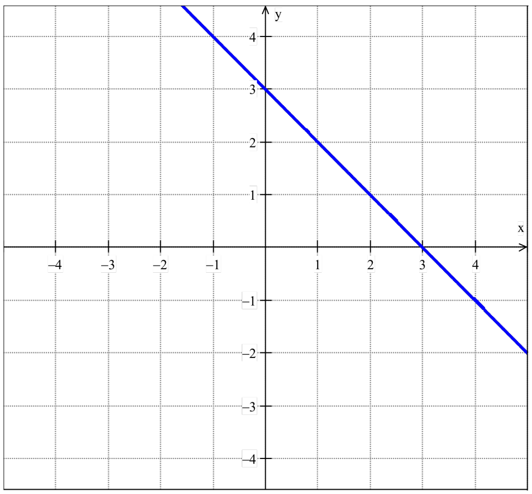
Name: ____ Period: __________ Date: _______________

Analyzing Graphs of Functions and Relations Assignment

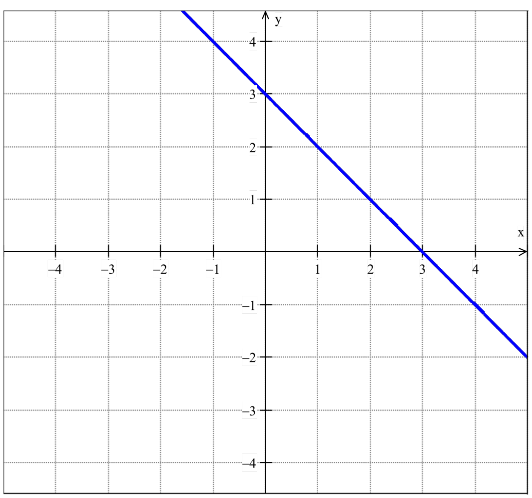
Use a graph of each function to estimate the indicated function values.

1. $f(x) = -x + 3$

$f(-1) = ?$ $f(0) = ?$ $f(3) = ?$



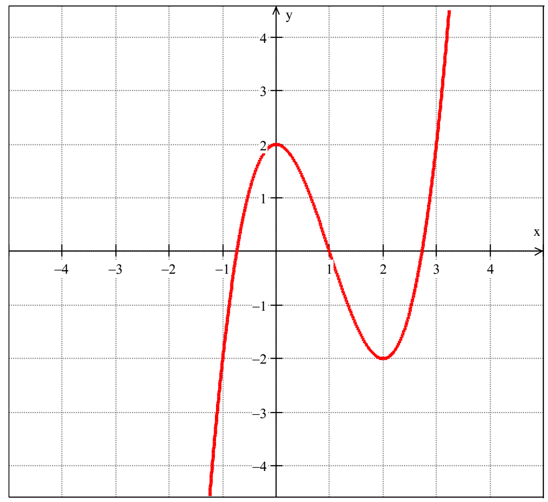
Graphically



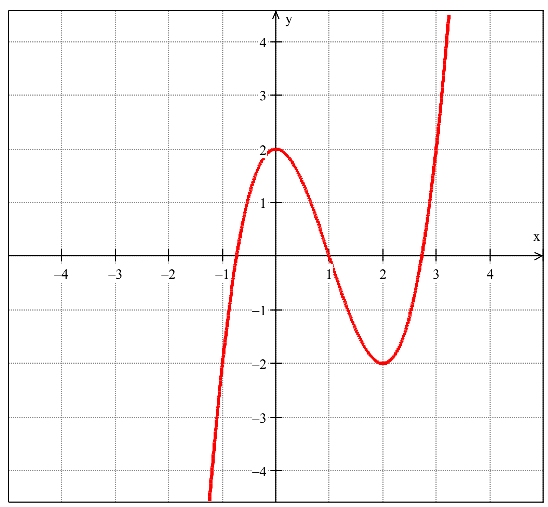
Algebraically

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

$f(-1) = ?$ $f(0) = ?$ $f(2) = ?$



Graphically



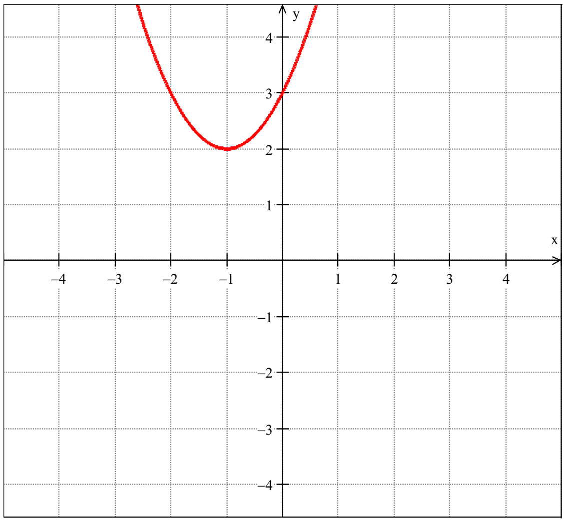
Algebraically

Name: ____ Period: ___________ Date: _______________

Analyzing Graphs of Functions and Relations Assignment

Use the graph of each function to approximate its y –intercept. Then find the y –intercept algebraically.

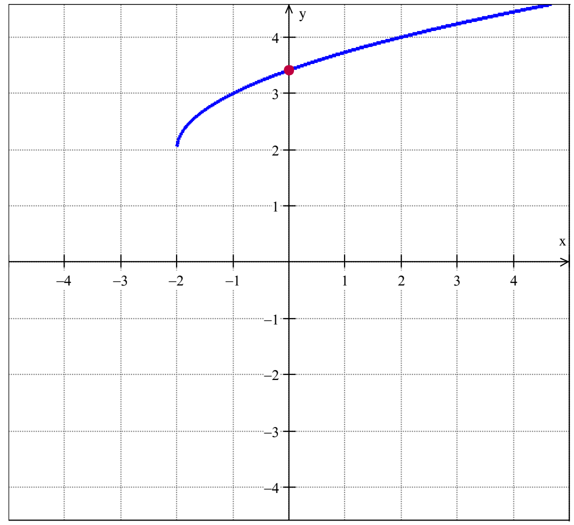
3. $f(x) = x^2 + 2x + 3$



Graphically

Algebraically

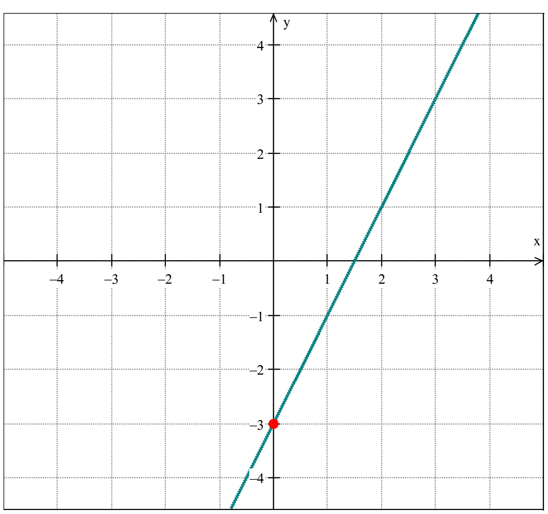
4. $f(x) = \sqrt{x+2} + 2$



Graphically

Algebraically

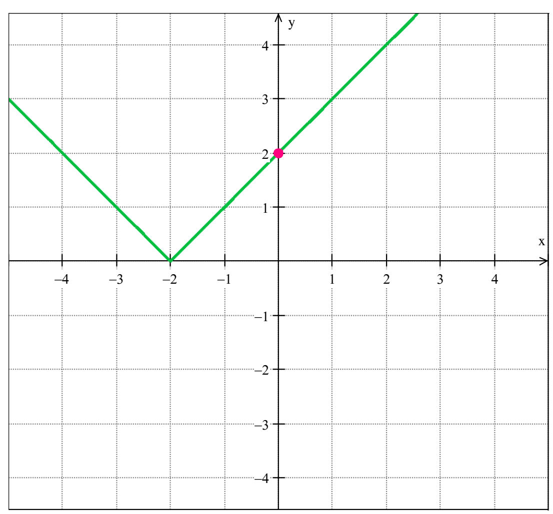
5. $f(x) = 2x - 3$



Graphically

Algebraically

6. $f(x) = |x + 2|$



Graphically

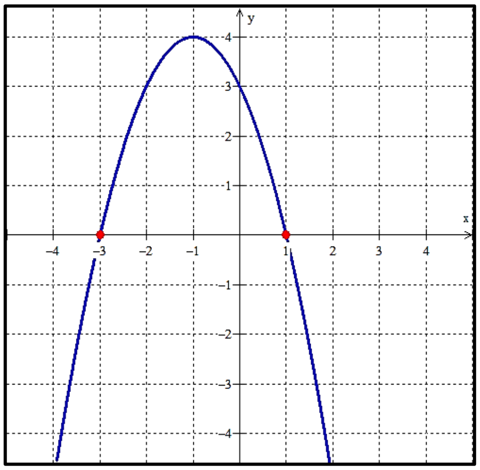
Algebraically

Name: ____ Period: __________ Date: _______________

Analyzing Graphs of Functions and Relations Assignment

Use the graph of each function to approximate its zeros. Then find the zeros of each function algebraically.

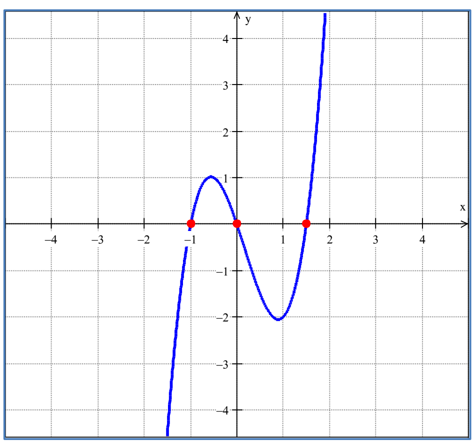
7. $f(x) = -x^2 - 2x + 3$



Graphically

Algebraically

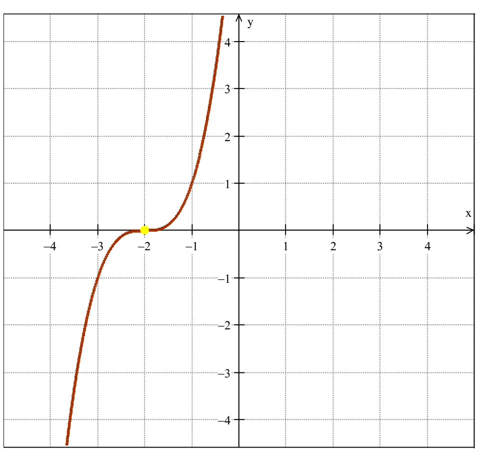
8. $f(x) = 2x^3 - x^2 - 3x$



Graphically

Algebraically

9. $f(x) = x^3 - 6x^2 - 12x + 8$



Graphically

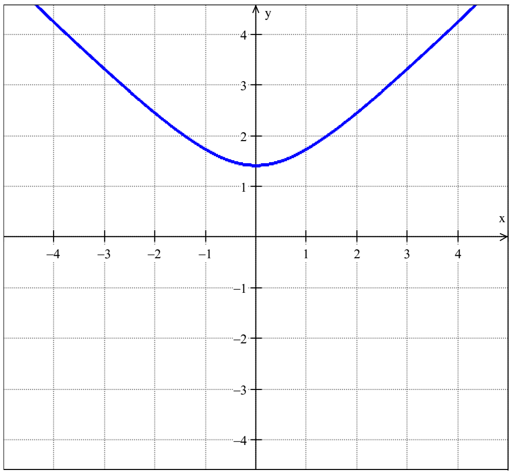
Algebraically

Name: ____ Period: __________ Date: _______________

Analyzing Graphs of Functions and Relations Assignment

Use the graph of each equation to test for symmetry with respect to the x -axis, y -axis, and the origin. Support the answer numerically. Then confirm algebraically.

10. $y = \sqrt{x^2 + 2}$



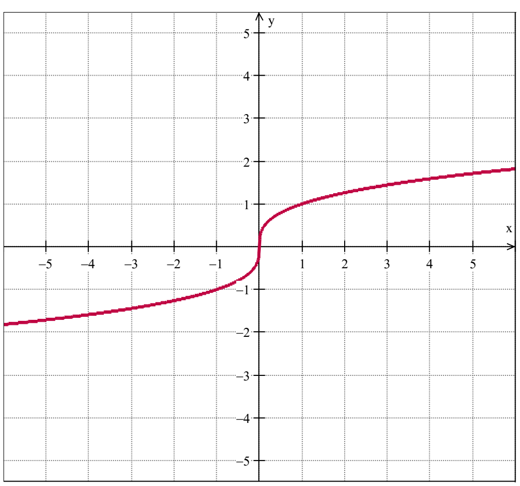
Graphically

Support Numerically

x					
y					
(x, y)					

Algebraically

11. $y = \sqrt[3]{x}$



Graphically

Support Numerically

x					
y					
(x, y)					

Algebraically

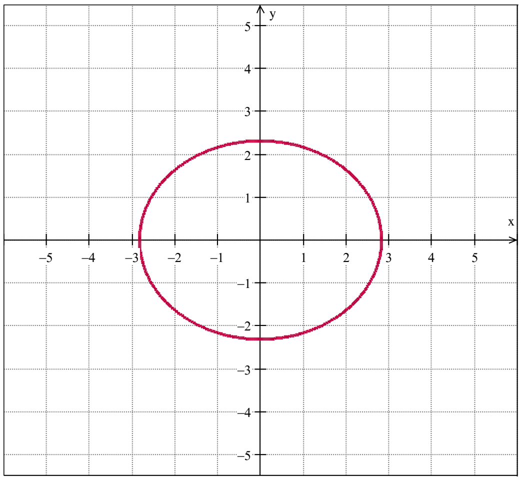
PreCalculusCoach.com

Name: ____ Period: __________ Date: ______________

Analyzing Graphs of Functions and Relations Assignment

12. $2x^2 + 3y^2 = 16$

<u>Graphically</u>



Symmetric with respect to x-axis

<u>Algebraically</u>

<u>Support Numerically</u>

x				
y				
(x, y)				

Symmetric with respect to y-axis

<u>Algebraically</u>

<u>Support Numerically</u>

x				
y				
(x, y)				

Symmetric with respect to origin

<u>Algebraically</u>

<u>Support Numerically</u>

x				
y				
(x, y)				

Name: ______________________________ Period: __________ Date: ______________

Analyzing Graphs of Functions and Relations Assignment

Determine whether the following are even, odd, or neither.

13. $f(x) = x^3 + 2x$

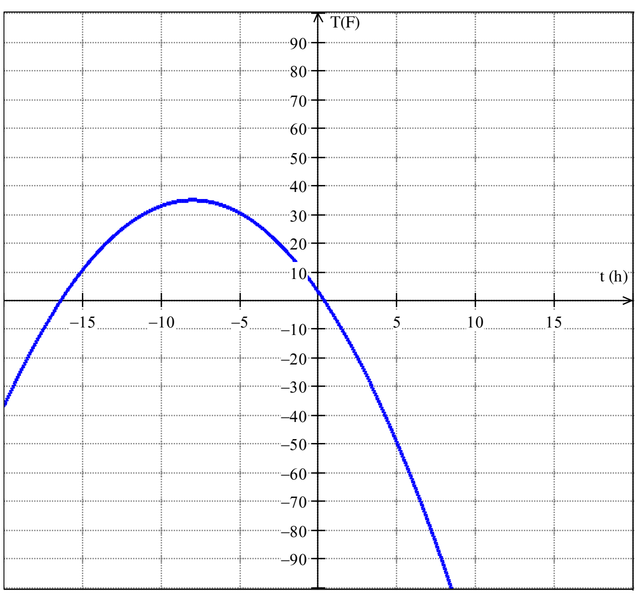
14. $g(t) = 2t^4 + t^2$

15. $h(y) = y^4 - 5y^2 - 3y$

SOLVE REAL WORLD PROBLEM

16. The temperature T in degrees Fahrenheit t hours after 6 AM is given by $T(t) = -\frac{1}{2}t^2 - 8t + 3$, $for\ 0 < t < 10$. Find $T(0)$, $T(2)$ and $T(6)$ graphically and algebraically.

<u>**Graphically**</u>



<u>**Algebraically**</u>

Name: ____ Period: __________ Date: _______________

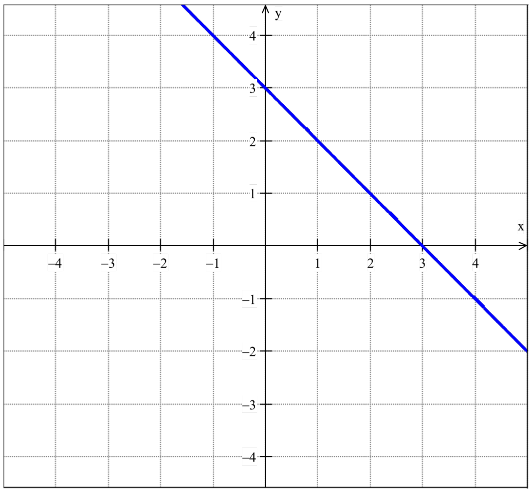
Analyzing Graphs of Functions and Relations Assignment

ANSWERS

Use a graph of each function to estimate the indicated function values.

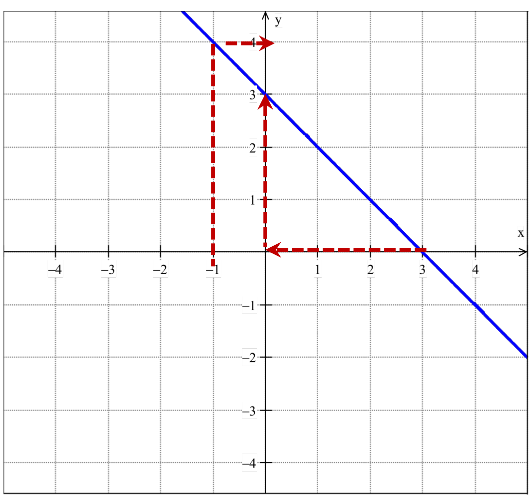
1. $f(x) = -x + 3$

$f(-1) = ?$ $f(0) = ?$ $f(3) = ?$



Graphically

$f(-1) = \mathbf{4}$ $f(0) = \mathbf{3}$ $f(3) = \mathbf{0}$



Algebraically

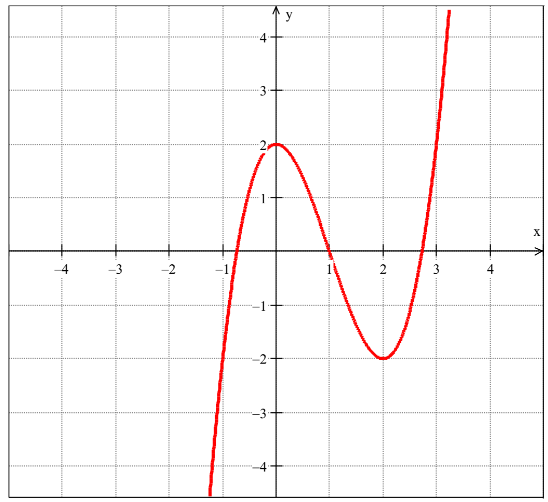
$f(-1) = -(-1) + 3 = 1 + 3 = \mathbf{4}$

$f(0) = -0 + 3 = \mathbf{3}$

$f(3) = -3 + 3 = \mathbf{0}$

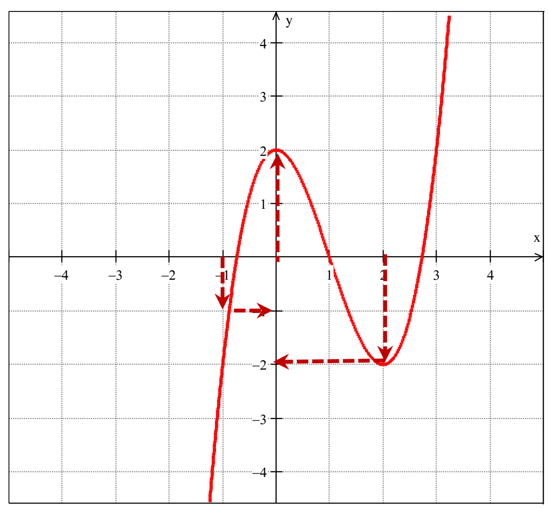
2. $f(x) = x^3 - 3x^2 + 2$

$f(-1) = ?$ $f(0) = ?$ $f(2) = ?$



Graphically

$f(-1) = \mathbf{-2}$ $f(0) = \mathbf{2}$ $f(2) = \mathbf{-2}$



Algebraically

$f(-1) = (-1)^3 - 3(-1)^2 + 2 = -1 - 3 + 2 = \mathbf{-2}$

$f(0) = 0^3 - 3 * 0^2 + 2 = \mathbf{2}$

$f(2) = 2^3 - 3 * 2^2 + 2 = 8 - 12 + 2 = \mathbf{-2}$

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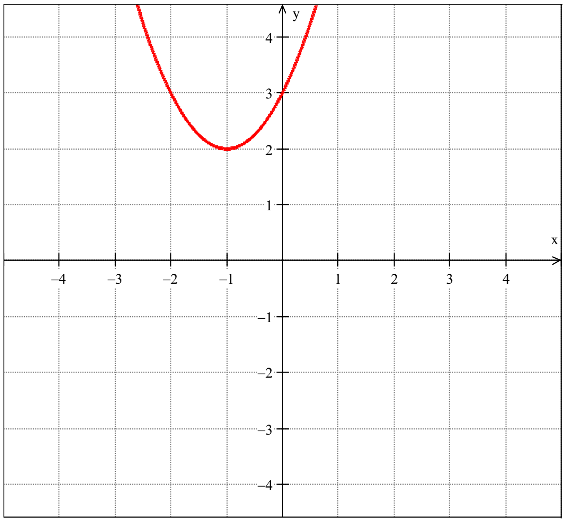
Name: ____ Period: __________ Date: _______________

Analyzing Graphs of Functions and Relations Assignment

Use the graph of each function to approximate its y –intercept. Then find the y –intercept algebraically.

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



Graphically

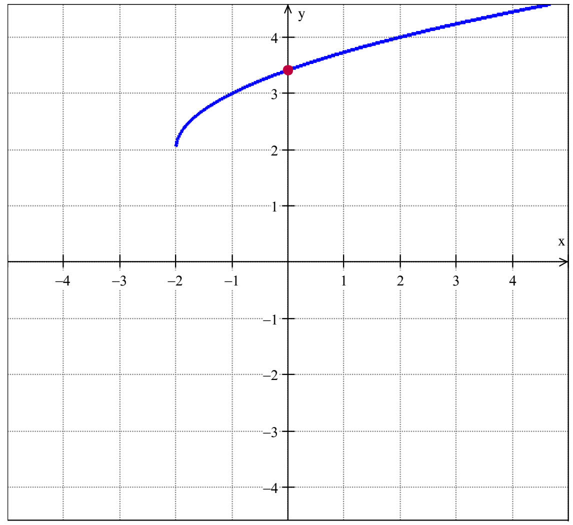
$f(x) = x^2 + 2x + 3$ $\quad$ $y-\text{intercept} = 3$

Algebraically y -intercept occurs where $x = 0$.

$f(0) = 0^2 + 2 * 0 + 3$

$f(0) = 3$ $\quad$ $y-\text{intercept} = 3$

4. $f(x) = \sqrt{x+2} + 2$



Graphically

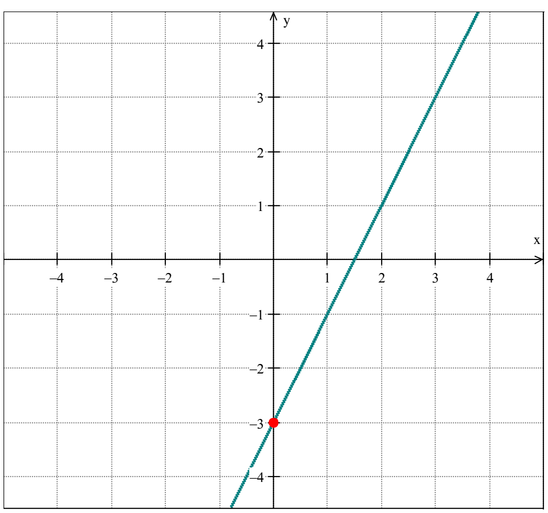
$f(x) = \sqrt{x+2} + 2$ $\quad$ $y-\text{intercept} \approx 3.2$

Algebraically y -intercept occurs where $x = 0$.

$f(0) = \sqrt{0+2} + 2 = \sqrt{2} + 2$

$f(0) \approx 3.41$ $\quad$ $y-\text{intercept} \approx 3.41$

5. $f(x) = 2x - 3$



Graphically

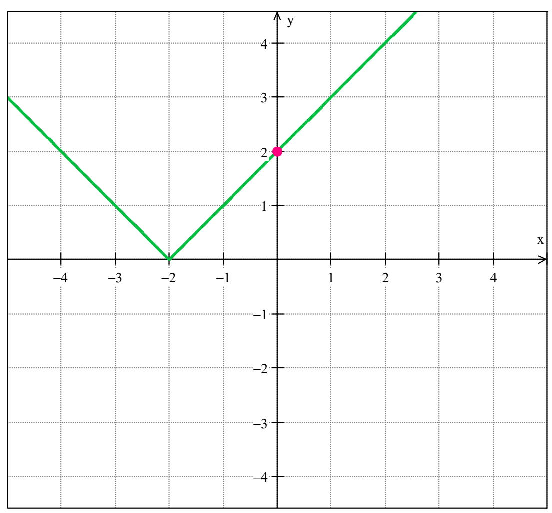
$f(x) = 2x - 3$ $\quad$ $y-\text{intercept} = -3$

Algebraically y -intercept occurs where $x = 0$.

$f(0) = 2 * 0 - 3$

$f(0) = -3$ $\quad$ $y-\text{intercept} = -3$

6. $f(x) = |x+2|$



Graphically

$f(x) = |x+2|$ $\quad$ $y-\text{intercept} = 2$

Algebraically y -intercept occurs where $x = 0$.

$f(0) = |0+2|$

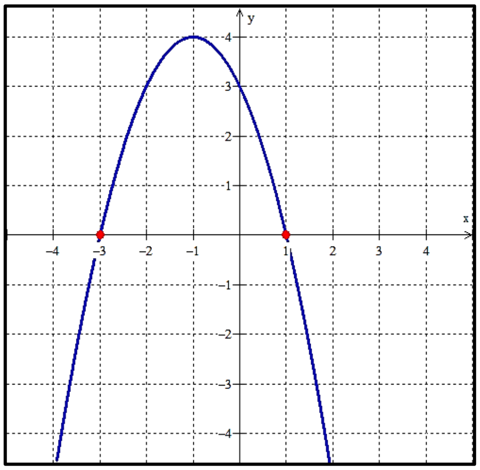
$f(0) = 2$ $\quad$ $y-\text{intercept} = 2$

Name: ____ Period: __________ Date: _______________

Analyzing Graphs of Functions and Relations Assignment

Use the graph of each function to approximate its zeros. Then find the zeros of each function algebraically.

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

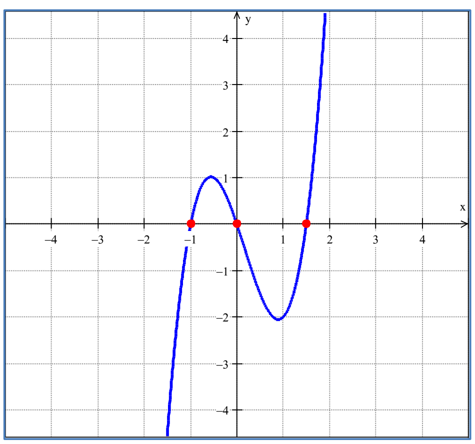


Graphically
x − intercepts -3 *and* 1

Algebraically
$f(x) = 0$
$-x^2 - 2x + 3 = 0$
$(x + 3)(x - 1) = 0$
$x = -3$ *and* $x = 1$

The zeros of f are -3 *and* 1

8. $f(x) = 2x^3 - x^2 - 3x$

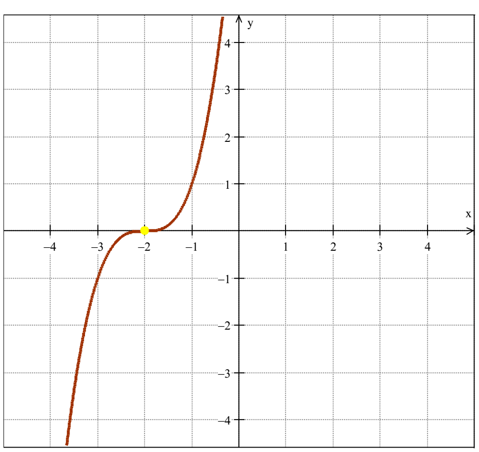


Graphically
x − intercepts -1, 0 *and* 1.5

Algebraically
$f(x) = 0$
$2x^3 - x^2 - 3x = 0$
$x(x + 1)(2x - 3) = 0$
$x = -1$ $x = 0$ *and* $x = 1.5$

The zeros of f are $-1, 0$ *and* 1.5

9. $f(x) = x^3 - 6x^2 - 12x + 8$



Graphically
x − intercepts -2

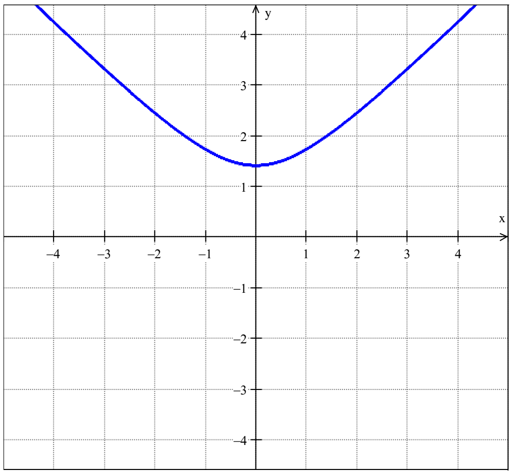
Algebraically
$f(x) = 0$
$x^3 - 6x^2 - 12x + 8$
$(x + 2)(x + 2)(x + 2) = (x + 2)^3$
$x = -2$
The zero of f is -2

Name: ____ Period: ___________ Date: ________________

Analyzing Graphs of Functions and Relations Assignment

Use the graph of each equation to test for symmetry with respect to the x -axis, y -axis, and the origin. Support the answer numerically. Then confirm algebraically.

10. $y = \sqrt{x^2 + 2}$



Graphically

The graph appears to be symmetric with respect to the y –axis because for every point (x, y) on the graph, there is a point $(-x, y)$.

Support Numerically

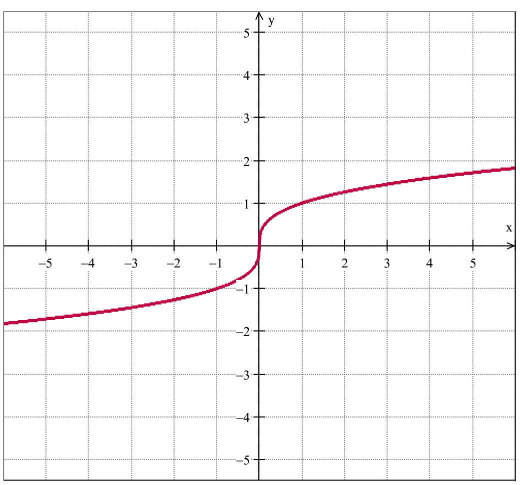
There is a table of values to support this conjecture.

x	-2	-1	0	1	2
y	$\sqrt{6}$	$\sqrt{3}$	$\sqrt{2}$	$\sqrt{3}$	$\sqrt{6}$
(x, y)	$(-2, \sqrt{6})$	$(-1, \sqrt{3})$	$(0, \sqrt{2})$	$(1, \sqrt{3})$	$(2, \sqrt{6})$

Algebraically

Because $y = \sqrt{(-x)^2 + 2}$ is equivalent to $\sqrt{x^2 + 2}$, the graph is symmetric with respect to the y –axis.

11. $y = \sqrt[3]{x}$



Graphically

The graph appears to be symmetric with respect to the **origin** because for every point (x, y) on the graph, there is a point $(-x, -y)$.

Support Numerically

There is a table of values to support this conjecture.

x	-2	-1	0	1	2
y	$-\sqrt[3]{2}$	-1	0	1	$\sqrt[3]{2}$
(x, y)	$(-2, -\sqrt[3]{2})$	$(-1, -1)$	$(0, 0)$	$(1, 1)$	$(2, \sqrt[3]{2})$

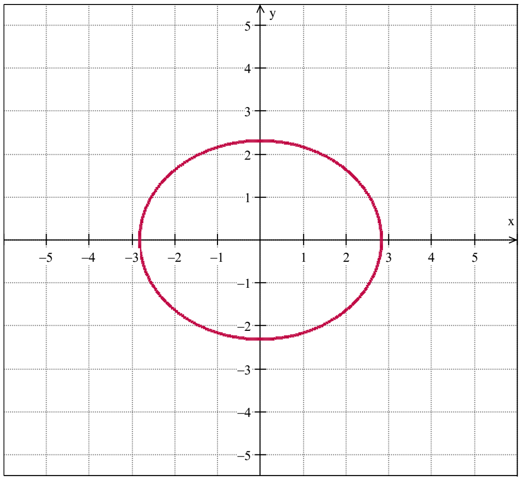
Algebraically

Because $-y = \sqrt[3]{-x}$ is equivalent to $y = \sqrt[3]{x}$, the graph is symmetric with respect to the **origin.**

Name: ____ Period: ___________ Date: ________________

Analyzing Graphs of Functions and Relations Assignment

12. $2x^2 + 3y^2 = 16$



Graphically

The graph appears to be:

- symmetric with respect to the x -**axis** because for every point (x, y) on the graph, there is a point $(x, -y)$,
- symmetric with respect to the y -**axis** because for every point (x, y) on the graph, there is a point $(-x, y)$,
- symmetric with respect to the **origin** because for every point (x, y) on the graph, there is a point $(-x, -y)$.

Symmetric with respect to x -axis

Algebraically

Because $2x^2 + 3(-y)^2 = 16$ is equivalent to $2x^2 + 3y^2 = 16$, the graph is symmetric with respect to x -**axis.**

Support Numerically

x	2	2	1	1
y	$\frac{2\sqrt{6}}{3}$	$-\frac{2\sqrt{6}}{3}$	$-\frac{\sqrt{42}}{3}$	$\frac{\sqrt{42}}{3}$
(x, y)	$(2, \frac{2\sqrt{6}}{3})$	$(2, -\frac{2\sqrt{6}}{3})$	$(1, -\frac{\sqrt{42}}{3})$	$(1, \frac{\sqrt{42}}{3})$

Symmetric with respect to y -axis

Algebraically

Because $2(-x)^2 + 3y^2 = 16$ is equivalent to$2x^2 + 3y^2 = 16$, the graph is symmetric with respect to the y –**axis.**

Support Numerically

x	-2	-1	1	2
y	$\frac{2\sqrt{6}}{3}$	$\frac{\sqrt{42}}{3}$	$\frac{\sqrt{42}}{3}$	$\frac{2\sqrt{6}}{3}$
(x, y)	$(-2, \frac{2\sqrt{6}}{3})$	$(-1, \frac{\sqrt{42}}{3})$	$(1, \frac{\sqrt{42}}{3})$	$(2, \frac{2\sqrt{6}}{3})$

Symmetric with respect to origin

Algebraically

Because $2(-x)^2 + 3(-y)^2 = 16$ is equivalent to $2x^2 + 3y^2 = 16$, the graph is symmetric with respect to the **origin.**

Support Numerically

x	-2	-1	1	2
y	$-\frac{2\sqrt{6}}{3}$	$-\frac{\sqrt{42}}{3}$	$\frac{\sqrt{42}}{3}$	$\frac{2\sqrt{6}}{3}$
(x, y)	$(-2, -\frac{2\sqrt{6}}{3})$	$(-1, -\frac{\sqrt{42}}{3})$	$(1, \frac{\sqrt{42}}{3})$	$(2, \frac{2\sqrt{6}}{3})$

Name: ____ Period: __________ Date: _______________

Analyzing Graphs of Functions and Relations Assignment

Determine whether the following are even, odd, or neither.

13. $f(x) = x^3 + 2x$

$f(x) = x^3 + 2x$
$f(-x) = (-x)^3 + 2(-x)$
$f(-x) = -x^3 - 2x$
$f(-x) = -(x^3 + 2x)$
$f(-x) = -f(x)$ **The function is odd.**

14. $g(t) = 2t^4 + t^2$

$g(t) = 2t^4 + t^2$
$g(-t) = 2(-t)^4 + (-t)^2$
$g(-t) = 2t^4 + t^2$

$g(-t) = g(t)$ **The function is even.**

15. $h(y) = y^4 - 5y^2 - 3y$

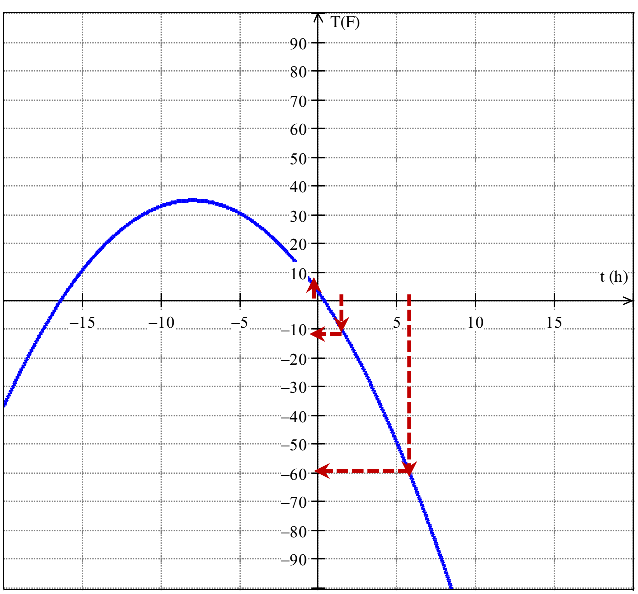
$h(y) = y^4 - 5y^2 - 3y$
$h(-y) = (-y)^4 - 5(-y)^2 - 3(-y)$
$h(-y) = y^4 - 5y^2 + 3y$

$h(-y) \neq h(y)$ $h(-y) \neq -h(y)$
The function is neither

SOLVE REAL WORLD PROBLEM

16. The temperature T in degrees Fahrenheit t hours after 6 AM is given by $T(t) = -\frac{1}{2}t^2 - 8t + 3$, $for\ 0 < t < 10$. Find $T(0), T(2)$ and $T(6)$ graphically and algebraically.

Graphically



$T(0) \approx 4$ $T(2) \approx -11$ $T(6) \approx -60$

Algebraically

$T(0) = -\frac{1}{2}t^2 - 8t + 3$
$T(0) = -\frac{1}{2} * 0 - 8t * 0 + 3 = 3$
$T(0) = 3$

$T(2) = -\frac{1}{2} * 2^2 - 8 * 2 + 3$
$T(2) = -\frac{1}{2} * 4 - 16 + 3$
$T(2) = -2 - 16 + 3$
$T(2) = -15$

$T(6) = -\frac{1}{2}6^2 - 8 * 6 + 3$
$T(6) = -\frac{1}{2} * 36 - 8 * 6 + 3$
$T(6) = -18 - 48 + 3$
$T(6) = -63$