BECA / Huson / Algebra 2
1 December 2023

Name: Solutions

# Polynomials and Rational Functions: Check Your Readiness

You may use a scientific calculator.

1. We can calculate the volume $V$ of a rectangular prism using $V = \ell wh$, where $\ell$ is the length, $w$ is the width, and $h$ is the height of the prism. Suppose that a prism has a volume of 200 $cm^3$ and $\ell = 2w$.

   a. Rewrite the volume formula by making substitutions for $V$ and $\ell$.

   $V = \ell wh$

   $200 = (2w)wh$

   b. Rewrite the equation as $h$ in terms of $w$. (Turn it into $h =$ something.)

   $h = \frac{100}{w^2}$

2. Select **all** expressions that are equivalent to $x^2 - 4x - 32$.

   $(x-8)(x+4)$

   A. $(x - 16)(x + 2)$

   B. $(x + 2)(x - 16)$

   C. $(x - 8)(x + 4)$

   D. $(x + 8)(x - 4)$

   E. $(x + 4)(x - 8)$

   F. $(x - 4)(x + 8)$

3. Select **all** solutions to the equation $(2x - 4)(x + 5) = 0$.

2 , -5

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

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

C. $x = -2$

D. $x = 2$

E. $x = -5$

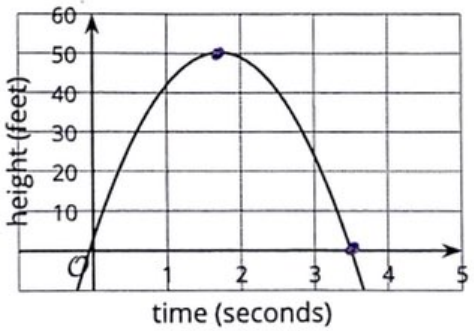
F. $x = 5$

4. Show that $(3x - 1)(x + 5)$ is equivalent to $3x^2 + 14x - 5$

$= 3x^2 + 15x - x - 5$

$= 3x^2 + 14x - 5$

5. The height of a softball, in feet, is modeled by the function $h$ given by $h(t) = 3 + 55t - 16t^2$, where $t$ is the time, in seconds, after the softball is hit. A graph of the function is shown.




a. About when does the softball reach its maximum height?

2.75 seconds

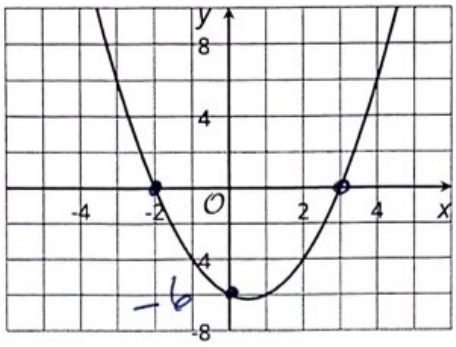
b. About how high is the maximum height of the softball?

50 ft

c. About when does the ball hit the ground?

$3\frac{1}{2}$ seconds

6. Here is a graph that represents a quadratic function. Which equation could define this function?




$a(x+2)(x-3)$

$a > 0$

$a = 1$

A. $y = (x-2)(x+3)$

B. $y = (x-2)(x-3)$

C. $y = (x+2)(x+3)$

D. $y = (x+2)(x-3)$

7. Solve the equation $2x^2 - 7x - 15 = 0$. Explain or show your work.

$(2x+3)(x-5)=0$

$x = -\frac{3}{2}$ $\quad x = 5$

$2(-5)+3(1) = -7$

1 (2)

+1 −15

+15 −1

1 +3 −5

+5 +3

multiplies to 15

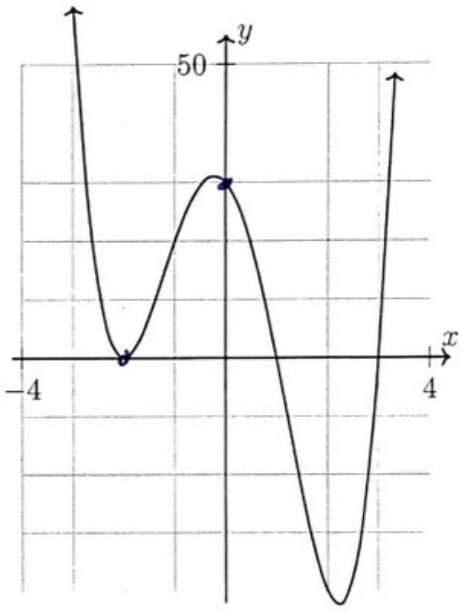
8. Complete the long division problem to find the quotient of 1,651 and 13.

$$\begin{array}{r} 127 \\ 13\overline{)1651} \\ 13 \\ \hline 35 \\ 26 \\ \hline 91 \\ 91 \\ \hline 0 \end{array}$$

127

**A2-F.IF.7c Graph polynomials, identify zeros, end behavior**

9. The polynomial $f(x)$ is graphed below.




(a) What is the degree of the function?

4

(b) What are zeros of the function?

$-2, 1, 3$

(c) What factor has a multiplicity of 2?

$(x+2)$

(d) Write down the $y$-intercept as an ordered pair.

$(0, 30)$

(e) Is the leading coefficient positive, negative, or zero?

positive

(f) Describe the end behavior.

$x \to +\infty$ , $y \to +\infty$

and $x \to -\infty$ , $y \to +\infty$

**A2-F.BF.2 Write arithmetic and geometric sequences with recursive formulas**

10. Write a recursive definition of the sequence $a_1 = 3$, $a_2 = 8$, $a_3 = 13$, $a_4 = 18, \ldots$

$a_1 = 3$ (+5)

$a_n = a_{n-1} + 5$

11. Find the difference $f(x) - g(x)$ as a polynomial in standard form, given $f(x) = 4x^4 + 5x^3 - 3x$ and $g(x) = 2x^3 - 2x^2 - 3x - 1$.

$4x^4 + 3x^3 + 2x^2 + 1$