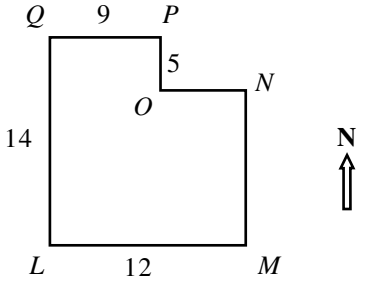
Mini-Test 4

DO YOUR FIGURING HERE.

31. An abandoned area of town has the shape and dimensions of the blocks given below. All borders run either north-south or east-west. A surveyor has set up his equipment halfway between point *M* and point *O*. Which of the following is the location of the surveyor from point *L* ?



A. $9\frac{1}{2}$ blocks east and $4\frac{1}{2}$ blocks north

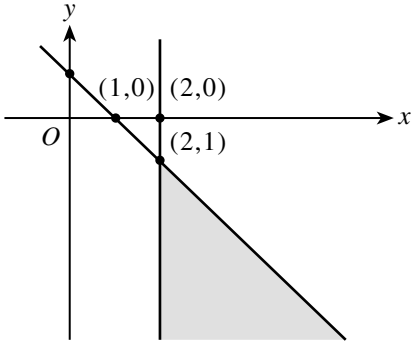
B. 9 blocks east and 5 blocks north

C. $10\frac{1}{2}$ blocks east and $4\frac{1}{2}$ blocks north

D. $10\frac{1}{2}$ blocks east and $5\frac{1}{2}$ blocks north

E. 12 blocks east and 9 blocks north

32. Which of the following systems of inequalities is represented by the shaded region of the graph below?



F. $y \le x$ and $x \ge 1$
G. $y \le -x + 1$ and $x \ge 2$
H. $y \le -x + 1$ and $x \ge 1$
J. $y \le x - 1$ and $x \ge 2$
K. $y \le x + 1$ and $x \ge -2$

DO YOUR FIGURING HERE.

33. If $\sin\theta = \frac{4}{5}$ and $\frac{\pi}{2} < \theta < \pi$, then $\cos\theta = ?$

A. $-\frac{4}{5}$

B. $-\frac{3}{4}$

C. $-\frac{3}{5}$

D. $\frac{3}{5}$

E. $\frac{5}{3}$

34. A triangle, ΔPQR, is reflected across the x-axis to have the image $\Delta P'Q'R'$ in the standard (x,y) coordinate plane; thus, P reflects to P'. The coordinates of point P are (a,b). Which of the following coordinates best describes the location of point P'?

F. (a,b)
G. $(a,-b)$
H. $(-a,b)$
J. $(-a,-b)$
K. Cannot be determined from the given information

DO YOUR FIGURING HERE.

35. What is $\cos \frac{\pi}{12}$, given that $\frac{\pi}{12} = \frac{\pi}{3} - \frac{\pi}{4}$ and $\cos(\alpha - \beta) = \cos(\alpha) \cdot \cos(\beta) + \sin(\alpha) \cdot \sin(\beta)$?

(Note: You may use the following table of values.)

θ	Sin θ	Cos θ
$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$
$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$

A. $-\frac{1}{2}$

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

C. $\frac{\sqrt{2}}{2}$

D. $\frac{\sqrt{2} - \sqrt{6}}{4}$

E. $\frac{\sqrt{2} + \sqrt{6}}{4}$

36. The larger of two numbers exceeds twice the smaller number by 6. The sum of twice the larger number and 4 times the smaller number is 70. If x is the smaller number, which equation below determines the correct value of x ?

F. $2(2x - 4) + 6x = 70$
G. $2(2x + 6) + 4x = 70$
H. $2(2x - 6) + 4x = 70$
J. $4(2x + 6) + 2x = 70$
K. $4(2x - 6) + 2x = 70$

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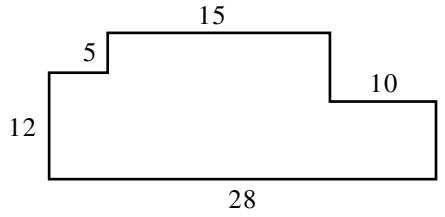
DO YOUR FIGURING HERE.

37. In the figure shown below, each pair of intersecting line segments meets at a right angle, and all the lengths given are in inches. What is the perimeter, in inches, of the figure?



A. 70
B. 75
C. 80
D. 90
E. 95

38. Which of the following statements describes the total number of dots in the first n rows of the triangular arrangement illustrated below?

1st row •
2nd row • • •
3rd row • • • • •
4th row • • • • • • •
5th row • • • • • • • • •

F. The total is equal to $2n$, where n is the number of rows.
G. The total is equal to n^2, where n is the number of rows.
H. The total is equal to $n!$, where n is the number of rows.
J. The total is equal to 2^n, where n is the number of rows.
K. The total is equal to $2^n - n!$, where n is the number of rows.

DO YOUR FIGURING HERE.

39. A certain parabola in the standard (x,y) coordinate plane opens downwards and has a vertex NOT at the origin (0,0). Which of the following equations could describe the parabola?

A. $x = 5y^2$
B. $y = 2(x + 3)^2 + 5$
C. $x = -2(y + 2)^2 + 4$
D. $y = -3x^2$
E. $y = -4(x + 1)^2 - 3$

40. The graph below shows the 2012 estimate of the five largest cities in the United States, to the nearest 1 million. According to the graph, the population of Houston makes up what fraction of the total population living in all five cities? Key: ☺ = 1 million people.

City	Population
New York	☺☺☺☺☺☺☺☺
Los Angeles	☺☺☺☺
Chicago	☺☺☺
Houston	☺☺
Philadelphia	☺☺

F. $\frac{1}{11}$

G. $\frac{1}{10}$

H. $\frac{2}{19}$

J. $\frac{3}{19}$

K. $\frac{4}{19}$

END OF MINI-TEST FOUR

STOP! DO NOT GO ON TO THE NEXT PAGE UNTIL TOLD TO DO SO.