Objective: Write equations and interpret parts of equations.

Kelsey is working at KFC and starts the day with the store having 2 baskets of chicken cooked. Kelsey can fry 3 baskets of chicken every hour.

a) Write an equation that can be used to find the number of baskets of chicken, b, after h hours of cooking.

rate of change = 3 baskets every hour = slope

starting number of baskets = 2 baskets = y-intercept

$y = mx + b$

$b = 3h + 2$

b) Describe the domain of the function.

Values of h greater than or equal to 0 hours.

c) How long will it take Kelsey to have 20 baskets cooked?

$20 = 3h + 2$

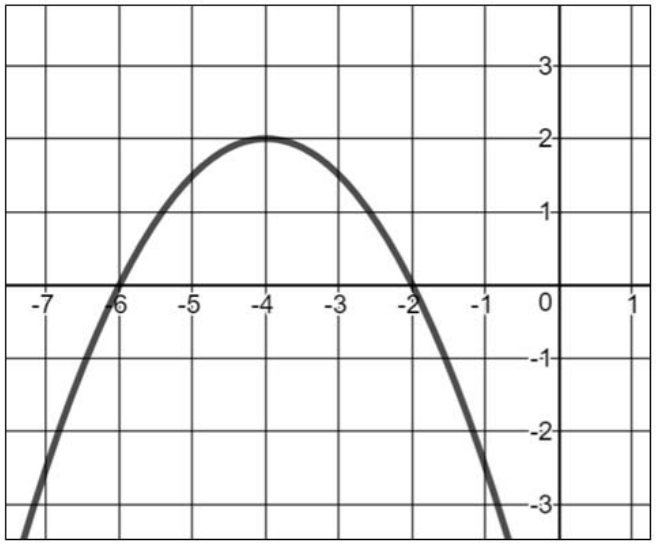
$18 = 3h$

$h = 6$

It will take Kelsey 6 hours to have 20 baskets of chicken cooked.

Objective: Write equations and interpret parts of equations.

Write an equation for the function shown in the graph in the form $f(x) = a(x-h)^2 + k$.



$$a = -\frac{1}{2}, h = -4, k = 2$$

$$\boxed{f(x) = -0.5(x+4)^2 + 2}$$

Write the equation of the function in factored form.

$zeros: -6, -2$

$x = -6 \ \ or \ \ x = -2$

$x + 6 = 0 \ \ or \ \ x + 2 = 0$

factor factor

factored form: $f(x) = a(x+6)(x+2)$

$$\boxed{f(x) = -0.5(x+6)(x+2)}$$

Write the equation of the function in standard form.

$f(x) = -0.5(x+4)^2 + 2$

$f(x) = -0.5(x^2 + 8x + 16) + 2$

$f(x) = -0.5x^2 - 4x - 8 + 2$

$$\boxed{f(x) = -0.5x^2 - 4x - 6}$$

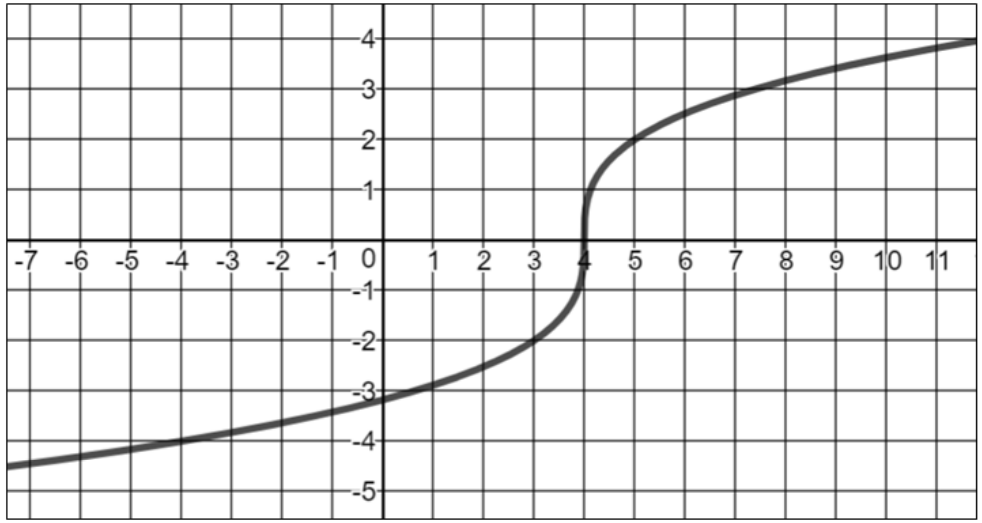
$f(x) = -0.5(x+6)(x+2)$

$f(x) = -0.5(x^2 + 8x + 12)$

$$\boxed{f(x) = -0.5x^2 - 4x - 6}$$

Objective: Write equations and interpret parts of equations.

Write an equation for the function shown in the graph.



$$f(x) = a\sqrt[3]{x-h} + k$$

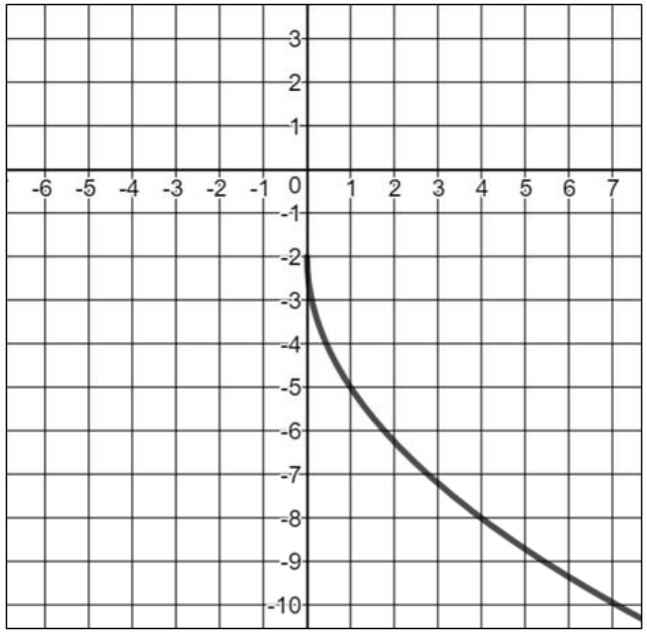
$$\boxed{f(x) = 2\sqrt[3]{x-4}}$$

Objective: Write equations and interpret parts of equations.

Write an equation for the function shown in the graph.

$$f(x) = a\sqrt{x-h} + k$$

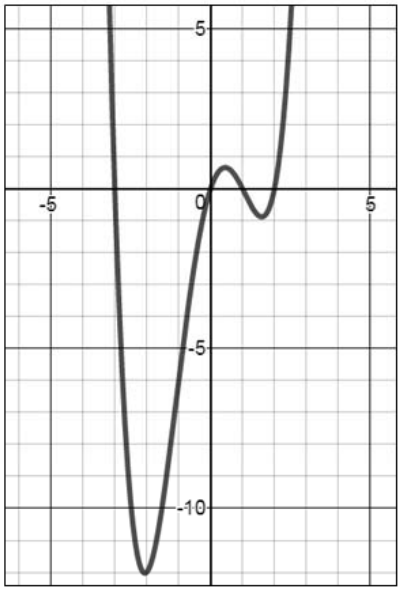
$$\boxed{f(x) = -3\sqrt{x} - 2}$$



Objective: Write equations and interpret parts of equations.

Complete the factored form of the function that represents the graph.

$f(x) = 0.5\_\_x(x+3)(x-1)(x-2)\_\_$



zeros : $-3, 0, 1, 2$

$x = -3,$ $x = 0,$ $x = 1,$ $x = 2$

$x + 3 = 0$ $x - 1 = 0$ $x - 2 = 0$

factors

factored form : $f(x) = 0.5x(x+3)(x-1)(x-2)$

Objective: Write equations and interpret parts of equations.

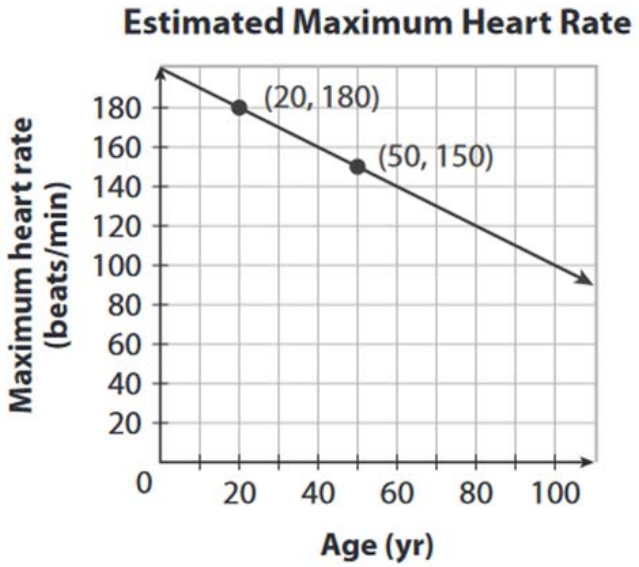
Concept

Writing the Equation of a Line Given Two Points in Slope Intercept Form

1. Calculate the slope (rate of change): $m = \frac{y_2 - y_1}{x_2 - x_1}$
2. Substitute the slope into slope intercept form: $y = mx + b$
3. Find the y-intercept, b: Choose one of the two given points and substitute the values into the equation for x and y. Solve for b.
4. Write the final equation with the values for both m and b.

Objective: Write equations and interpret parts of equations.

Write an equation that can be used to find the estimated maximum heart rate, y, based on a person's age, x, in years.



1. $m = \dfrac{150-180}{50-20} = \dfrac{-30}{30} = -1$

2. $y = mx + b$

$y = -1x + b$

3. $(20,180) = (x,y) \rightarrow 180 = -1(20) + b$

$180 = -20 + b$

$200 = b$

4. $\boxed{y = -x + 200}$

What is the rate at which a person's maximum heart rate changes per year of age? Explain what this value means in terms of the context.

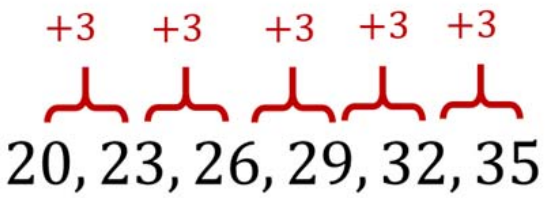
-1beats/min/year; A person's maximum heart rate decreases at a rate of 1 beat per minute per year of age.

Objective: Write explicit and recursive functions.

Concept

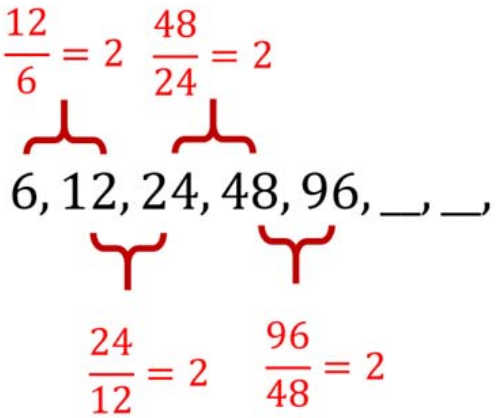
An **arithmetic sequence** is a sequence in which there is a **common difference** between each pair of consecutive numbers. This type of sequence has a linear pattern.

Example:



A **geometric sequence** is a **sequence** where the ratio between two consecutive terms is constant. This ratio is called the **common ratio**. This type of sequence has an exponential pattern.

Example:



Objective: Write explicit and recursive functions.

Concept

An **explicit process** defines the n^{th} term of a sequence, where n is the order of the term in the sequence. Explicit processes may be defined as a_n or $f(n)$. (You can find any term in the sequence)

A **recursive process** is a process that uses the previous term to find the next term in the sequence. (You can't find the 10th term if you don't know the 9th term)

	Recursive Process	Explicit Process
Arithmetic Sequence (Linear)	$f(0) = ?$ $f(x) = f(x-1) \pm d$ d = common difference	$f(x) = dx + f(0)$
Geometric Sequence (Exponential)	$f(0) = ?$ $f(x) = r * f(x-1)$ r = common ratio $= \frac{f(2)}{f(1)}$	$f(x) = f(0) * r^x$

Objective: Write explicit and recursive functions.

Write an equation in explicit form and recursive form that can be used to find the next term in the sequence.

$$-8, -3, 2, \ldots$$

1. *identify the pattern*

arithmetic / linear

$f(0) = -8$

$d = -3 - (-8) = 5$

2. explicit equation

$f(x) = dx + f(0)$

$f(x) = 5x + -8$

or

$f(x) = 5x - 8$

3. recursive equation

define $f(0)$

$f(x) = f(x-1) + d$

$f(0) = -8$

$f(x) = f(x-1) + 5$

Objective: Write explicit and recursive functions.

Write an equation in explicit form and recursive form that can be used to find the next term in the sequence.

$$6, 9, \frac{27}{2}, \ldots$$

1. *identify the pattern*

geometric/exponential

$f(0) = 6$

$r = \frac{9}{6} = \frac{3}{2}$

2. explicit equation

$f(x) = f(0) \cdot (r)^x$

$$\boxed{f(x) = 6\left(\frac{3}{2}\right)^x}$$

3. recursive equation

define $f(0)$

$f(x) = r \cdot f(x-1)$

$$\boxed{\begin{array}{l} f(0) = 6 \\ f(x) = \frac{3}{2} \cdot f(x-1) \end{array}}$$

Objective: Write explicit and recursive functions.

Create an explicit and recursive function from the given pattern.
Find how many blocks there will be after 27 days.

In the beginning

After 1 day

After 2 days

Type of sequence: Arithmetic

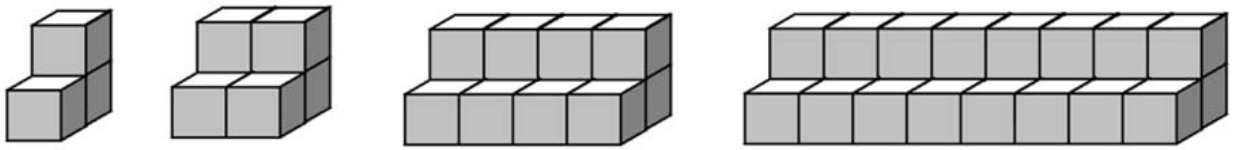
Recursive: $f(0) = 2$
$f(x) = f(x-1) + 2$

Explicit: $f(x) = 2x + 2$

$f(27) = 56$

Objective: Write explicit and recursive functions.

Create an explicit and recursive function from the given pattern.
Find how many blocks there will be on the 15th day.



Day 1 | Day 2 | Day 3 | Day 4

Type of sequence: Geometric

Recursive: $f(0) = 1.5$, $f(x) = 2f(x-1)$

Explicit: $f(x) = 1.5(2)^x$

$f(15) =$ 49,152