2a + 6c)(4b + 5d)]$

J. $\begin{bmatrix} (2a + 4c) & (2b + 4d) \\ (6c + 5d) & (6a + 5b) \end{bmatrix}$

K. $\begin{bmatrix} (2a + 4c) & (2b + 4d) \\ (6a + 5c) & (6b + 5d) \end{bmatrix}$

END OF TEST
STOP! DO NOT RUN THE PAGE UNTIL TOLD TO DO SO.
DO NOT RETURN TO THE PREVIOUS TEST.