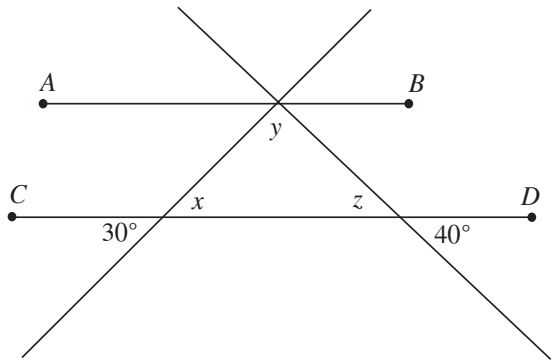
GEOMETRY DRILL 1

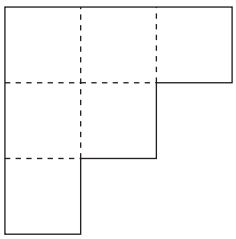
Plane Geometry

8. In the figure below, $\overline{AB} \parallel \overline{CD}$. What is the value of y ?



F. 110°
G. 120°
H. 135°
J. 140°
K. 170°

14. The 8-sided figure below is divided into 6 congruent squares. The total area of the 6 squares is 96 square centimeters. What is the perimeter, in centimeters, of the figure?



F. 16
G. 28
H. 48
J. 56
K. 96

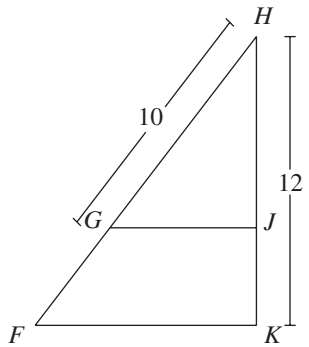
22. The base of triangle M is four times the base of triangle N, while the height of triangle N is half the height of triangle M. The area of triangle M is how many times that of triangle N ?

F. 2
G. 4
H. 8
J. 10
K. 16

26. A rectangular horse corral is built along one side of a square barn whose area is 5,776 square feet. The length of the corral is the same as the length of the side of the barn, while the width of the corral is one-fourth the length of the side of the barn. What is the area of the horse corral, in square feet?

F. 76
G. 1,016
H. 1,284
J. 1,444
K. 5,776

27. In right triangle ΔFHK below, $\overline{GJ}$ is parallel to $\overline{FK}$, and $\overline{GJ}$ is perpendicular to $\overline{HK}$ at J. The length of $\overline{HK}$ is 12 inches, the length of $\overline{GJ}$ is 6 inches, and the length of $\overline{GH}$ is 10 inches. What is the length, in inches, of $\overline{FK}$?

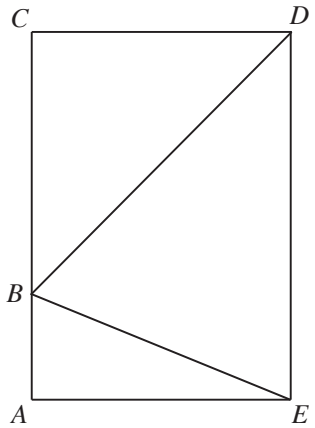


A. 7
B. 8
C. 9
D. 10
E. 11

30. The diameter of circle A is twice that of circle B. If the area of circle A is 36π, then what is the circumference of circle B ?

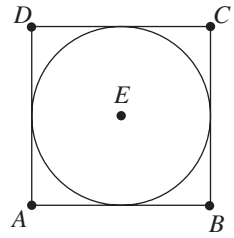
F. π
G. 3π
H. 6π
J. 9π
K. 18π

36. In the figure below, the distance from A to B is $\frac{1}{3}$ the distance from B to C. The area of ΔBDE is what fraction of the area of rectangle $ACDE$?



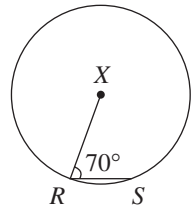
F. $\frac{1}{6}$
G. $\frac{1}{3}$
H. $\frac{1}{2}$
J. $\frac{3}{5}$
K. $\frac{2}{3}$

39. The circle with center E is inscribed in square $ABCD$, as shown in the figure below. If line $\overline{AC}$ (not shown) has a length of $8\sqrt{2}$, then what is the area of the circle?



A. π
B. 4π
C. 8π
D. 12π
E. 16π

48. In the figure below, the circle with center X has a radius of 8 centimeters, and the measure of $\angle SRX$ is 70°. What is the measure of $\overline{RS}$?

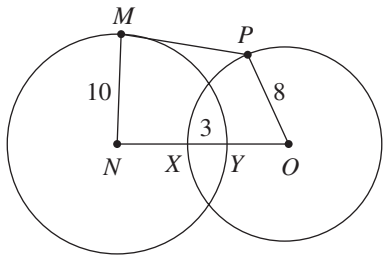


F. 20°
G. 40°
H. 50°
J. 55°
K. 70°

54. The side of an equilateral triangle is s inches longer than the side of a second equilateral triangle. How many inches longer is the altitude of the first triangle than the altitude of the second triangle?

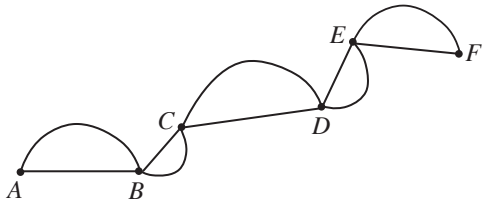
F. $\frac{\sqrt{3}}{2}s$
G. $\sqrt{2}s$
H. $2s$
J. $3s$
K. s^3

55. In the figure below, the circles' centers at N and O intersect at X and Y, and points N, X, Y, and O are collinear. The lengths of $\overline{MN}$, $\overline{OP}$, and $\overline{XY}$ are 10, 8, and 3 inches, respectively. What is the length, in inches, of $\overline{NO}$?



A. 10
B. 11
C. 12
D. 15
E. 18

57. The five semicircles in the figure below touch only at their corners. If the distance from A to F along the diameters of the semicircles is 60 inches, what is the distance, in inches, from F to A along the arcs of these semicircles?



A. 30π
B. 40π
C. 60π
D. 72π
E. 90π

Coordinate Geometry

3. A point at (5,–4) in the standard (x,y) coordinate plane is shifted left 3 units and up 6 units. What are the new coordinates of the point?

A. (11, 7)
B. (8, 2)
C. (8,10)
D. (2, 2)
E. (2,10)

13. The points $A(-6,8)$ and $B(10,2)$ lie in the standard (x,y) coordinate plane. What is the midpoint of $\overline{AB}$?

A. (–3, 4)
B. (2, 5)
C. (4,10)
D. (5, 1)
E. (8,–3)

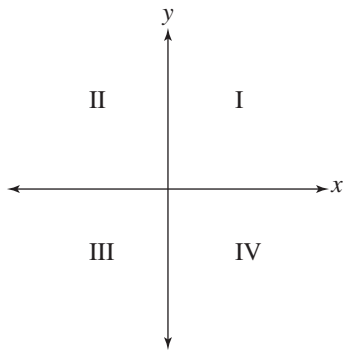
19. What is the x-intercept of the line $y = 5x + 2$?

A. $\left(0, -\frac{2}{5}\right)$
B. $\left(0, \frac{2}{5}\right)$
C. (2, 0)
D. $\left(\frac{2}{5}, 0\right)$
E. $\left(-\frac{2}{5}, 0\right)$

24. Points $O(5,3)$ and $P(-3,8)$ lie in the standard (x,y) coordinate plane. What is the slope of a line that is perpendicular to line of $\overline{OP}$?

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

33. What are the quadrants of the standard (x,y) coordinate plane below that contain points on the graph of the equation $8x + 4y = 12$?



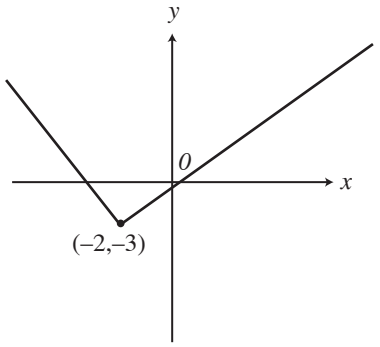
Quadrants of the standard (x,y) coordinate plane

A. II and IV only
B. I, II, and III only
C. I, II, and IV only
D. I, III, and IV only
E. II, III, and IV only

39. On a map in the standard (x,y) coordinate plane, the cities of Everton and Springfield are represented by the points (–3,–5) and (–6,–8), respectively. Each unit on the map represents an actual distance of 20 kilometers. Which of the following is closest to the distance, in kilometers, between these 2 cities?

A. 316
B. 120
C. 85
D. 60
E. 49

41. The figure below shows the graph in the standard (x,y) coordinate plane of one of the following functions. Which function is shown?



A. $y = |x + 2| + 3$

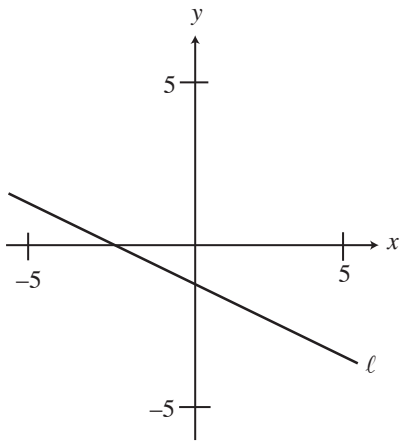
B. $y = |x - 2| - 3$

C. $y = |x + 2| - 3$

D. $y = |x + 3| - 2$

E. $y = |x - 3| + 2$

47. The figure below shows the graph of line ℓ in the standard (x,y) coordinate plane. Which of the following could be the equation of line ℓ ?



A. $y = -\frac{5}{2}x - 1$

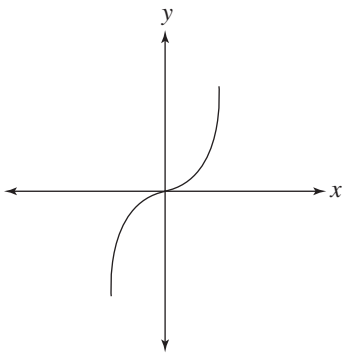
B. $y = \frac{5}{2}x + 1$

C. $y = -\frac{2}{5}x - 1$

D. $y = -\frac{2}{5}x + 1$

E. $y = \frac{2}{5}x - 1$

48. The graph of $f(x) = x^3$ is shown in the standard (x,y) coordinate plane below. For which of the following equations is the graph of the cubic function shifted 4 units to the left and 3 units up?



F. $f(x) = (x - 4)^3 - 3$

G. $f(x) = (x - 4)^3 + 3$

H. $f(x) = (x + 3)^3 - 4$

J. $f(x) = (x + 4)^3 + 3$

K. $f(x) = (x + 4)^3 - 3$

50. If a circle in the standard (x,y) coordinate plane has the equation $(x + 3)^2 + (y - 5)^2 = 16$, then which of the following points represents the center of the circle?

F. (–5, 3)

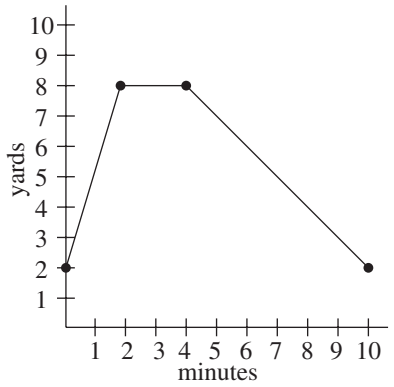
G. (–3,–5)

H. (3, 5)

J. (–5,–3)

K. (–3, 5)

56. The graph below shows the distance a hot-air balloon is from the ground for a period of 10 minutes. A certain order of 3 of the following 5 actions describes the balloon's movement in relation to the position of the ground. Which order is it?

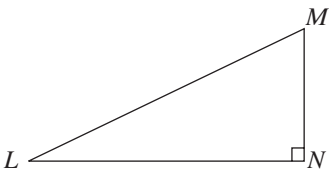


I. Remains stationary for 2 minutes
II. Moves away at 3 yards per minute
III. Moves toward at 3 yards per minute
IV. Moves away at 1 yard per minute
V. Moves toward at 1 yard per minute

F. I, II, II
G. II, I, V
H. III, I, IV
J. IV, I, III
K. V, I, II

Trigonometry

21. In right triangle ΔLMN below, $\sin L = \frac{3}{8}$. Which of the following expressions is equal to $\sin M$?



A. $\frac{8}{3}$

B. $\frac{\sqrt{73}}{3}$

C. $\frac{\sqrt{55}}{3}$

D. $\frac{\sqrt{73}}{8}$

E. $\frac{\sqrt{55}}{8}$

23. In isosceles right triangle ABC (not shown), $\overline{AB} = \overline{AC} = 3$. Which of the following represents the value of $\cos \angle ABC$?

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

B. $\frac{\sqrt{3}}{2}$

C. $\sqrt{2}$

D. $\sqrt{3}$

E. 2

25. A painter leans a 10-foot ladder against a wall at an angle of 65° relative to the ground. How far away from the wall is the base of the ladder?

A. 10 tan 65°

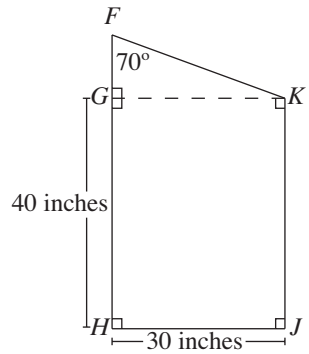
B. 10 sin 65°

C. 10 cos 65°

D. $\frac{10}{\sin 65°}$

E. $\frac{10}{\cos 65°}$

29. For the polygon below, which of the following represents the length, in inches, of $\overline{FK}$?



A. 10

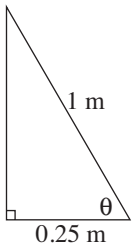
B. 30

C. $\frac{10}{\sin 70°}$

D. $\frac{30}{\sin 70°}$

E. $\sin 70°$

35. A right triangle is shown in the figure below. Which of the following expressions gives θ ?



A. $\cos^{-1}\left(\frac{1}{4}\right)$

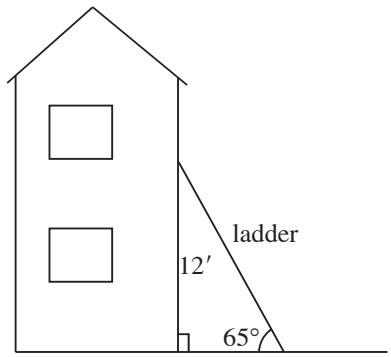
B. $\sin^{-1}\left(\frac{1}{4}\right)$

C. $\tan^{-1}\left(\frac{1}{4}\right)$

D. $\cos^{-1}(4)$

E. $\tan^{-1}(4)$

37. A straight ladder is leaned against a house so that the top of the ladder is 12 feet above level ground, as shown in the figure below. Which of the following gives the length, in feet, of the ladder?



A. $x = 12\cos 65°$

B. $x = 12\sin 65°$

C. $x = \frac{12}{\cos 65°}$

D. $x = \frac{12}{\sin 65°}$

E. $x = \frac{12}{\tan 65°}$

53. In ΔXYZ, the measure of $\angle X$ is 57°, the measure of $\angle Y$ is 72°, and the length of $\overline{XZ}$ is 12 inches. Which of the following is an expression for the length, in inches, of $\overline{YZ}$?

(Note: The Law of Sines states that for any triangle, the ratios of the lengths of the sides to the sines of the angles opposite those sides are equal.)

A. $\frac{\sin 57°}{12\sin 72°}$

B. $\frac{\sin 72°}{12\sin 57°}$

C. $\frac{12\sin 72°}{\sin 57°}$

D. $\frac{12\sin 57°}{\sin 72°}$

E. $\frac{(\sin 57°)\ (\sin 72°)}{12}$

56. If $\cos\theta = \frac{3}{4}$ and $0 < \theta < \frac{\pi}{2}$, which of the following is equal to $\sin\theta\tan\theta$?

F. $\frac{7}{12}$

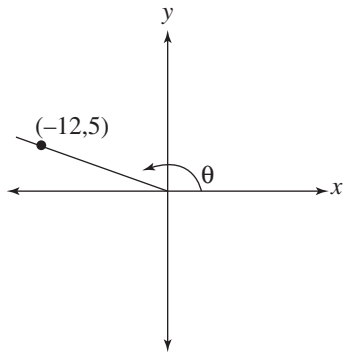
G. $\frac{4}{3\sqrt{7}}$

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

J. $\frac{4\sqrt{7}}{3}$

K. $\frac{12}{7}$

58. The angle in the standard (x,y) coordinate plane shown below has its vertex at the origin. One side of this angle includes the positive x-axis, and the other side with measure θ passes through $(-12,5)$. What is the sine of θ ?



F. $-\frac{13}{5}$

G. $-\frac{12}{13}$

H. $-\frac{5}{13}$

J. $\frac{5}{13}$

K. $\frac{12}{5}$

59. The domain of the function $f(x) = 4\sin(3x - 1) + 2$ is all real numbers. Which of the following is the range of the function $f(x)$?

A. $-4 \le f(x) \le 4$

B. $-6 \le f(x) \le 2$

C. $-5 \le f(x) \le 3$

D. $-2 \le f(x) \le 6$

E. All real numbers