

## Algebra 1

Our Goal: To learn to solve polynomial equations in factored form

Warm Up: Average <sup>slope</sup> rate of change of a function

Today's homework

- 7.4 Exercises, p.381-382: 4-40 (evens)
- **iready, if needed**

Previous homework

7.3 Exercises, p.375-376: 4-36 (evens)

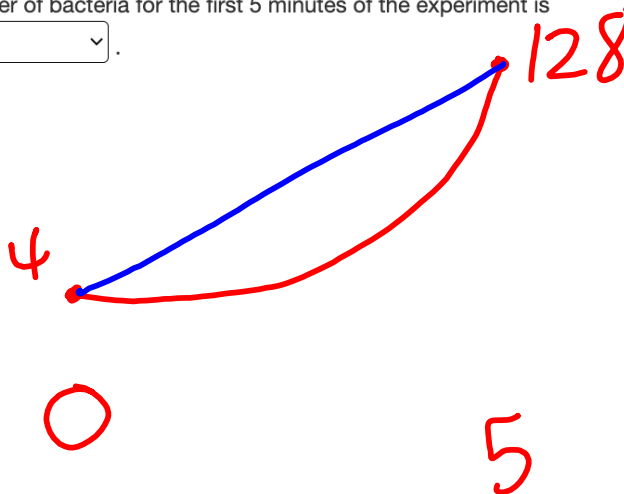
At the beginning of an experiment, the number of bacteria in a colony was counted at time  $t = 0$ . The number of bacteria in the colony  $t$  minutes after the initial count is modeled by the function  $b(t) = 4(2)^t$ . What is the average rate of change in the number of bacteria for the first 5 minutes of the experiment?

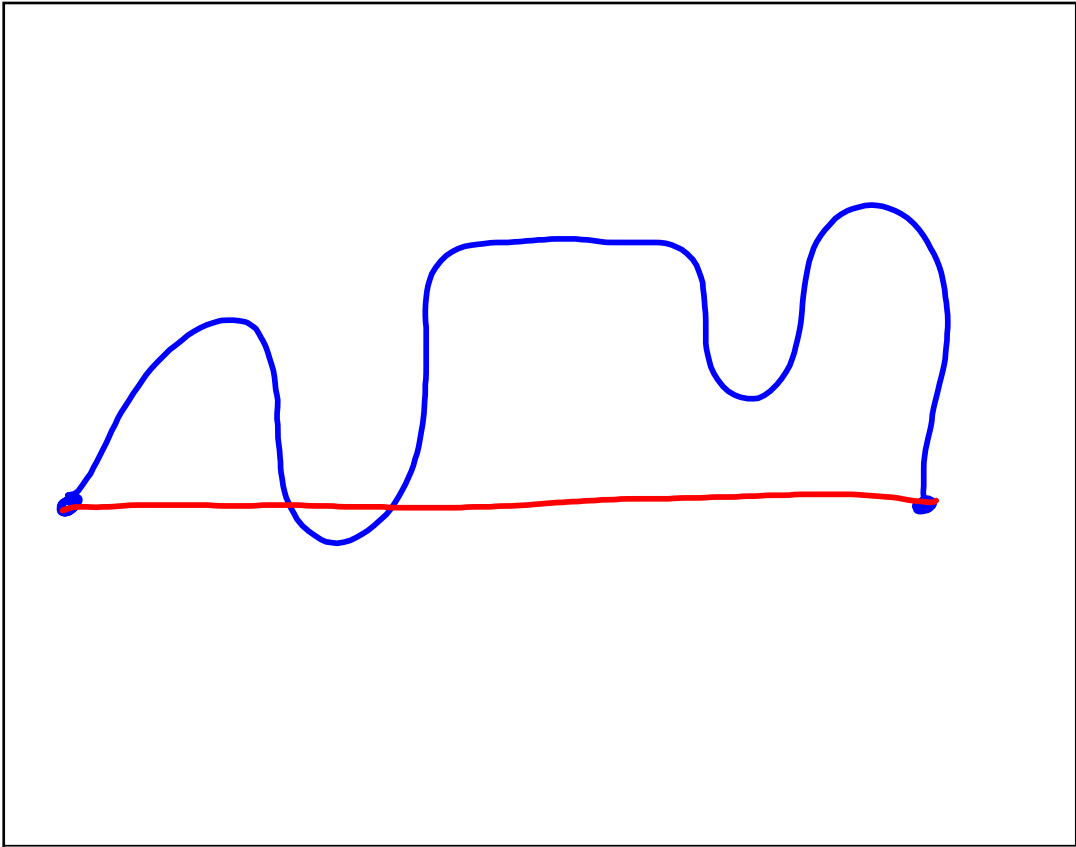
Select from the drop-down menus to correctly complete the sentence.

The average rate of change in the number of bacteria for the first 5 minutes of the experiment is

Choose... Choose...

$$\frac{\text{rise}}{\text{run}} = \frac{128-4}{5-0}$$

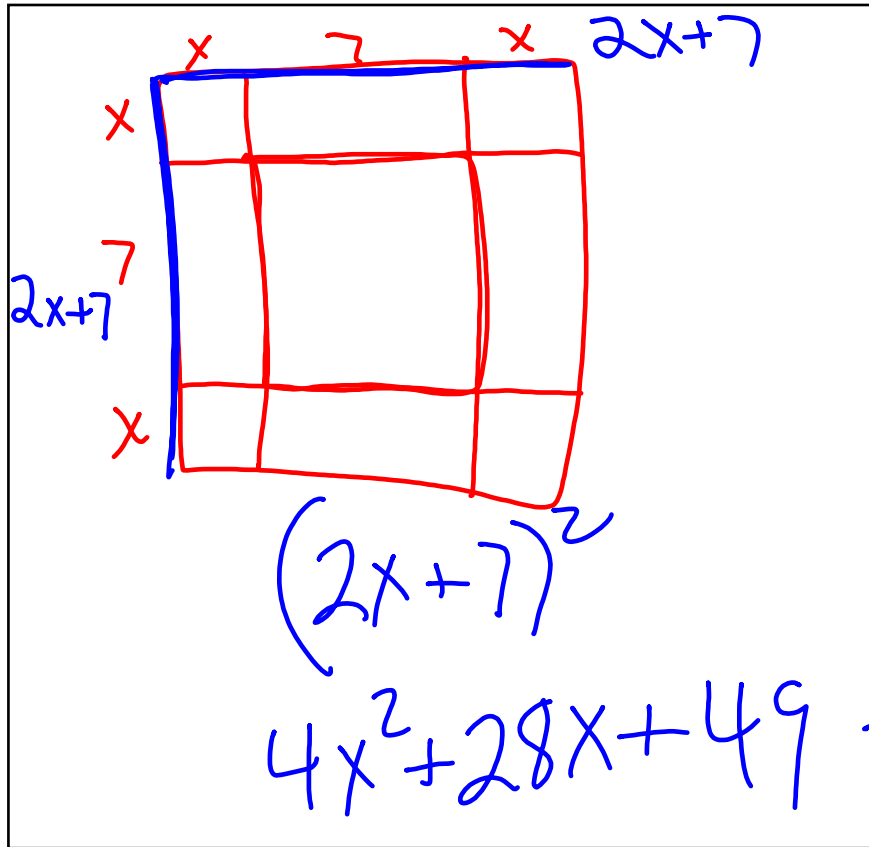




$$(-12-n)^2$$

$$(-12)^2 - 2(-12)(n) + (n)^2$$

$$144 + 24n + n^2$$



$$(30+3)(30-3)$$

$$33 \cdot 27$$

$$30^2 - 3^2$$

$$900 - 9$$

$$891 \checkmark$$

$$(x+3) - (x-7)^2$$

$$(x+3) - (x^2 - 14x + 49)$$

$$x+3 - x^2 + 14x - 49$$

$$(x-7)^2 \neq x^2 + 49$$

$$(x-7)(x-7)$$

$$\begin{aligned}(-12-n)^2 &= (n+12)^2 \\ -(12+n)^2 &= \cancel{(-1)^2} (12+n)^2\end{aligned}$$

$$\begin{aligned}(x+3)(x+4) \\ x^2 + 7x + 12\end{aligned}$$

$$\underline{\quad} \times \underline{\quad} = 0$$

$$\begin{aligned} 1 \times 0 &= 0 \\ 7 \times 0 &= 0 \\ 0 \times 0 &= 0 \end{aligned}$$

## Core Concept

### Zero-Product Property

**Words** If the product of two real numbers is 0, then at least one of the numbers is 0.

**Algebra** If  $a$  and  $b$  are real numbers and  $ab = 0$ , then  $a = 0$  or  $b = 0$ .

Solve each equation.

a.  $2x(x - 4) = 0$

b.  $(x - 3)(x - 9) = 0$

$x - 3 = 0$

$x = 3$

$x = 9$

$x^2 - 7x + 27 = 0$

Solve the equation. Check your solutions.

1.  $x(x - 1) = 0$

2.  $3t(t + 2) = 0$

$$\begin{array}{l} x = 0 \\ x = 1 \end{array} \quad x = 0, 1 \quad \text{or} \quad \bigcirc$$

3.  $(z - 4)(z - 6) = 0$

$z - 4 = 0$

$z - 6 = 0$

$z = 4, 6$

$t + 2 = 0$

$t = -2$

Solve each equation.

a.  $(2x + 7)(2x - 7) = 0$

$$2x + 7 = 0$$

$$2x - 7 = 0$$

$$2x = -7$$

$$x = -\frac{7}{2}$$

$$2x = 7$$

$$x = \frac{7}{2}$$

b.  $(x - 1)^2 = 0$

$$x - 1 = 0$$

$$(x - 1)(x - 1) = 0$$

c.  $(x + 1)(x - 3)(x - 2) = 0$

$$x = -1$$

$$x = 3$$

$$x = 2$$

$$7, 10, 3, -2$$

$$(x - 7)(x - 10)(x - 3)(x + 2) = 0$$



Solve the equation. Check your solutions.

4.  $(3s + 5)(5s + 8) = 0$

5.  $(b + 7)^2 = 0$

6.  $(d - 2)(d + 6)(d + 8) = 0$

Factor out the greatest common monomial factor from  $4x^4 + 24x^3$ .

$$4x^4 + 24x^3$$
$$4x^3(x + 6)$$

7. Factor out the greatest common monomial factor from  $8y^2 - 24y$ .

$$8y^2 - 24y$$

$$8y(y-3)$$

Solve a.  $2x^2 + 8x = 0$

b.  $6n^2 = 15n$

$$6n^2 - 15n = 0$$

$$3n(2n - 5) = 0$$

$$0, 2\frac{1}{2}$$

$$2n - 5 = 0$$

$$2n = 5$$

$$n = 2\frac{1}{2}$$

**Solve the equation. Check your solutions.**

8.  $a^2 + 5a = 0$

9.  $3s^2 - 9s = 0$

10.  $4x^2 = 2x$

You can model the arch of a fireplace using the equation

$y = -\frac{1}{9}(x + 18)(x - 18)$ , where  $x$  and  $y$  are measured in inches.

The  $x$ -axis represents the floor. Find the width of the arch at floor level.

**11.** You can model the entrance to a mine shaft using the equation  $y = -\frac{1}{2}(x + 4)(x - 4)$ , where  $x$  and  $y$  are measured in feet. The  $x$ -axis represents the ground. Find the width of the entrance at ground level.