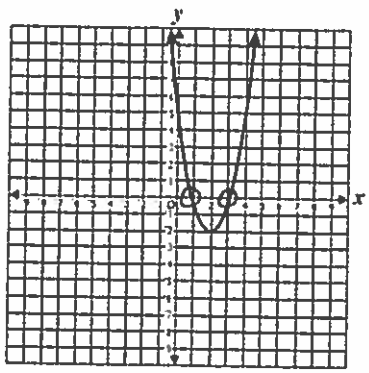
Quadratic Functions (Graphing) – Guided Practice



Based on the zeros, which best represents the graphed function?

- A $y = (x-3)(2x+2)$
- B $y = (2x+6)(x+1)$
- C $y = 2(x+3)(x-1)$
- D $y = 2(x-3)(x-1)$

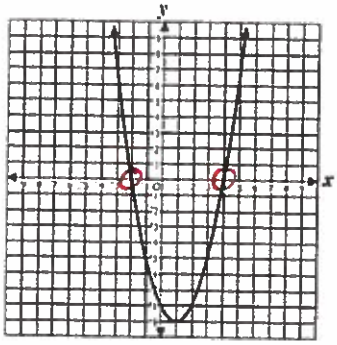
$x = 1, 3$

$(x-1)(x-3)$

What are the real roots of $x^2 - 7x + 10 = 0$?

- A 2 and 5
- B 1 and 10
- C -1 and -10
- D -2 and -5

* use Desmos to find x-intercepts

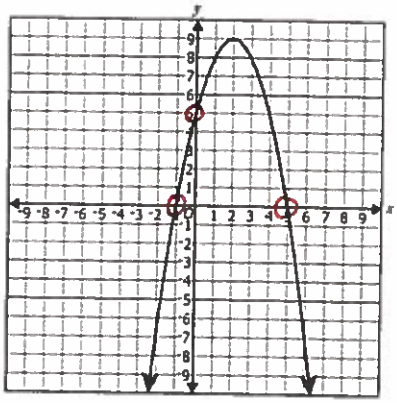


What are the solutions to $x^2 - 2x - 8 = 0$?

- A $x = 1$ and $x = -9$
- B $x = 0$ and $x = -8$
- C $x = -2$ and $x = 4$
- D $x = -4$ and $x = 2$

$x = -2, 4$

Identify each of the x- and y-intercepts of the relation shown.



y-int: (0, 5)

x-int: (−1, 0)
(5, 0)

Which number is a zero of the function h?

$h(x) = x^2 + 3x - 18$

- A −6
- B −3
- C 0
- D 6

$(x+6)(x-3) = 0$

$x = -6, 3$

-18: 6×-3, 3

Which equation could represent a graph with x-intercepts of (4, 0) and (−7, 0)?

- A $y = x^2 + 3x - 28$
- B $y = x^2 - 3x - 28$
- C $y = x^2 + 3x + 28$
- D $y = x^2 - 3x + 28$

$x = 4, -7$

$(x-4)(x+7)$

FOIL

$x^2 + 7x - 4x - 28$

$x^2 + 3x - 28$

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Identifying Key Parts on Desmos

EXAMPLE: Use Desmos to find the following characteristics of the given quadratic.

$$f(x) = x^2 + 2x - 3$$

Axis of Symmetry	$x = -1$
Vertex	$(-1, -4)$
Open up or down? Minimum or maximum?	up minimum
y-intercept	$(0, -3)$
x-intercept	$(-3, 0)$ $(1, 0)$
Domain	$x \in \mathbb{R}$
Range	$y \geq -4$

1. Type the function into Box 1 as written
2. Click on the gray dots to locate:
   a. **Vertex** (write as a point)
   b. **x- and y-intercepts** (write as a point)
3. The **axis of symmetry** is the x-value of the vertex
4. Look at the y-value of the vertex for **range**
5. Remember: **domain** of a quadratic is all reals!

Using Desmos to Find Quadratics in Standard Form

EXAMPLE: Which function is a quadratic in standard form with x-intercepts at $x = -3$ and $x = -1$?

$y = (x+3)(x+1)$

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

1. Recognize that x-intercepts can be written as factors
   - Write as two binomials with opposite signs for the x-values!
2. Type: $y = (x + 3)(x + 1)$ into Box 1
   - **What does the graph look like?**
3. Write the answers A – D in Boxes 2 – 5
   - **Which graph/quadratic matches what is Box 1?**

Polynomials and Factoring – Guided Practice

Which of the following is equivalent to $\frac{a^{12}b^2}{a^3b^6}$?

- (A) $\frac{a^9}{b^4}$
- B $\frac{b^4}{a^9}$
- C $\frac{a^4}{b^3}$
- D a^9b^4

a^9b^{-4}

$\frac{a^9}{b^4}$

Which expression is equivalent to $\frac{18c^8d^9}{9c^3d^6}$?

Assume the denominator does not equal zero.

- (A) $2c^5d^3$
- B $9c^5d^3$
- C $2c^{11}d^{15}$
- D $9c^{11}d^{15}$

$2c^5d^3$

Which polynomial is equivalent to $(18n^2 - 9n + 1) \div (3n - 1)$?
Assume the divisor is not equal to zero.

- (A) $6n - 1$
- B $6n \div 1$
- C $6n^2 - 3$
- D $18n^2 - 3$

$\frac{18n^2-9n+1}{3n-1}$

$n^2-9n+18$

$(n-\frac{6}{18})(n-\frac{3}{18})$

$(n-\frac{1}{3})(n-\frac{1}{6})$

$(3n-1)(6n-1)$

$\frac{(3n-1)(6n-1)}{(3n-1)}$

$6n-1$

Simplify:

$$5(-2n+4)-2(n+3)$$

$-10n+20-2n-6$

$-12n+14$

Simplify:

$$(3x-3)(2x+1)$$

FOIL

$6x^2+3x-6x-3$

$6x^2-3x-3$

Simplify:

$$(x-2x+1)(x^2+2x^2-x+3)$$

$(-x+1)(3x^2-x+3)$

$-3x^3+x^2-3x+3x^2-x+3$

$-3x^3+4x^2-4x+3$

Which of the following binomials is a factor of $x^2 - x - 6$?

- A $x - 1$
- B $x - 2$
- C $x - 3$
- D $x - 6$

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

-6, -3, 2, -1

Which is a factor of $2n^2 - 5n - 42$?

- A $2n - 7$
- B $2n - 6$
- C $n - 7$
- D $n - 6$

$n^2 - 5n - 84$

$\frac{(n-12)}{2}\frac{(n+7)}{2}$

$(n-6)(2n+7)$

-84, -12, 7, -5

Identify each expression that is a factor of this polynomial.

$4x^2 - 2x - 2$

$2x+1$	2	$x-1$	$2x-1$	$4x-1$

$2(2x^2 - x - 1)$

$x^2 - x - 2$

$\frac{(x-2)}{2}\frac{(x+1)}{2}$

$(x-1)(2x+1)$

$2(x-1)(2x+1)$

Which binomial is a factor of $c^2 - 12c + 32$?

- A $c - 12$
- B $c - 8$
- C $c - 2$
- D $c - 1$

$(c-8)(c-4)$

32, -8, -4, -12

Factor completely:

$-18a^2 - 12a - 2$

$-2(9a^2 + 6a + 1)$

$a^2 + 6a + 9$

$\frac{(a+3)}{9}\frac{(a+3)}{9}$

$(a+\frac{1}{3})(a+\frac{1}{3})$

$(3a+1)(3a+1)$

$-2(3a+1)(3a+1)$

or

$-2(3a+1)^2$

Factor completely:

$2x^2 - 200$

$2(x^2 - 100)$

$2(x+10)(x-10)$