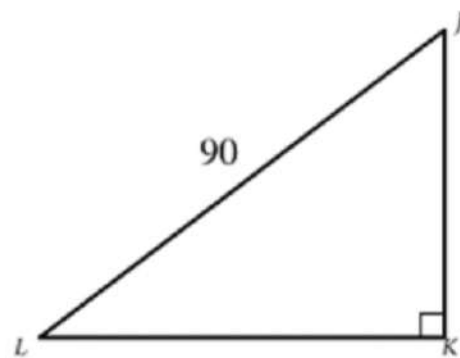




Note: Figure not drawn to scale.

In the right triangle JKL , the tangent $\angle L$ of is $\frac{3}{4}$. What is the length of $\overline{JK}$?

- ☐ A) $\frac{35}{16}$
- ☒ B) $\frac{15}{4}$
- ☐ C) 54
- ☐ D) 72

13

$$\sqrt[5]{x^m}$$

In the given expression, m is a constant and $x > 1$. The expression can be rewritten as $\sqrt[7]{x}$. What is the value of m ?

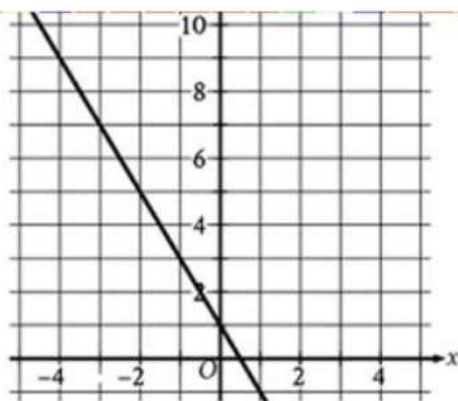
15

$$z(w) = (0.829)^{2w}$$

The function z is defined by the equation shown. The value of $z(w)$ decreases by p % for each increase by 1 in the value of w . Which of the following is closest to the value of p ?

- ☐ A) 0.171
- ☐ B) 0.829
- ☐ C) 17.1
- ☐ D) 31.3

16



The graph of the linear function $y = f(x) + 11$ is shown. If c and d are positive constants, which equation could define f ?

- ☐ A) $f(x) = -d - cx$
- ☐ B) $f(x) = d + cx$
- ☐ C) $f(x) = d - cx$
- ☐ D) $f(x) = -d + cx$

The speed of particles A, B, and C are a meters per second, b meters per second, and c meters per second, respectively. If the speed of particle A is 6,000% of the speed of particle C and the speed of particle C is 0.008% of the speed of particle B, which expression represents the value of $a + b$ in terms of c ?

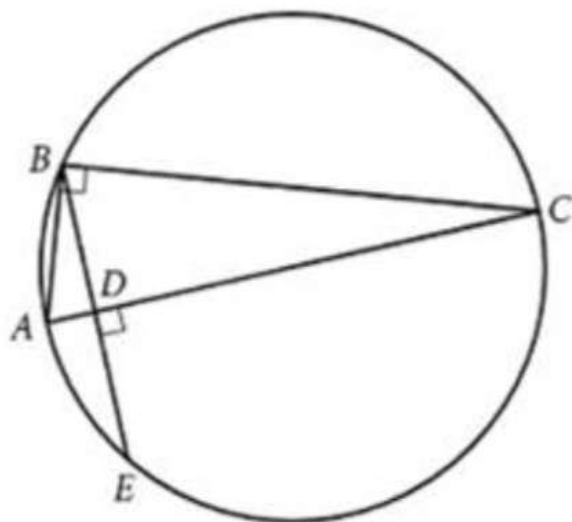
- ☐ A) $12,560c$
- ☐ B) $6,125c$
- ☐ C) $6,008c$
- ☐ D) $1,850c$

19

$$-16(5x - 3)^2 + 4(5x - 2)^2$$

The given expression can be rewritten as $\frac{a}{4}x^2 + \frac{b}{4}x + \frac{c}{4}$, where a , b , and c are constants. What is the value of $a + b + c$?

- ☐ A) -112
- ☐ B) -56
- ☐ C) -28
- ☐ D) -7



Note: Figure not drawn to scale.

In the figure shown, point A , B , C , and E lie on the circle, and $AB < BC$. Segment AC is perpendicular to segment BE at point D , and $BD = \sqrt{346}$. The diameter of the circle is 175.

If $\frac{CD}{AD} = r$, what is the value of r ?

16

A linear model estimates the population of city from 1995 to 2019. The model estimates the population was 55 thousand in 1995, 217 thousand in 2015, and x thousand in 2019. To the nearest whole number, what is the value of x ?

18

$$\frac{x}{7} + 5(y - 14) = 29$$

$$\frac{x}{3} - 5(y - 14) = 41$$

The solution to the given system of equation is (x, y) . What is the value of $10x$.

When several resistors are connected in series in a circuit, the total resistance of the circuit is the sum of the resistances of these resistors. A certain circuit contains 8 resistors connected in series, where the resistance of each resistor is positive. This circuit has a total resistance of 130 ohms. The total resistance of 3 resistors in this circuit is 90 ohms. Which inequality best represents all possible values of the resistance x , in ohms, of one of the other 5 resistors in this circuit?

- ☐ A) $0 < x < 8$
- ☐ B) $0 < x < 40$
- ☐ C) $40 < x < 90$
- ☐ D) $40 < x < 130$

2

The graph of the polynomial function f in the xy -plane, where $y = f(x)$, passes through the point $(5,3)$. What is the value of $f(5)$?

- ☐ A) 3
- ☐ B) 5
- ☐ C) 8
- ☐ D) 15

7

The density of a certain type of wood is 353 kilograms per cubic meter. A sample of this type of wood is in the shape of a cube and has a mass of 345 kilograms. To the nearest hundredth of a meter, what is the length of one edge of this sample?

- ☐ A) 0.98
- ☐ B) 0.99
- ☐ C) 1.01
- ☐ D) 1.02

On a plot of land, 52.0% of the square footage is farmland and the remaining square footage is pasture. There are buildings on exactly 21.5% of the square footage of the farmland, and there are building on exactly 14.0% of the square footage of the pasture. If there are buildings on exactly p % of the square footage of the plot of land, what is the value of p ?