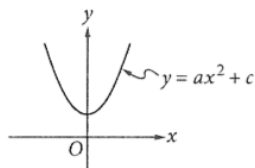
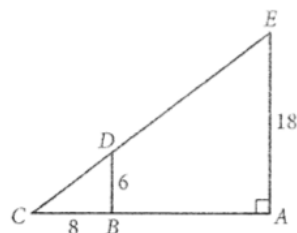


NO CALCULATOR



The vertex of the parabola in the xy -plane above is $(0, c)$. Which of the following is true about the parabola with the equation $y = -a(x - b)^2 + c$?

- A) The vertex is (b, c) and the graph opens upward.
- B) The vertex is (b, c) and the graph opens downward.
- C) The vertex is $(-b, c)$ and the graph opens upward.
- D) The vertex is $(-b, c)$ and the graph opens downward.



In the figure above, \overline{BD} is parallel to \overline{AE} . What is the length of \overline{CE} ?

Which of the following complex numbers is equal to

$$(5 + 12i) - (9i^2 - 6i), \text{ for } i = \sqrt{-1} \text{ ?}$$

- A) $-14 - 18i$
- B) $-4 - 6i$
- C) $4 + 6i$
- D) $14 + 18i$

Points A and B lie on a circle with radius 1, and

arc \widehat{AB} has length $\frac{\pi}{3}$. What fraction of the circumference of the circle is the length of arc \widehat{AB} ?

The expression $\frac{x^{-2}y^{\frac{1}{2}}}{x^{\frac{1}{3}}y^{-1}}$, where $x > 1$ and $y > 1$, is

equivalent to which of the following?

- A) $\frac{\sqrt{y}}{\sqrt[3]{x^2}}$
- B) $\frac{y\sqrt{y}}{\sqrt[3]{x^2}}$
- C) $\frac{y\sqrt{y}}{x\sqrt{x}}$
- D) $\frac{y\sqrt{y}}{x^2\sqrt[3]{x}}$

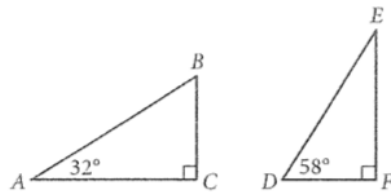
The expression $\frac{1}{3}x^2 - 2$ can be rewritten as

$$\frac{1}{3}(x - k)(x + k), \text{ where } k \text{ is a positive constant.}$$

What is the value of k ?

- A) 2
- B) 6
- C) $\sqrt{2}$
- D) $\sqrt{6}$

CALCULATOR ALLOWED

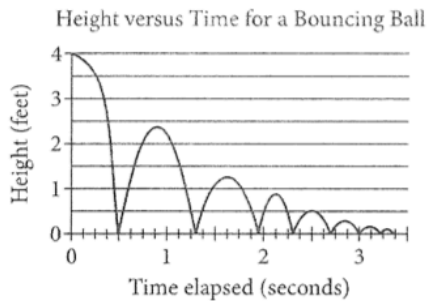


Triangles ABC and DEF are shown above. Which of the following is equal to the ratio $\frac{BC}{AB}$?

- A) $\frac{DE}{DF}$
- B) $\frac{DF}{DE}$
- C) $\frac{DF}{EF}$
- D) $\frac{EF}{DE}$

In the xy -plane, the graph of $2x^2 - 6x + 2y^2 + 2y = 45$ is a circle. What is the radius of the circle?

- A) 5
- B) 6.5
- C) $\sqrt{40}$
- D) $\sqrt{50}$



As part of an experiment, a ball was dropped and allowed to bounce repeatedly off the ground until it came to rest. The graph above represents the relationship between the time elapsed after the ball was dropped and the height of the ball above the ground. After it was dropped, how many times was the ball at a height of 2 feet?

- A) One
- B) Two
- C) Three
- D) Four

In the xy -plane, the graph of $y = 3x^2 - 14x$ intersects the graph of $y = x$ at the points $(0, 0)$ and (a, a) . What is the value of a ?