Lecture 1

1.

Multiply. Write your answer in lowest terms.

$\frac{1}{7} \cdot \frac{1}{3}$

_____

2.

Multiply: $\frac{1}{8} \cdot \frac{2}{5}$

Give your answer as a fraction, reduced to lowest terms

_____

3.

Add $\frac{3}{16} + \frac{5}{16}$

Reduce your answer to lowest terms

_____

4.

Add and give your answer as a fraction (not mixed number), reduced to lowest terms.

$\frac{2}{5} + \frac{3}{2} =$

_____

5.

Add $\frac{3}{3} + \frac{2}{6} + \frac{5}{12}$

Give your answer as a fraction (not mixed number) reduced to lowest terms, or integer.

_____

6.
Subtract: $\frac{26}{35} - \frac{13}{25}$

Give your answer in reduced terms.

_____

7.
Divide. Write your answer in lowest terms.

$\frac{5}{7} \div \frac{11}{5}$

_____

8.
Divide, if possible. If not possible, put DNE as the answer.
$\frac{9}{0} =$

_____

9.
Use the distributive property to simplify the expression:

$5(a + 11) =$

_____

10.
Write the expression 'six times nine to the eighth power' using mathematical symbols. Do not evaluate the result.

In mathematical symbols the expression is

_____

11.
Find each power

-4^2 =

$(-4)^2$ =

_____

12.
In which set(s) of numbers would you find the number
0

- irrational number
- natural number
- whole number
- real number
- integer
- rational number

_____

13.
In which set(s) of numbers would you find the number
$\sqrt{11}$

- real number
- whole number
- integer
- rational number
- natural number
- irrational number

_____

14.
Select all of the natural numbers on the list below:

- $-\frac{13}{4}$
- ∞
- $\sqrt{11}$
- -5
- 5.75
- 11
- π
- 0

Select all of the integers on the list below:

- 5.75
- ∞
- π
- 0
- $\sqrt{11}$
- -5
- $-\frac{13}{4}$
- 11

Select all of the rational numbers on the list below:

- $-\frac{13}{4}$
- 0
- π
- 5.75
- 11
- $\sqrt{11}$
- -5
- ∞

Select all of the irrational numbers on the list below:

- π
- 0
- ∞
- -5
- $\sqrt{11}$
- $-\frac{13}{4}$
- 5.75
- 11

Select all of the real numbers on the list below:

- 5.75
- -5
- $-\frac{13}{4}$
- 0
- 11
- $\sqrt{11}$
- π
- ∞

_____

15.
Round 0.73 to the nearest tenth

_____

16.
Round 0.69 to the nearest tenth

_____

17.
Round 0.85 to the nearest tenth

_____

18.
Round 0.723 to the nearest hundredth

_____

19.
Is the statement shown below an expression or an equation?
$-10x + 3 + 5x - 13$

- Expression
- Equation

_____

20.
Is the statement shown below an expression or an equation?
$-8x + 8 = 3x - 19$

- Expression
- Equation

_____

21.
Use algebra to solve for x in the equation $3x + 5 = -9x + 2$.
If your answer is a fraction, write it in reduced, fractional form.
x =

22.
Evaluate.
$|13| =$
$\left|-\frac{2}{3}\right| =$
$|0| =$

23.
Simplify the expressions below assuming $x - 8 < 0$.

$|x - 8| + 2$

$5x + 7 - 2|x - 8|$

24.

Express each set as an interval.

$4 \leq x < 19$

$x \geq 5$

Lecture 2

Exp Rules/Simplifying, Radicals Simplifying/Combining, Rational Exp, Rationalizing Denoms

1.
Simplify the following expression completely: $z^{12} \cdot z^{13}$

2.
Simplify the expression completely: $\frac{z^6}{z^{11}}$

3.
Simplify the following expression completely: $(3z^5)(11z^3)$

4.
Write the fraction in simplest form.

$$\frac{30d}{27d^2}$$

5.
Simplify: $\frac{12x^6y^7}{3x^5y^2}$

6.
a. The square roots of 81 are _____

b. $\sqrt{81} =$

7.
Evaluate $-\sqrt{100}$

Answer DNE if the result is not a real number.

8.
Evaluate $\sqrt{-4}$

Answer DNE if the result is not a real number.

9.
Evaluate $\sqrt{\frac{9}{100}}$

10.
Simplify without using a calculator.

$\sqrt[4]{625} =$

11.
Simplify without using a calculator.

$\sqrt[5]{243} =$

12.
Simplify $\sqrt{180}$

13.
Assuming x represents a positive value, simplify the expression below:

$\sqrt[3]{x^{12}} =$

14.
Assuming k represents a positive value, simplify the expression below:

$\sqrt[3]{k^{32}} =$

15.
Simplify $\sqrt{12a}$ where $a > 0$:

16.
If x and y are positive, then the expression $\sqrt{175x^8y^{11}}$ simplifies to…

17.
Simplify the expression, assuming all variables represent positive numbers.

$\sqrt[3]{-8y^{33}} =$

18.
Simplify the radical expression. Assume all variables represent positive values.

$\sqrt[4]{\frac{625c^{28}}{16b^{16}}} =$

19.
Simplify the radical expression. Assume all variables represent positive values.

$\sqrt[3]{16x^4y^5}$

20.
Simplify the radical expression $\sqrt[3]{128}$

21.
Combine the terms if possible or answer DNE if they cannot be combined:

$7\sqrt{10} - 4\sqrt{90} =$

22.
Combine the terms if possible or answer DNE if they cannot be combined:

$13\sqrt{11} - 6\sqrt{160} =$

23.
Combine the terms if possible or answer DNE if they cannot be combined:

$-4\sqrt[3]{81} + 3\sqrt[3]{24} =$

24.
A rectangle has a length of $\sqrt{96}$ meters and a width of $\sqrt{216}$ meters. Find its perimeter in exact and approximate forms, and then find its area.
The exact perimeter is _____ meters.
This is approximately _____ meters. (Round your answer to the nearest tenth)
The area of the rectangle is _____ square meters.

25.
Simplify:

$3\sqrt{7} \cdot 5\sqrt{21}$

26.
Simplify. $\frac{\sqrt{32k^2n^{10}}}{\sqrt{25k^8n^{12}}}$

27.
Rationalize the denominator: $\frac{2}{\sqrt{15}}$

The result can be expressed in the form $\frac{A}{B}$ where

A =

B =

28.
Rationalize the denominator: $\frac{1}{\sqrt{6}}$

The result can be expressed in the form $\frac{A}{B}$ where

A =

B =

29.

Rationalize the denominator: $\frac{-8}{\sqrt{2}}$

30.

Simplify. $\sqrt{\frac{15}{11}}$

31.

Rationalize the denominator. Give an exact answer.

$\sqrt{\frac{5}{x^3}}$ =

32.

Rationalize the denominator:

$\frac{15}{\sqrt{x}}$ =

33.

The radical expression $\sqrt[14]{x^9}$ can be rewritten in the rational exponent form $x^{\frac{a}{b}}$ where,

$a =$

$b =$

34.

Rewrite $x^{\frac{1}{4}}$ in radical form.

$x^{\frac{1}{4}} =$

35.

Evaluate and express your answer as a reduced fraction:

$64^{-4/3} =$

36.

Rewrite the expression $x^{-\frac{7}{10}}$ in radical form using positive exponents.

$x^{-\frac{7}{10}} =$

37.

Evaluate without a calculator:

$125^{4/3}$

38.

Simplify using the rules of exponents:

$8^{\frac{1}{4}} \cdot 8^{\frac{5}{8}} =$

Lecture 3

1.
Simplify

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

2.
Multiply and simplify:

$3x^4(2x^2 - 5x)$

3.
Add the two polynomials and simplify:
$(8x^4 + 2x^3 + 9x) + (-4x^4 - x^3 + 10)$

4.
Perform the indicated operations and simplify:

$[(-7x^2 + 6x + 10) - (4x^2 + 14x + 17)] - (-19x^2 - 10x - 5)$

5.
Multiply and simplify:

$(x - 5)(2x - 2)$

6.
Perform the following operation and simplify:

$(7x - 5)^2$

7.
Multiply and simplify:

$6r(3r + 4)(r - 6) =$

8.
Factor the following expression completely by pulling out the GCF. Factor out a negative number if the expression begins with a negative coefficient.

$-6x^8 - 3x^5 - 9$

9.
Factor the following expression completely by pulling out the GCF.

$14x^9 + 6x^8 + 22x^6$

10.
Factor the following expression completely:

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

11.
Factor the following expression completely:

$z^2 + 8z + 9z + 72$

12.
Factor the following expression completely:

$w^3 - 3w^2 + 10w - 30$

13.
Factor the following expression completely:

$y^2 + 2y - 8$

14.
Factor the following expression completely:

$6z^2 + 37z - 35$

15.
Factor the following expression completely:

$2w^3 - 8w^2 - 90w$

16.
Solve $(3y + 10)(5y + 7) = 0$

$y =$

17.
Solve the equation: $p^2 = 8p$

$p =$

18.
Solve $r^2 = 25$

$r =$

19.

Solve the following equation:

$(9c + 11)(c + 9) = 79$

$c =$

20.
The product of two consecutive odd integers is 99. If x is the smallest of the integers, write an equation in terms of x that describes the situation, and then find all such pairs of integers.

The equation that describes the situation is _____

The positive set of integers is _____

The negative set of integers is _____

21.

Use factoring by grouping to solve the following equation:

$a^3 - 4a^2 - 25a + 100 = 0$

$a =$

22.

Use the square root property to determine all real solutions for each of the following equations.

$3a^2 - 528 = 0$

$a =$

$5x^2 + 360 = 0$

$x =$

Give exact solutions (don't use decimals), and separate multiple solutions with commas. If there are no real solutions, answer DNE.

23.

Find all real solutions of the equation.

$(a + 2)^2 = 24$

$a =$

Simplify your solutions.

24.

In order to solve an equation with the quadratic formula, the equation must be in which of these forms?

- $ax^2 + bx + c = 0$
- $a(x - h)^2 + k = 0$
- $y = m(x - x_1) + y_1$
- $(x - a)(x - b) = 0$

25.
Solve by the quadratic formula:

$-2x^2 - 3x + 5 = 0$

26.
Solve equation by using the quadratic formula

$3m^2 - 1 = 5m$

Simplify answers.

27.
Find the last term to make the trinomial into a perfect square:

$x^2 + 18x +$_____

Write the trinomial as a binomial squared:

28.
Add the same constant to both sides to make the left hand side a perfect square:

$z^2 - 6z +$ _____ $= 3 +$ _____

29.

Consider the equation: $x^2 + 18x + 77 = 0$

A. First, use the "completing the square" process to write this equation in the form $(x + A)^2 = B$ and enter your equation below.
   $x^2 + 18x + 77 = 0$ is equivalent to the equation _____
B. Solve your equation and enter your answers below as a list of numbers, separated with a comma where necessary.
   $x =$

30.
Solve by completing the square:

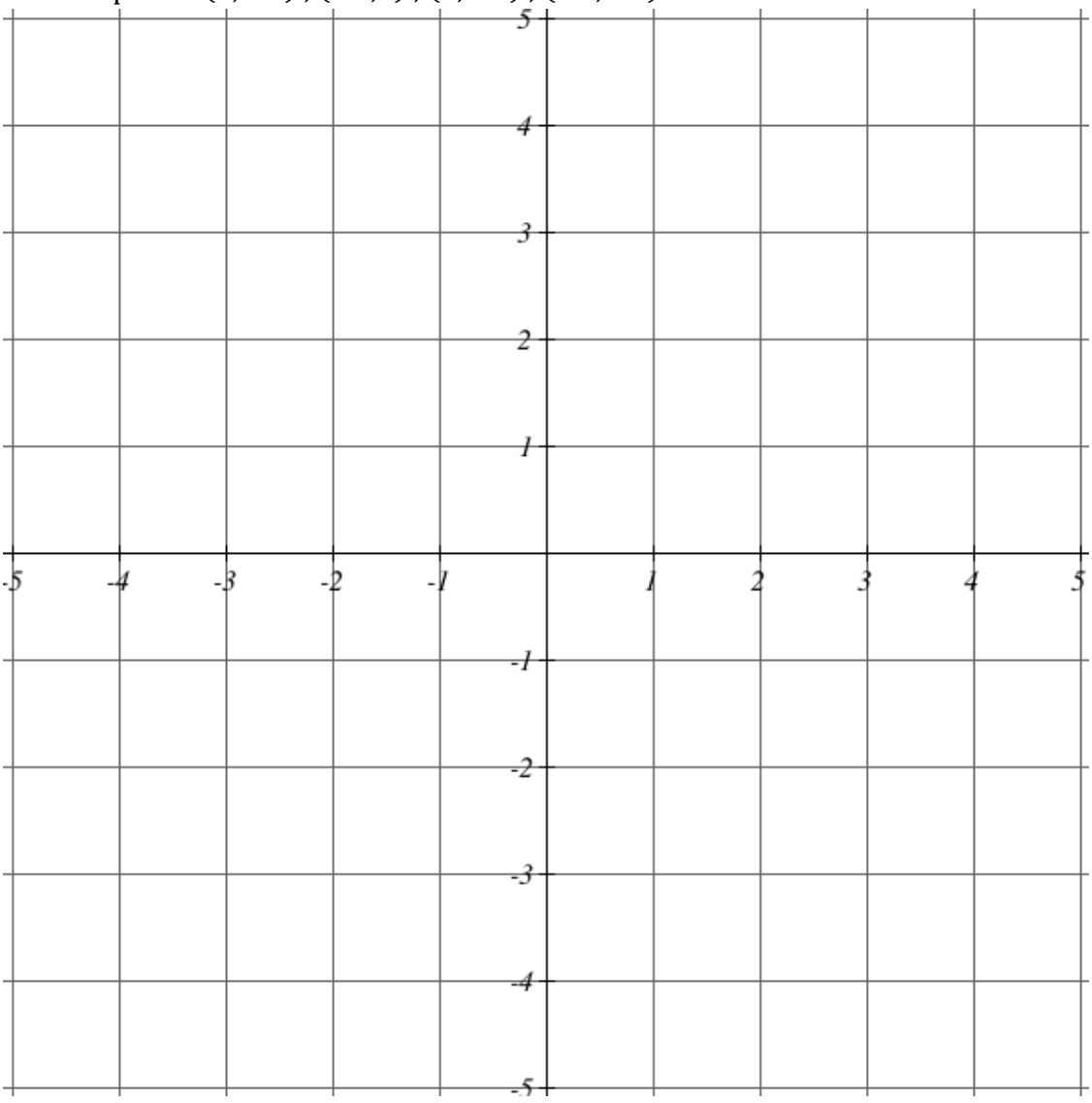
$16z^2 - 24z = 216$

$z =$

Lecture 4

1.

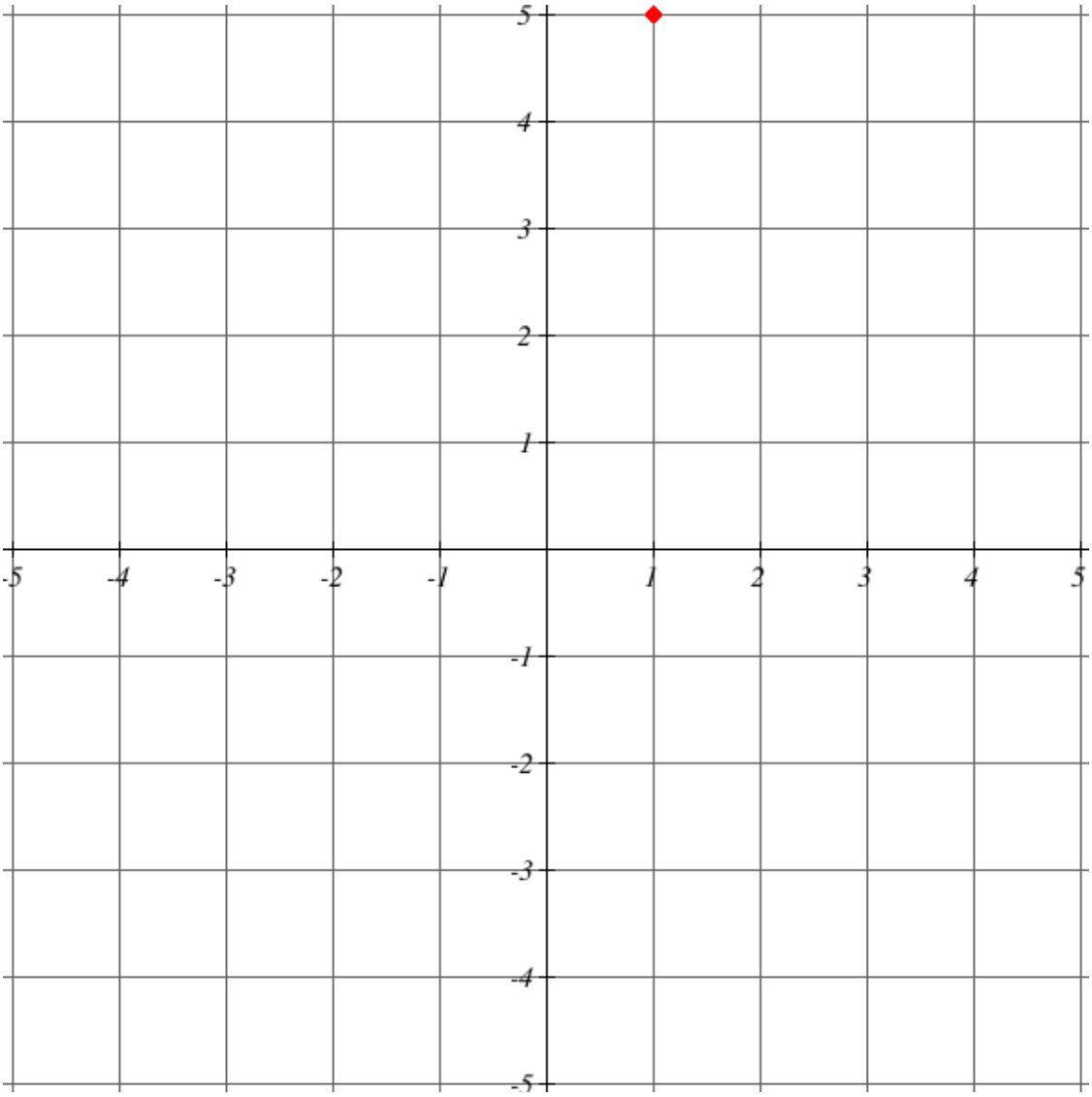
Plot the points $(0,-2)$, $(-3,0)$, $(4,-5)$, $(-5,-5)$.



2.

The coordinate below represents the point $P(1,5)$

Plot another point by shifting the given point 1 units left and 4 units down



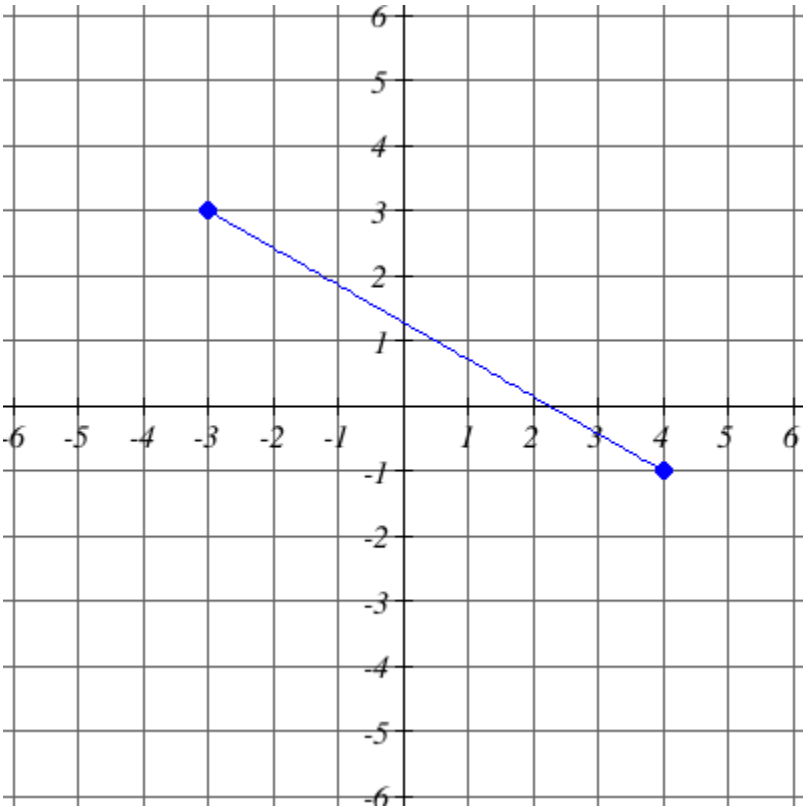
3.

Identify the quadrant or axis where each of the following points lies.

$(-4,1)$
$(0,-2)$
$(-3,0)$
$(0,2)$
$(-1,-1)$
$(2,-4)$

4.

Find the midpoint of the line segment shown below.

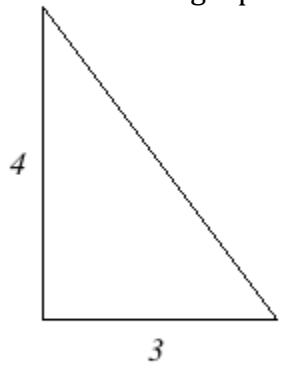


5.

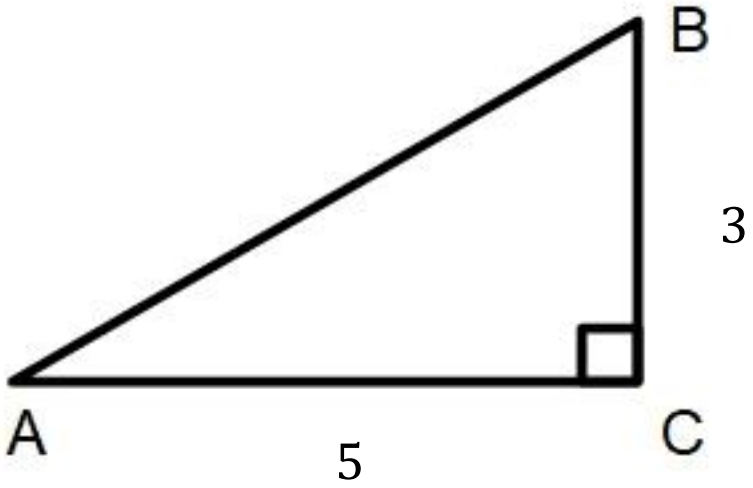
Find the midpoint of the line segment with endpoints: $\left(\frac{10}{3}, -\frac{1}{8}\right)$ to $\left(-\frac{10}{3}, -\frac{9}{8}\right)$

6.

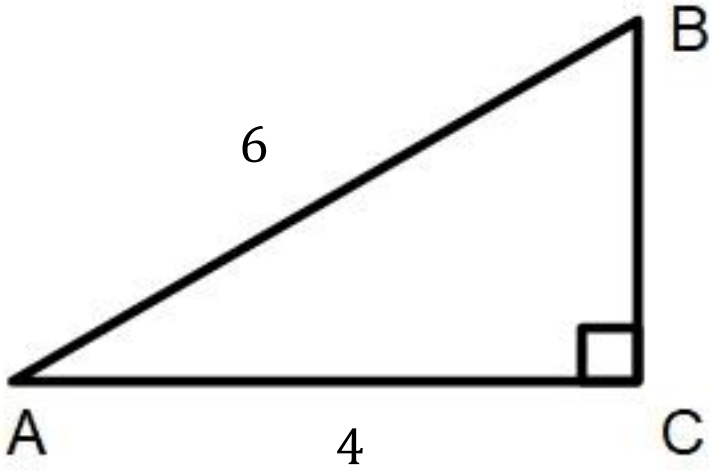
Find the length of the hypotenuse of the triangle pictured below



7.
In triangle ABC , $\angle ACB$ is a right angle. Find the length of the missing side.



8.
In triangle ABC , $\angle ACB$ is a right angle. Find the length of the missing side.

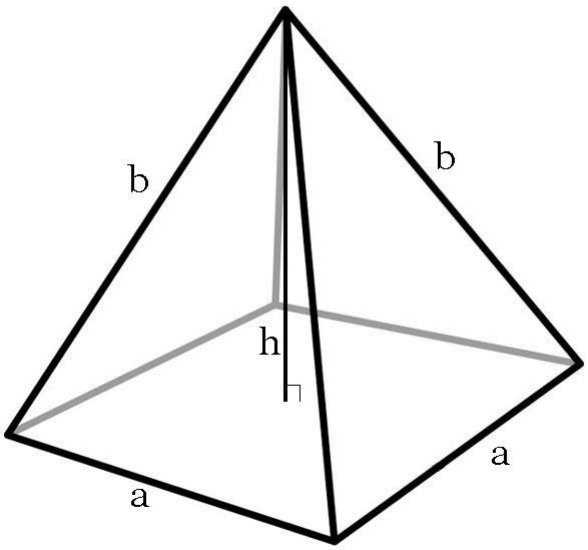


9.

Find the distance between the points (7 , 8) and (−15 , 12).

10.

Compute the **exact value** of the height h of the square-based straight pyramid, given that the base is a square with sides 24 inches long, and all other edges are 39 inches long.



11.
Write the equation of the circle centered at (0,8) with radius 12.

12.
Find the standard form for the equation of a circle
$(x-h)^2+(y-k)^2=r^2$
with a diameter that has endpoints $(-6,-8)$ and $(4,-10)$.

$h=$ _____
$k=$ _____
$r=$ _____

13.

Find the center and radius of the circle whose equation is $x^2 - x + y^2 + 6y - 20 = 0$.

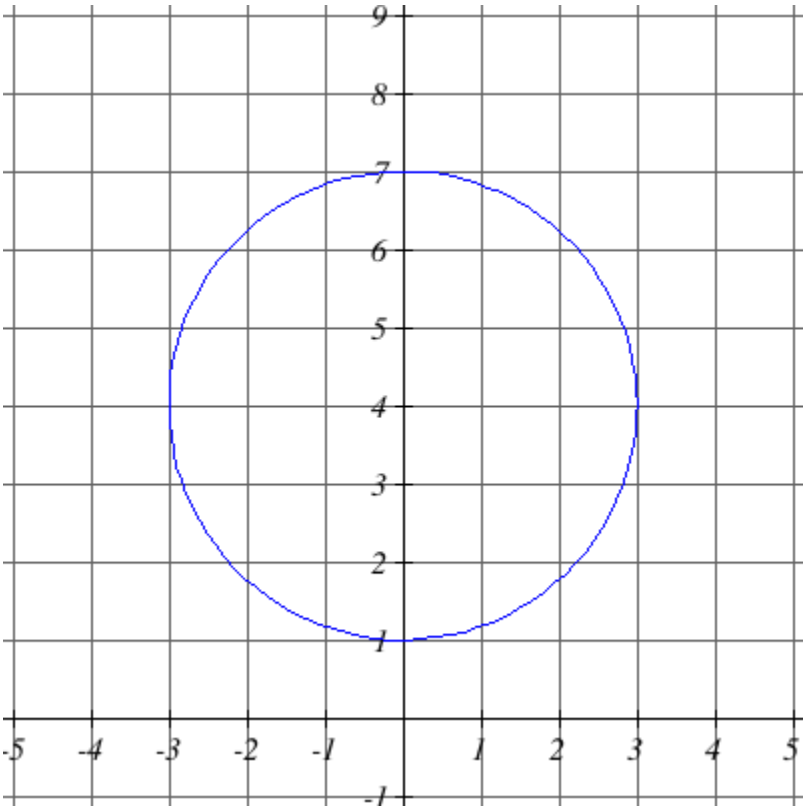
The center of the circle is _____.
The radius of the circle is _____.

14.

Give the equation of the circle that has its center at $(-3,4)$ that intersects the y-axis exactly once. Hint: sketch the graph.

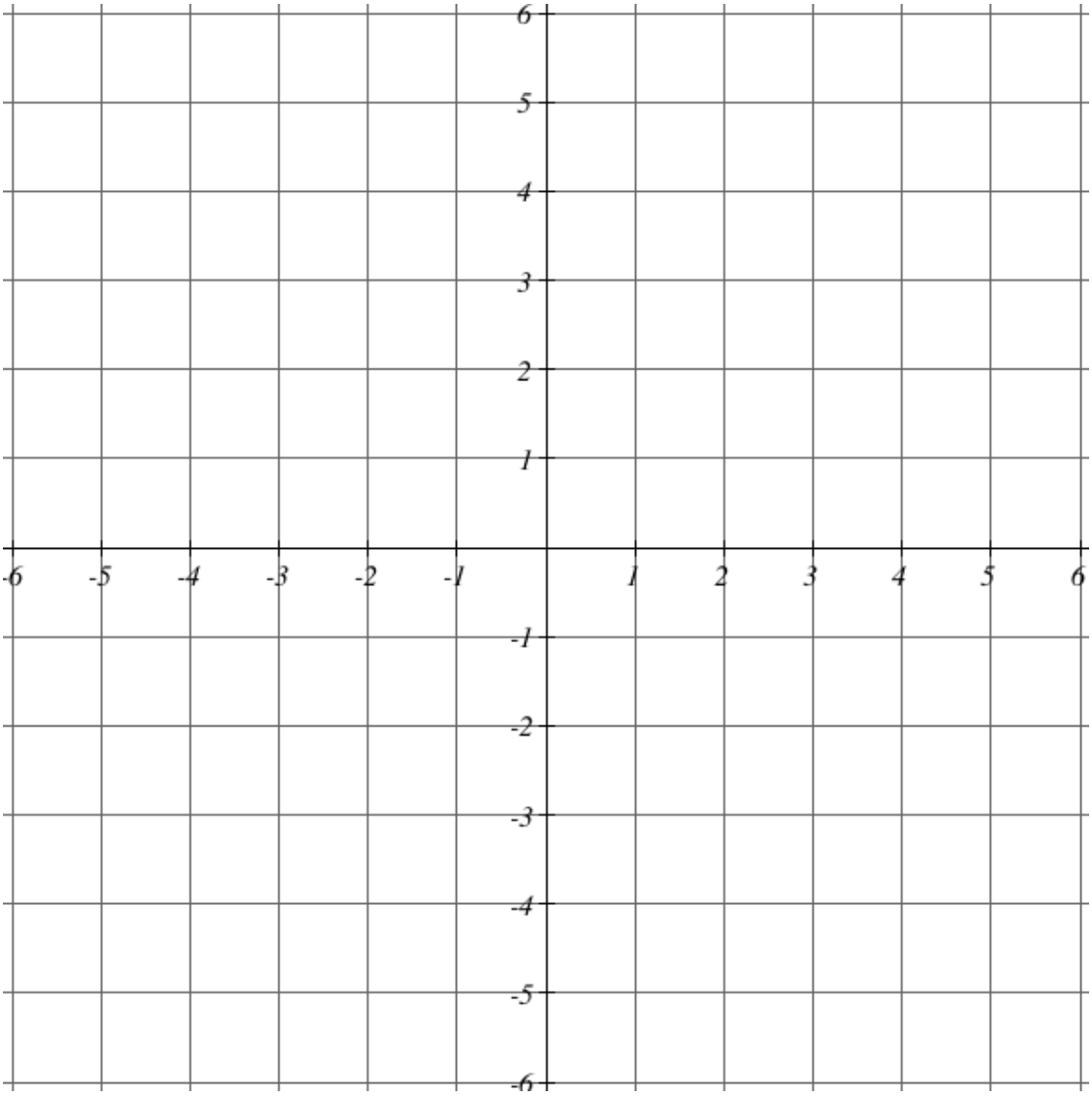
15.

Write the equation of the circle shown in standard form.



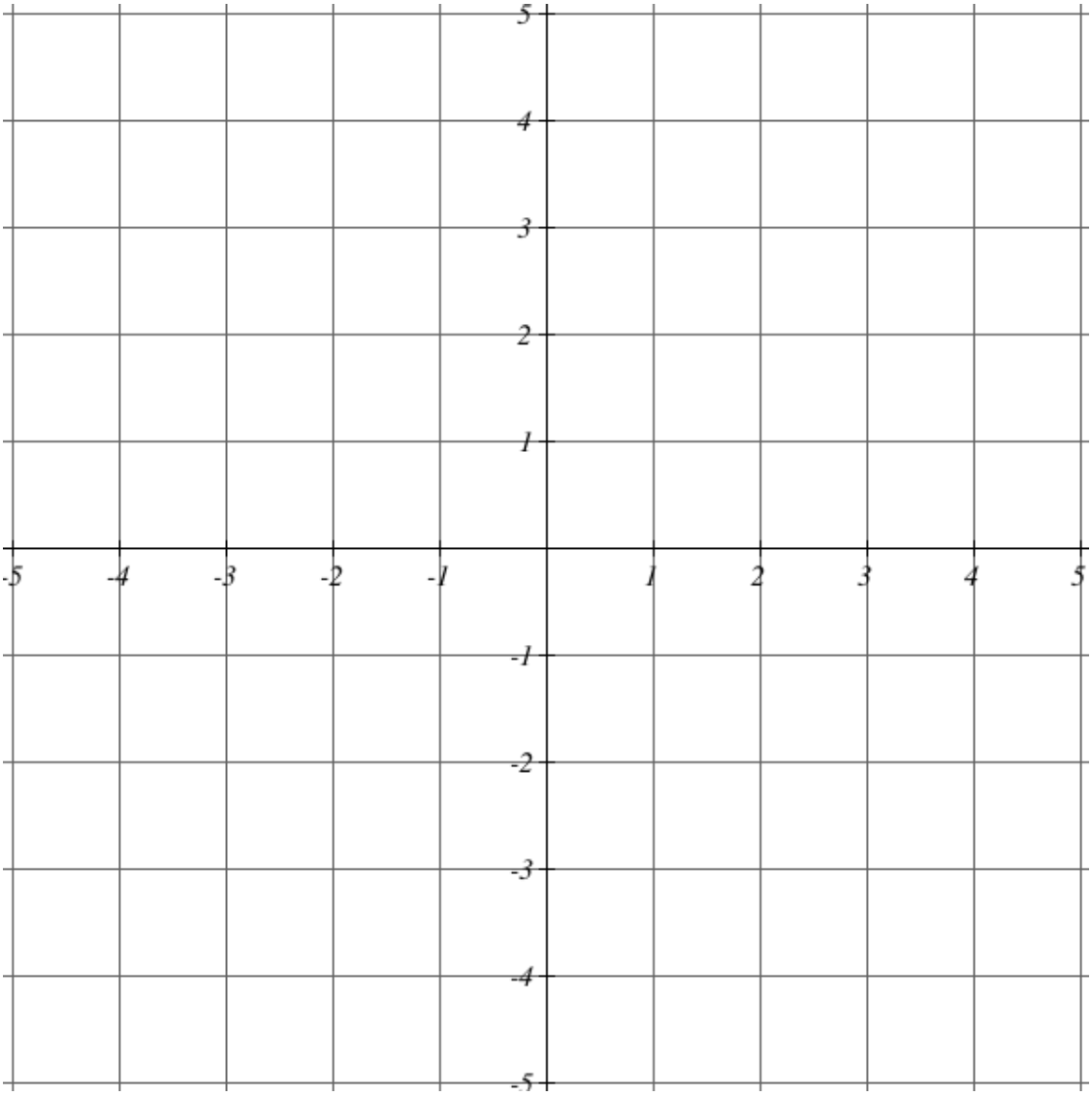
16.

Draw the circle $(x+2)^2+(y+3)^2=9$.



17.

Draw a circle with an equation of $x^2 + 2x + y^2 - 2y = 7$.

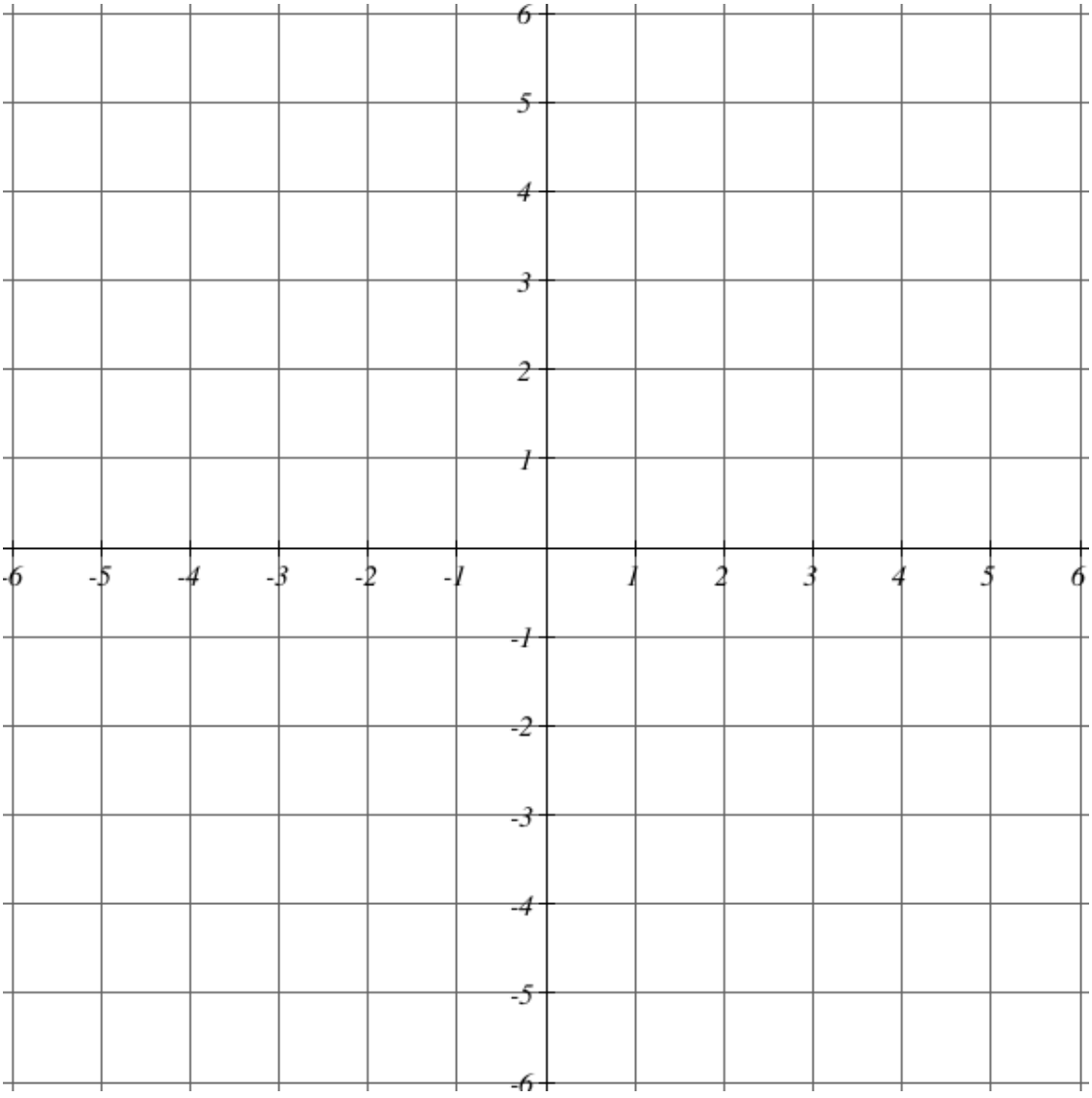


18.
For the equation $-3x + y = 3$

a) Complete the table:

x	y
	0
0	

b) Plot the two points you found in the table.



19.
Find the x -intercepts of the graph of the equation

$x^2 - 3x + y^2 + 6y = 28$

20.
Find the y -intercepts of the graph of the equation

$x^2 - 8x + y^2 + 5y = 50$

21.
Find the x-intercept of the equation $(-8x - 10)y = -6\text{x} - 1$

22.
Find the y-intercept of the equation $-8xy - 2y = 4\text{x} + 8$

23.
Suppose the point $P = (12,2)$ is reflected across the x -axis to the point P' .

The coordinates of P' are _____

24.
Suppose the point $P = (-8,-3)$ is reflected across the y -axis to the point P' .

The coordinates of P' are _____

25.
Suppose the point $P = (7,-9)$ is reflected across the origin to the point P' .

The coordinates of P' are _____

26.
Consider the curve given by the equation

$2x^2 - 5xy - 4y^2 = 88$

Which of the symmetries below does this curve display?
- symmetry about the x -axis
- symmetry about the y -axis
- symmetry about the origin
- no symmetry

27.
Consider the curve given by the equation

$4x^2 - 5x + 5y^2 = 86$

Which of the symmetries below does this curve display?
- symmetry about the x -axis
- symmetry about the y -axis
- symmetry about the origin
- no symmetry

28.
Consider the curve given by the equation

$2x^2 - 3y + 5y^2 = 75$

Which of the symmetries below does this curve display?
- symmetry about the x -axis
- symmetry about the y -axis
- symmetry about the origin
- no symmetry

29.
Consider the curve given by the equation

$5x^2 - 2y^2 = 82$

Which of the symmetries below does this curve display?

- symmetry about the x -axis
- symmetry about the y -axis
- symmetry about the origin
- no symmetry

30.
Consider the curve given by the equation

$-2x^3 + 3y^3 = 130$

Which of the symmetries below does this curve display?

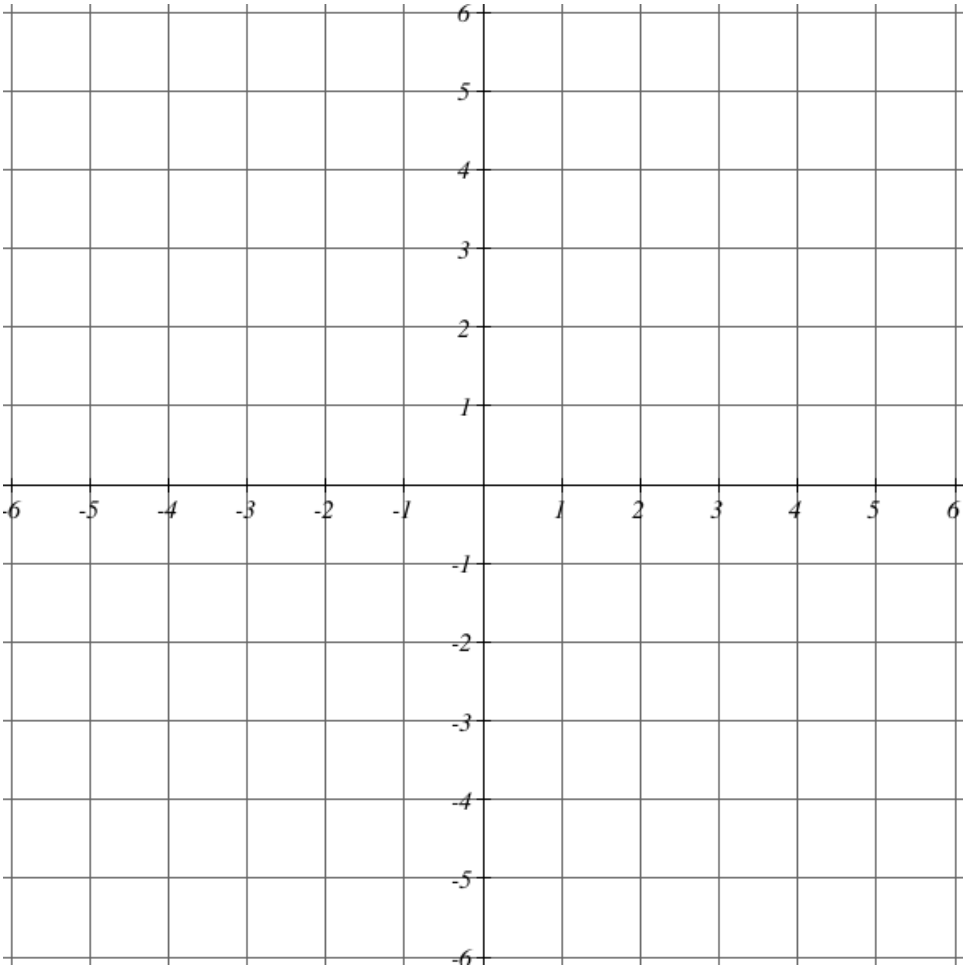
- symmetry about the x -axis
- symmetry about the y -axis
- symmetry about the origin
- no symmetry

31.
For the equation $y = -|x - 1|$

a) Complete the table:

x	y
-1	
0	
1	
2	
3	

b) Plot the points you found in the table.



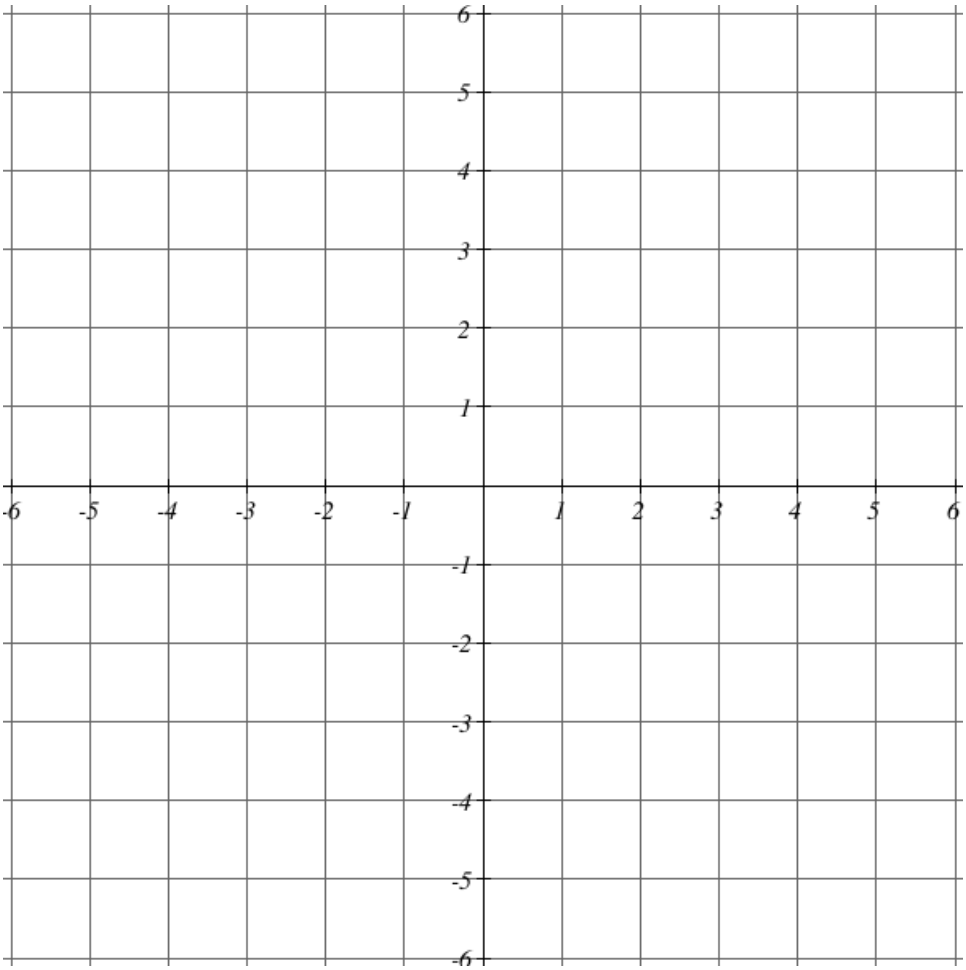
32.

For the equation $y = -\sqrt{x-2}$

a) Complete the table, rounding to three decimal places where needed.

x	y
2	
3	
4	

b) Plot the points you found in the table.



Lecture 5

Relations, functions, function notation, evaluation, graphing, domain/range, piecewise

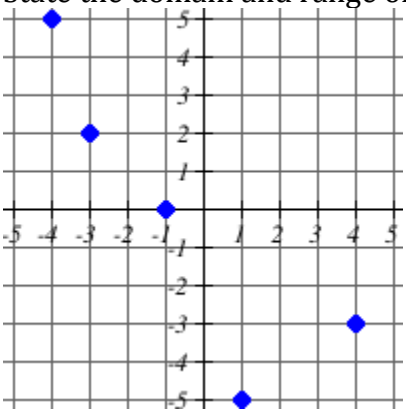
1.
Find the domain and range of the relation R given below:

$R = \{(10, -18), (-21, -21), (-14,19), (24, -29)\}$

The domain is:

The range is:

2.
State the domain and range of the relation graphed below:



Domain:

Range:

3.
State the domain and range of the relation given in the table below, and determine if it is a function.

x	-18	-20	7	-3	-7
y	12	-18	-9	16	-8

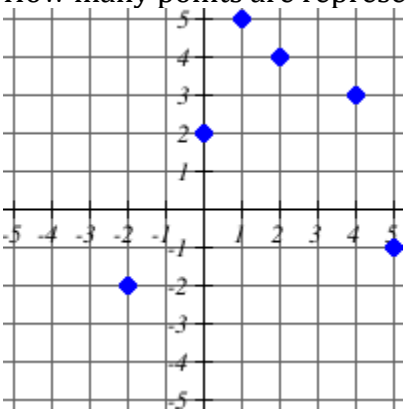
Domain:
Range:

Is the relation a function?

- Yes
- No

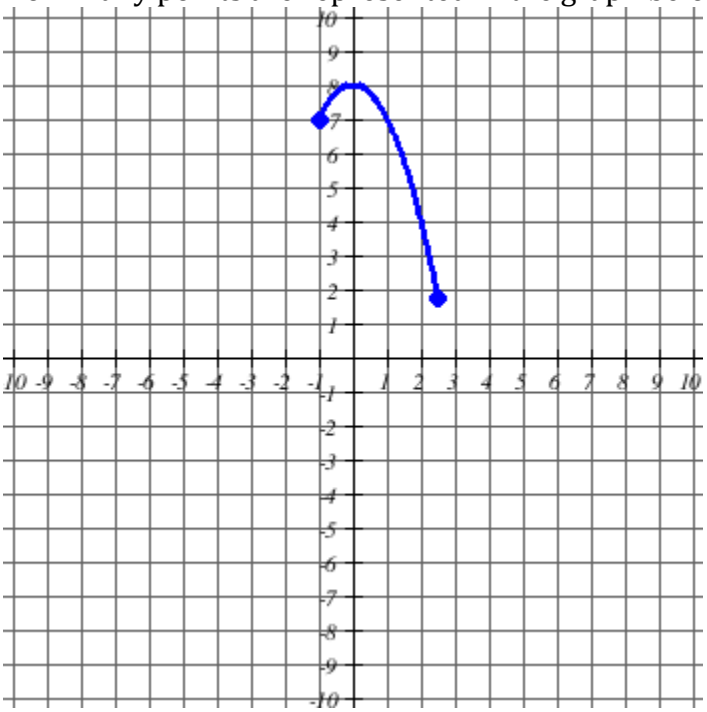
4.

How many points are represented in the graph below?



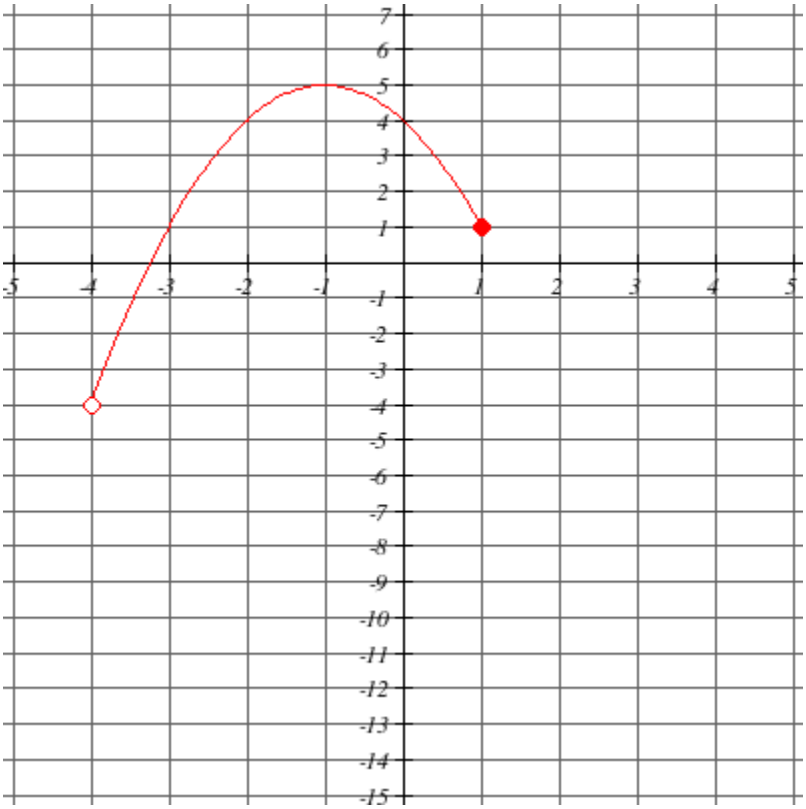
5.

How many points are represented in the graph below?



6.

Determine the domain and range of the function using the graph below. Give your answer as an inequality using the appropriate variables.

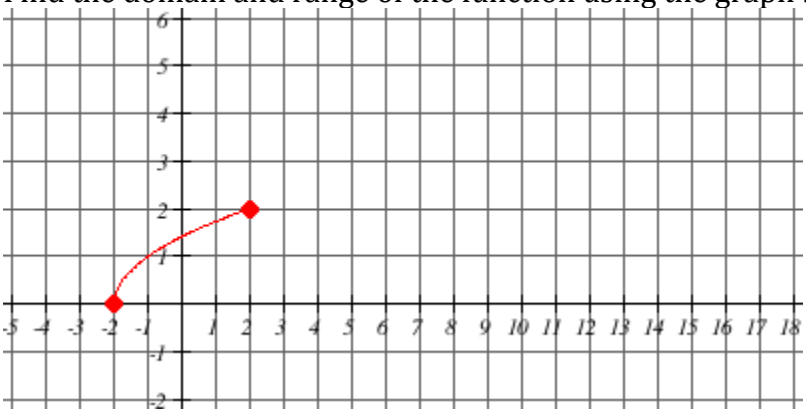


Domain:

Range:

7.

Find the domain and range of the function using the graph below.

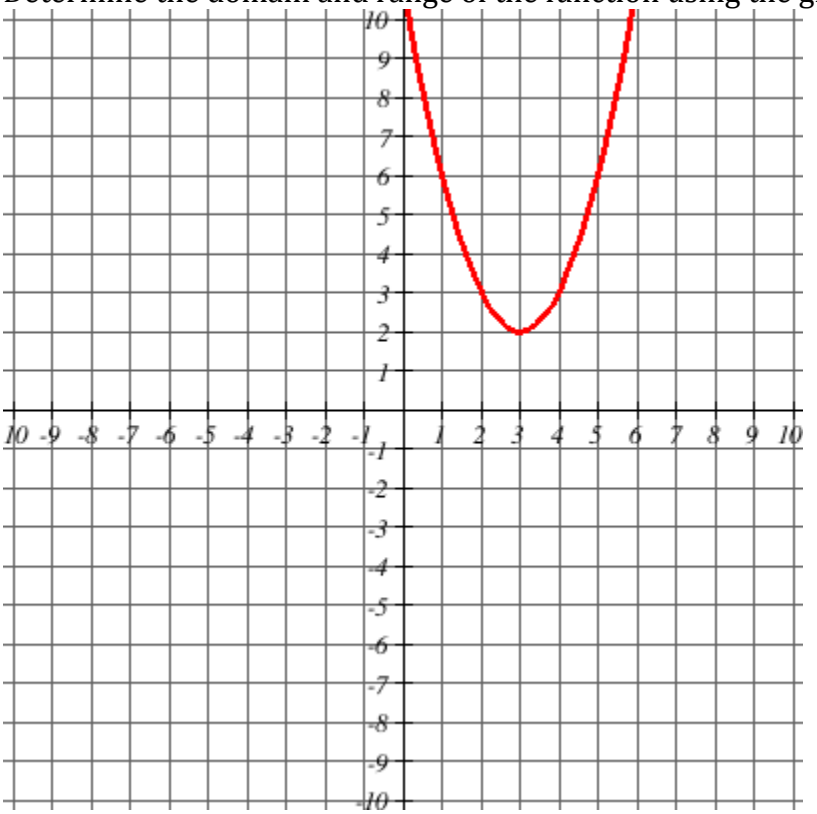


Domain: ___ ≤ x ≤ ___

Range: ___ ≤ y ≤ ___

8.

Determine the domain and range of the function using the graph below.



The domain is:

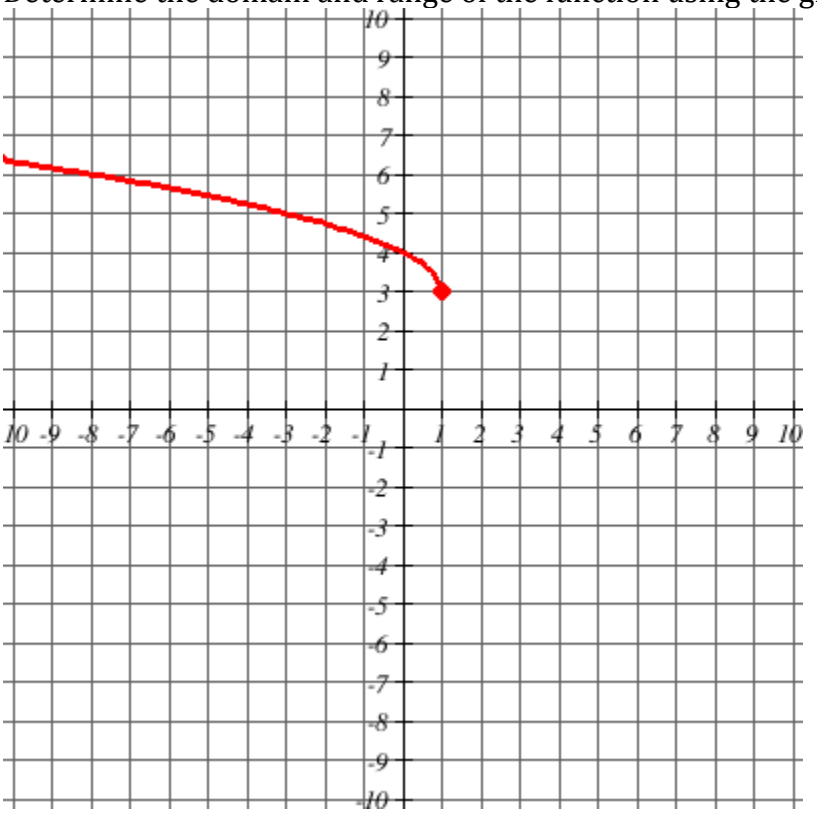
- $x \geq 2$
- $x \leq 2$
- $x \leq 0$
- All real numbers

The range is:

- $y \geq 2$
- All real numbers
- $y \leq 0$
- $y \leq 2$

9.

Determine the domain and range of the function using the graph below.



The domain is:

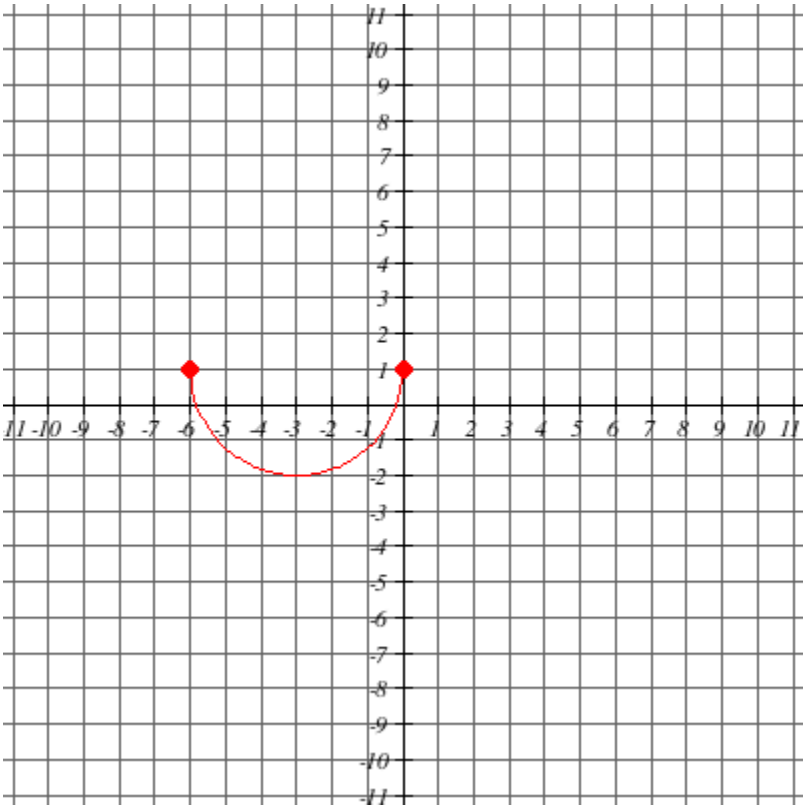
- All real numbers
- $x \leq 0$
- $x \leq 1$
- $x \geq 1$

The range is:

- $y \leq 3$
- $y \geq 3$
- All real numbers
- $y \leq 0$

10.

Give the domain and range for the function shown below. State your answers as inequalities.



Domain:

Range:

11.

When the definition of a function involves a fraction, the function is undefined at any value that would make the denominator of the function _____

- the same as the numerator
- 1
- your best friend
- 0

12.

The domain of the function $f(x) = \frac{50}{5x-27}$ is all real numbers x except for _____

13.
Find the domain of the function given below:

$f(t) = \frac{t}{t^2 + 81}$

The domain is:

- $t \neq -9$
- $t \leq 81$
- $\displaystyle{t}&#{8800};{9}$
- $t \geq 81$
- All real numbers
- $t \geq 9$
- $t \leq 9$

14.
If $f(-7) = -8$, then the point ____ is on the graph of f .

15.
Given the function $f(x) = 6x^2 - 6x + 3$. Calculate the following values:
$f(-2) =$
$f(-1) =$
$f(0) =$
$f(1) =$
$f(2) =$

16.
Evaluate the function $g(x) = -3x^2 + 7$ at two different inputs and state the corresponding points. You choose the inputs.

17.
Express the rule "Subtract 17, then square" as a function of x .

$f(x) =$.

18.
For the function $g(x) = \frac{-5x-9}{10x+7}$, evaluate $g(1)$.
$g(1) =$

19.
Evaluating Functions

Use the function $f(x) = -8x - 6$ to answer the following questions

Evaluate $f(0)$:

$f(0) =$

For what values(s) of x does $f(x) = -78$?

$x =$

20.
Evaluating Functions

Use the table to answer the following questions. Separate multiple answers with commas if needed.

x	0	1	2	3	4	5	6	7	8	9
$h(x)$	-37	-2	-25	-32	-95	-2	-99	-79	33	7

Evaluate $h(7)$:

$h(7) =$

For what value(s) of x does $h(x) = -2$?

$x =$

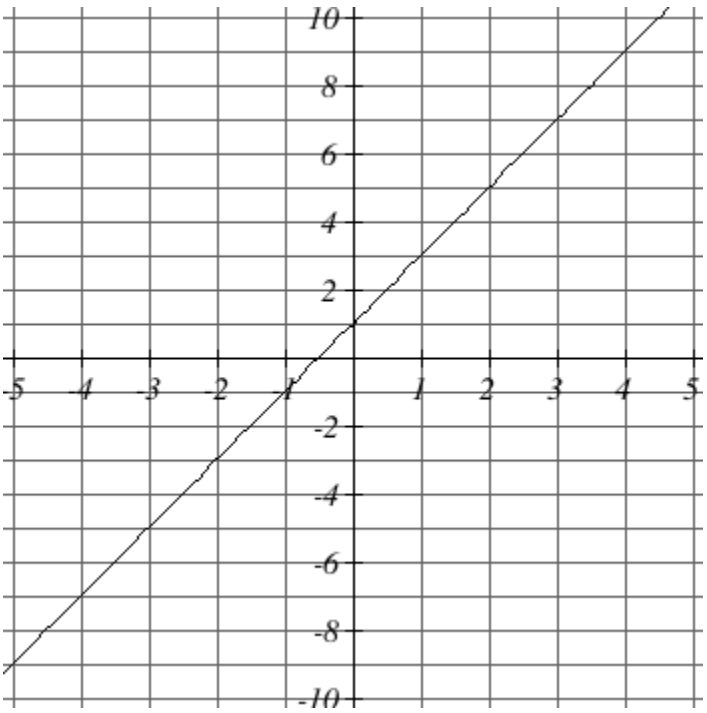
21.
Construct a table of values for a function $f(x)$ which specifies that $f(2) = 10$.

x				
$f(x)$				

22.
Create a formula for a function $f(x)$ that has $f(4) = 10$. Do not give a simple constant function (like $f(x) = 10$) as your answer.

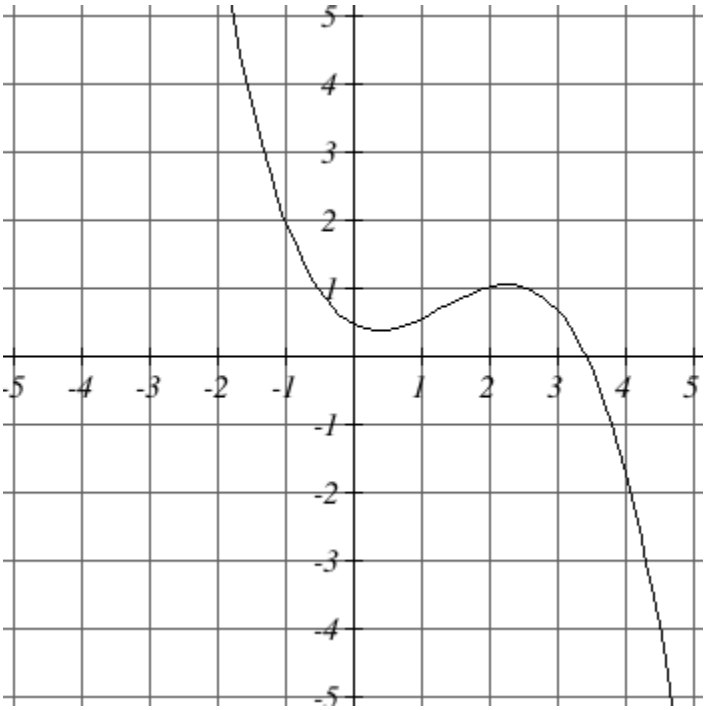
$f(x) =$

23.
The plot below represents the function $f(x)$



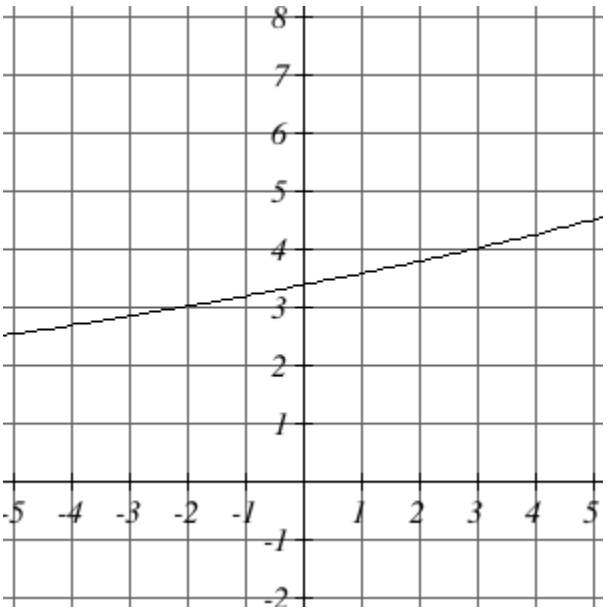
Evaluate $f(-2)$

24.
The plot below represents the function $f(x)$



Evaluate $f(2)$

25.
The plot below represents the function $f(x)$



Evaluate $f(3)$

$f(3) =$

Solve $f(x) = 3$

$x =$

26.
The function f multiplies its input by 11 and then subtracts 20 to produce its output. What is the symbolic representation of this operation?
$f(x) =$

27.
Give a verbal description of what the function $f(n) = (n + 8)^2$ does to the input n.

- n is squared and 8 is added to the result
- 8 is squared and the result is added to n
- 8 is added to n and the result is squared
- 8 and n are both squared and the results are added together

28.
Give a verbal description of what the function $f(x) = x^2 + 5$ does to the input x.

- 5 is squared and the result is added to x
- 5 is added to x and the result is squared
- 5 and x are both squared and the results are added together
- x is squared and 5 is added to the result

29.
You are studying meteorology and collect weather data for Gainesville, FL for the months of April, May, and June 2015. The function $T(x) = .18x + 80.25$ gives an estimate of the daily high temperature during this period where x is the number of days after April 1, 2015. Evaluate $T(29)$ (rounded to one decimal place) and then state its physical interpretation.
$T(29)$ =_____

The physical interpretation of $T(29)$ is:
- $T(29)$ is the estimated high temperature on June 30
- $T(29)$ is the estimated high temperature on April 30
- $T(29)$ is the estimated number of days that have passed since the high temperature was 29
- $T(29)$ is the estimated number of days it will be until the high temperature is 29

30.
The amount of garbage, G, in tons per week, produced by a city with population p, measured in thousands of people, is given by $G = f(p)$

The town of Tola has a population of 45,000 and produces 5 tons of garbage each week. Express this information in terms of the function f

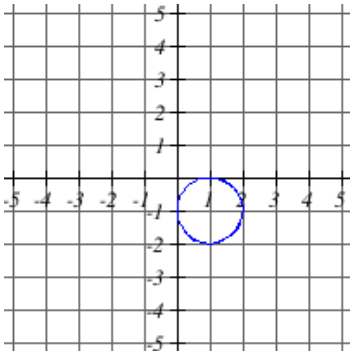
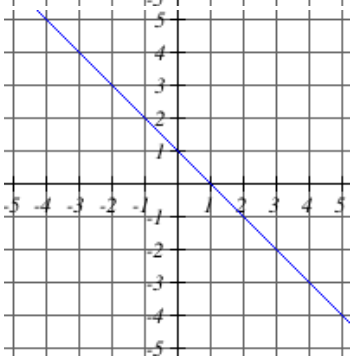
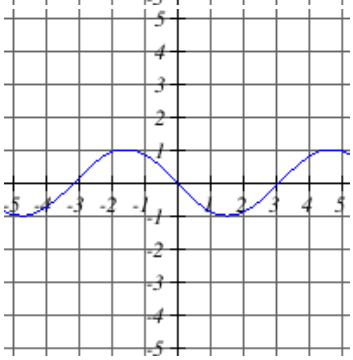
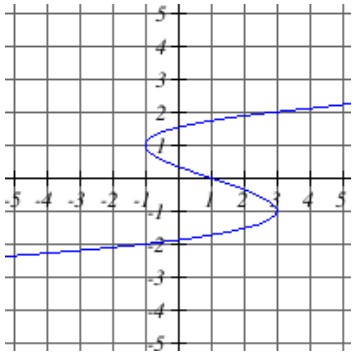
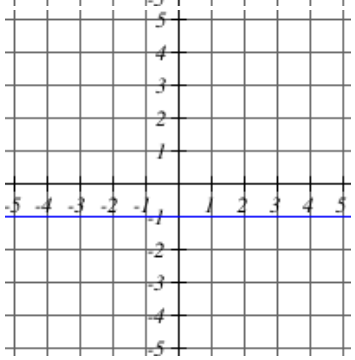
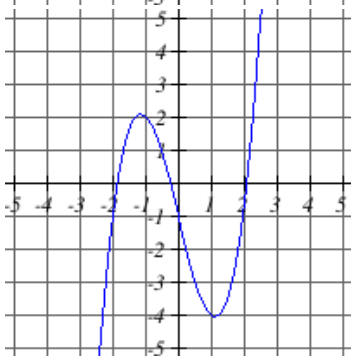
31.
For the equation shown below, solve for y as a function of x and express the result in function notation. Use f for the name of the function.

$-20x + 4y = 28$

The function is _____

32.

Select all of the following graphs which represent y as a function of x .

- 
- 
- 
- 
- 
- 

33.

Select all of the following tables which represent y as a function of x .

x	y
0	-1
1	2
4	2
8	9
11	10

x	y
-2	-4
3	2
6	5
7	8
14	15

x	y
-4	-2
3	2
5	2
8	7
3	10

x	y
-3	-5
3	2
3	5
9	8
14	12

34.

Based on the table below,

x	0	1	2	3	4	5	6	7	8	9
$f(x)$	26	5	78	100	2	52	22	36	37	73

Evaluate $f(2)$:

$f(2)$ =

Solve $f(x) = 5$:

x =

35.

Suppose $f(x) = -2x^2 + 10x - 9$. Compute the following:

A.) $f(-3) + f(5) =$

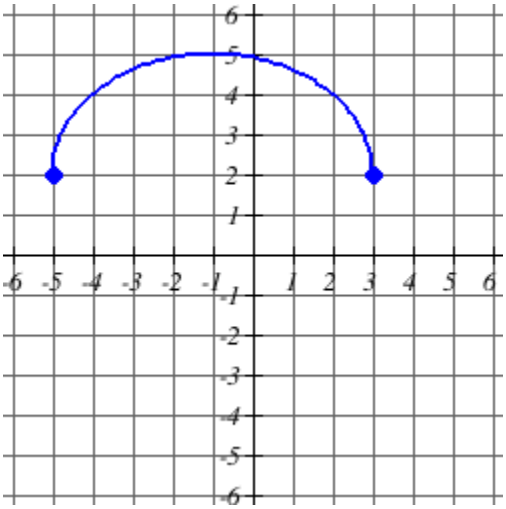
B.) $f(-3) - f(5) =$

36.

Find the the domain of the function $f(x) = \frac{x-4}{x^2+9x-10}$.

- {x| x ≠ -10}
- {x | x ≠ -10 and x ≠ 1}
- {x| x ≠ -4}
- {x| x ≠ 10 and x ≠ 4}
- {x| x ≠ 10}

37.



Write the domain of the function using interval notation.

38.

Given the function:

$$f(x) = \begin{cases} 2x+1 & x < 0 \\ 2x+2 & x \geq 0 \end{cases}$$

Calculate the following values:

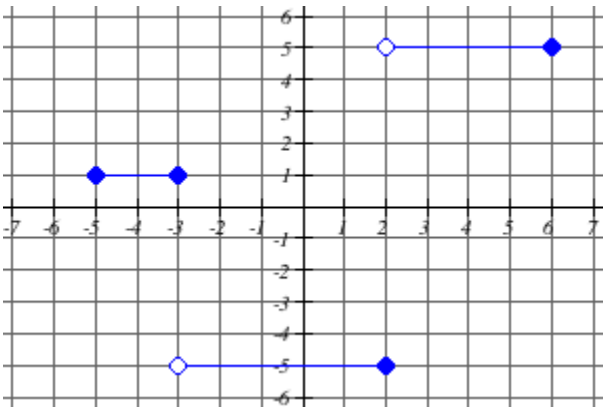
$f(-1) =$

$f(0) =$

$f(2) =$

39.

Complete the description of the piecewise function graphed below. Use interval notation to indicate the intervals.

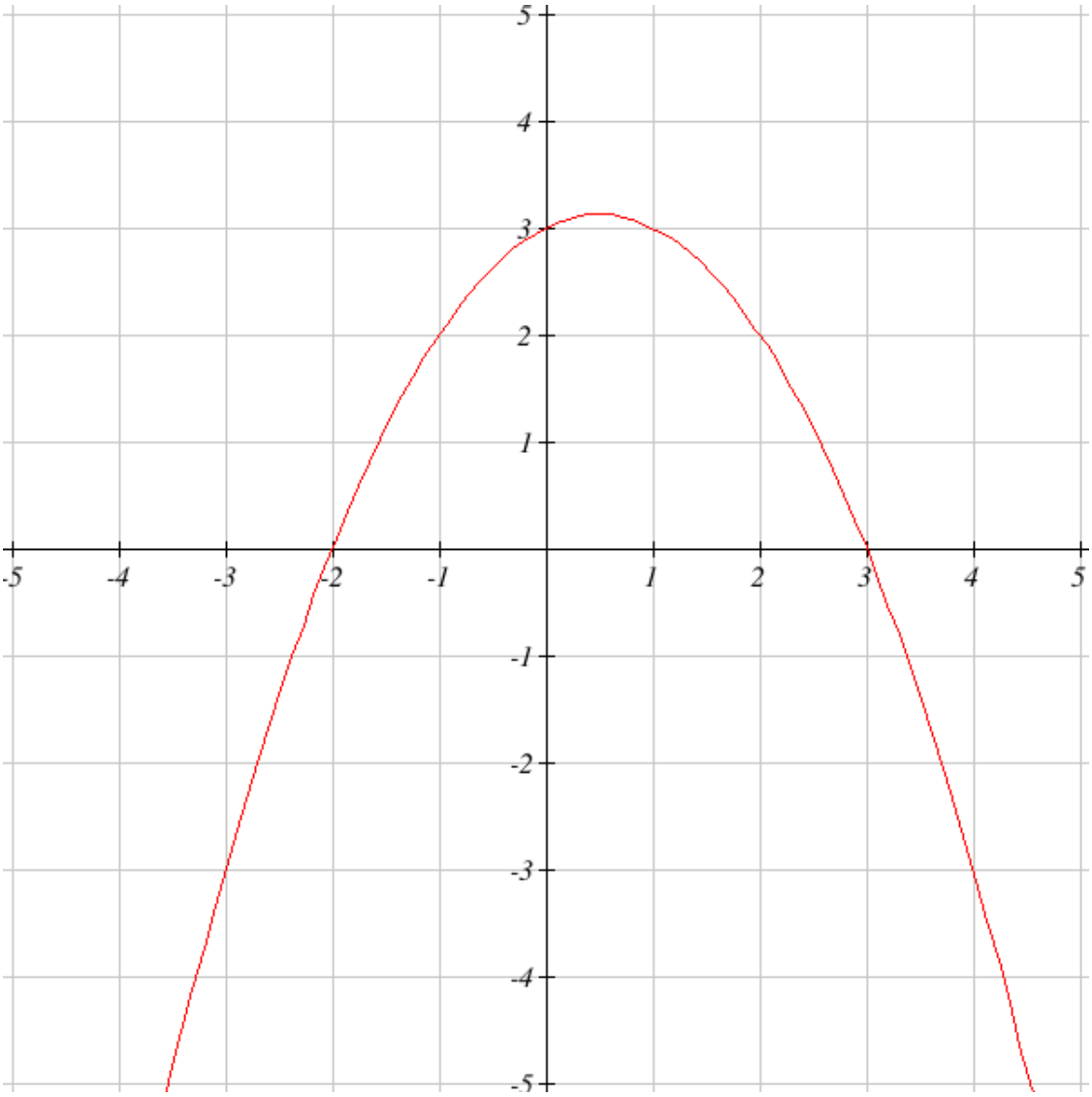


$$f(x) = \begin{cases} 1 & \text{if} \\ -5 & \text{if} \\ 5 & \text{if} \end{cases}$$

Lecture 6

Vertical Line Test, Zeros, Positive/Negative, Increasing/Decreasing, Concavity, Relative min/max, Avg Rate of Change, Even/odd

1.
Put dots on the graph where the "zeros" can be found. Then list the zeros.

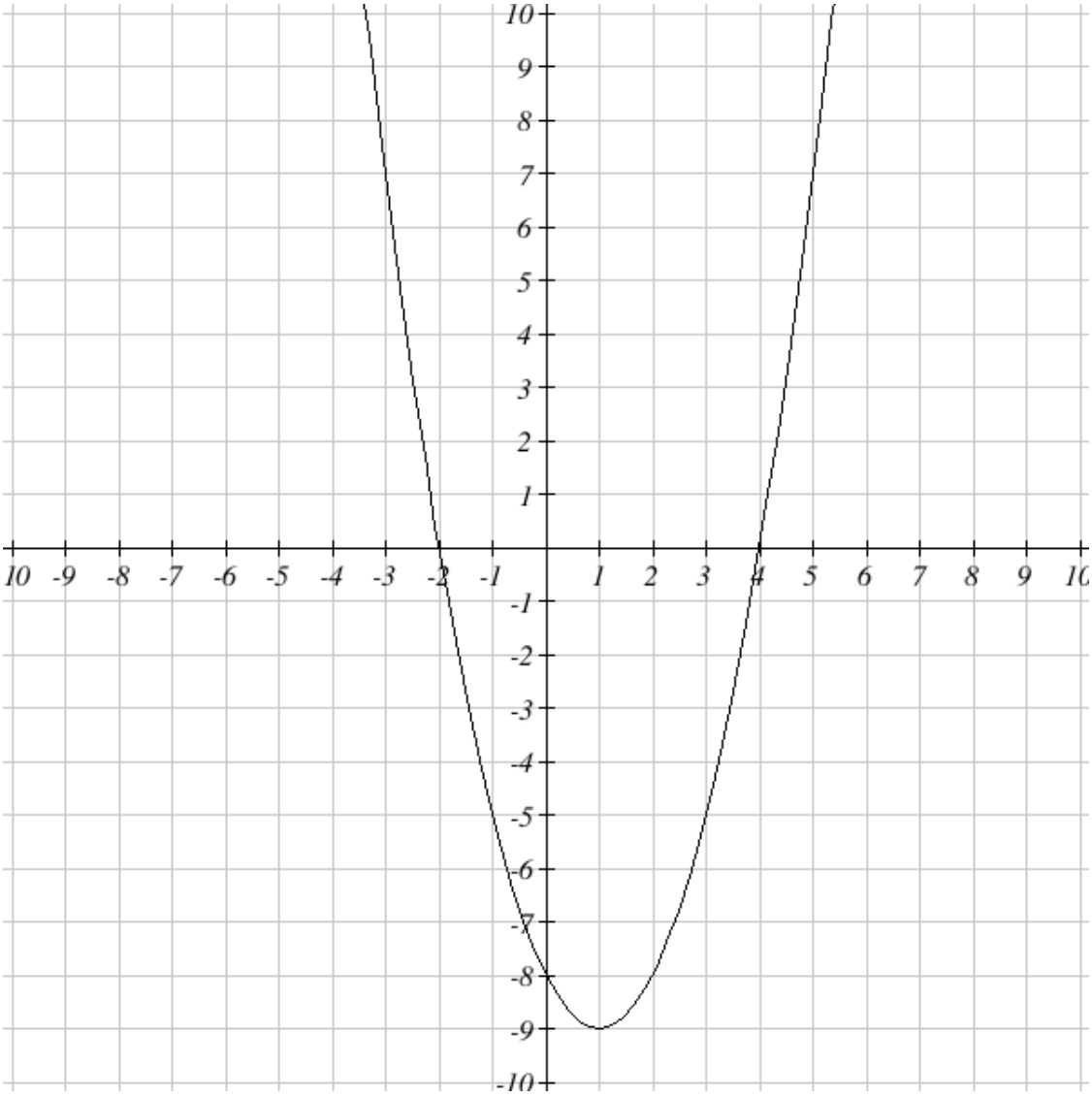


If more than one zero, seperate with a comma. The zero's are $x =$ _____.

_____

2.

Consider the function graphed below.



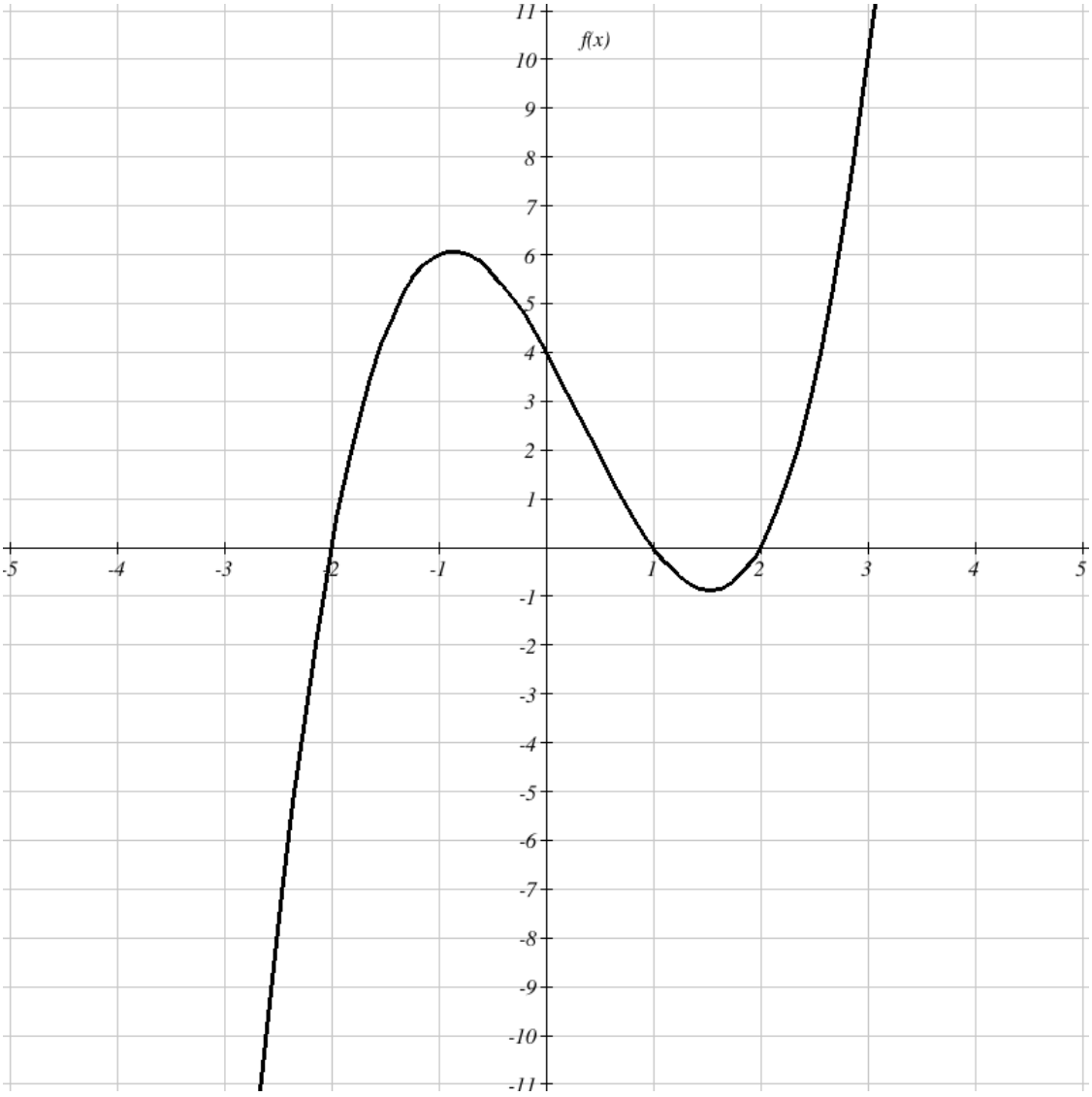
What are the *X*-intercepts of the function?

What are the zeros of the function?

_____

3.

For the graph of $f(x)$ below, identify the zeros of $f(x)$ and the intervals where $f(x)$ is positive/negative. Answer DNE if there is no such interval.



The zeros of $f(x)$ are _____

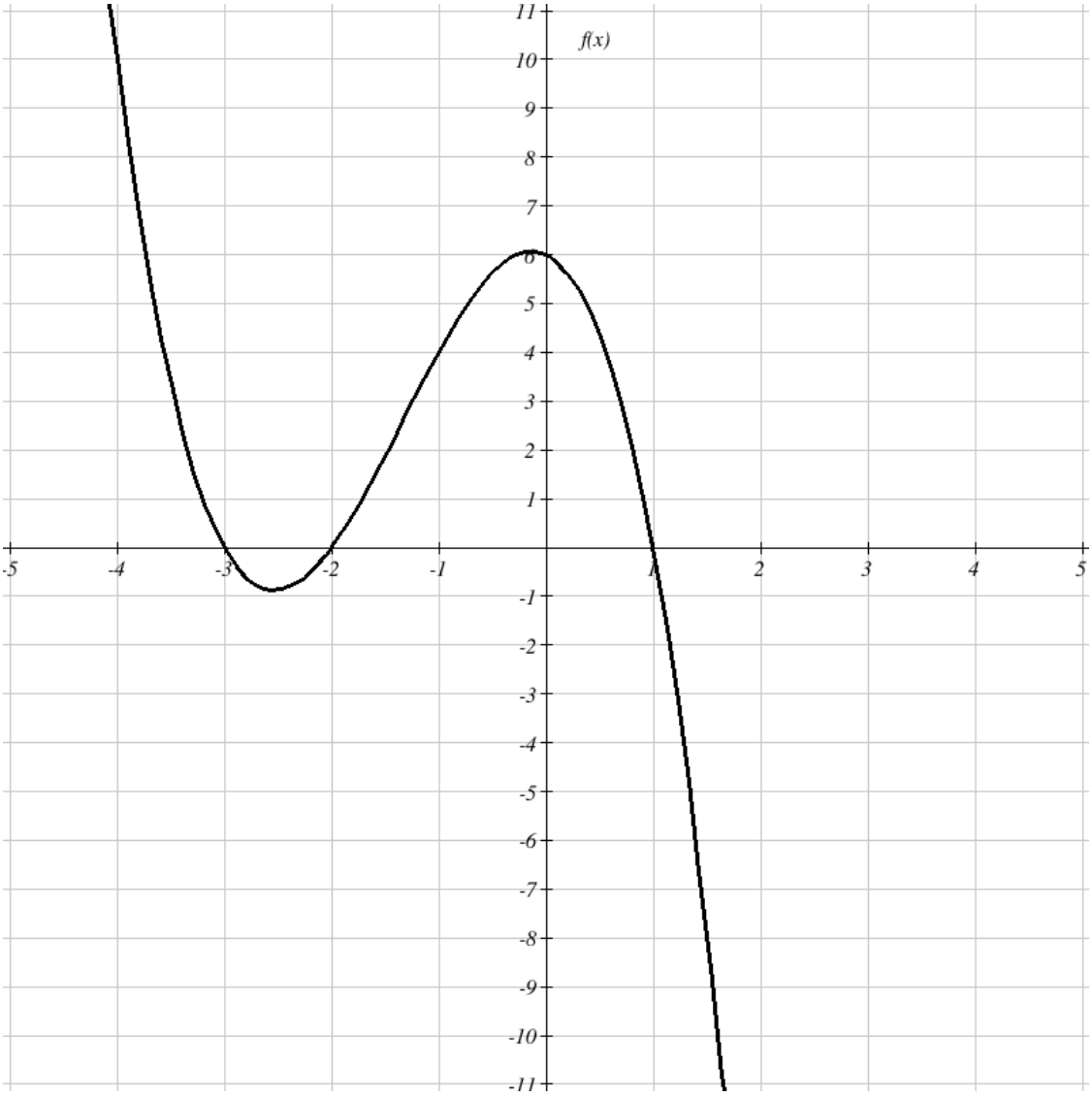
$f(x)$ is positive on the inverval(s) _____

$f(x)$ is negative on the interval(s) _____

_____

4.

For the graph of $f(x)$ below, identify the zeros of $f(x)$ and the intervals where $f(x)$ is positive/negative. Answer DNE if there is no such interval



The zeros of $f(x)$ are _____

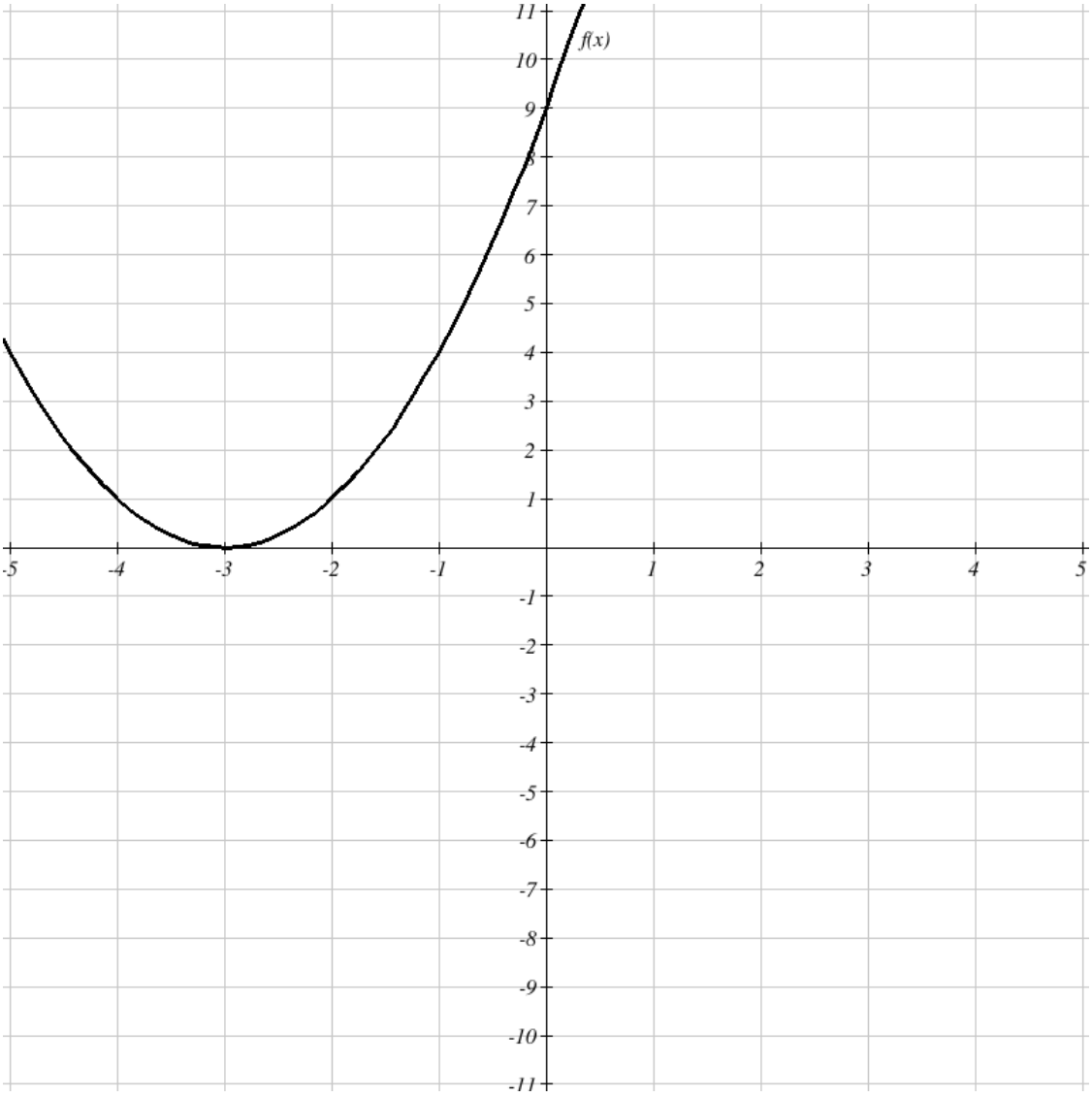
$f(x)$ is positive on the inverval(s) _____

$f(x)$ is negative on the interval(s) _____

_____

5.

For the graph of $f(x)$ below, identify the zeros of $f(x)$ and the intervals where $f(x)$ is positive/negative. Answer DNE if there is no such interval.



The zeros of $f(x)$ are _____

$f(x)$ is positive on the inverval(s) _____

$f(x)$ is negative on the interval(s) _____

_____

6.
The table below gives the annual sales (in millions) of a product.

year	1998	1999	2000	2001	2002	2003	2004	2005	2006
sales	243	297	339	369	387	393	387	369	339

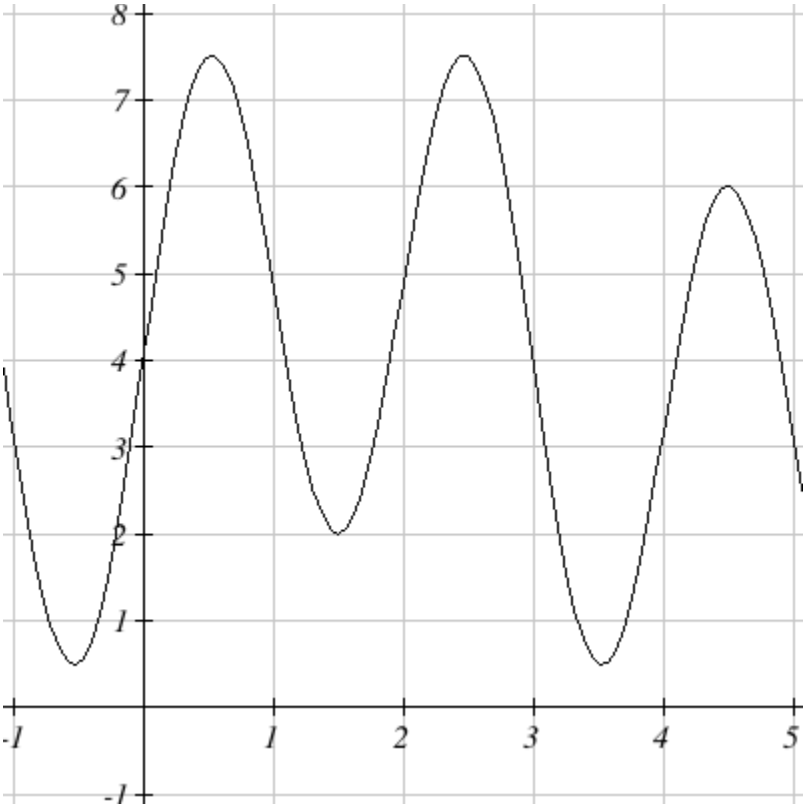
What was the average rate of change of annual sales

a) between 1999 and 2000? _____ millions of dollars/year

b) between 1999 and 2006? _____ millions of dollars/year

_____

7.



Based on the graph above, estimate (to one decimal place) the average rate of change from $x = 1$ to $x = 3$

_____

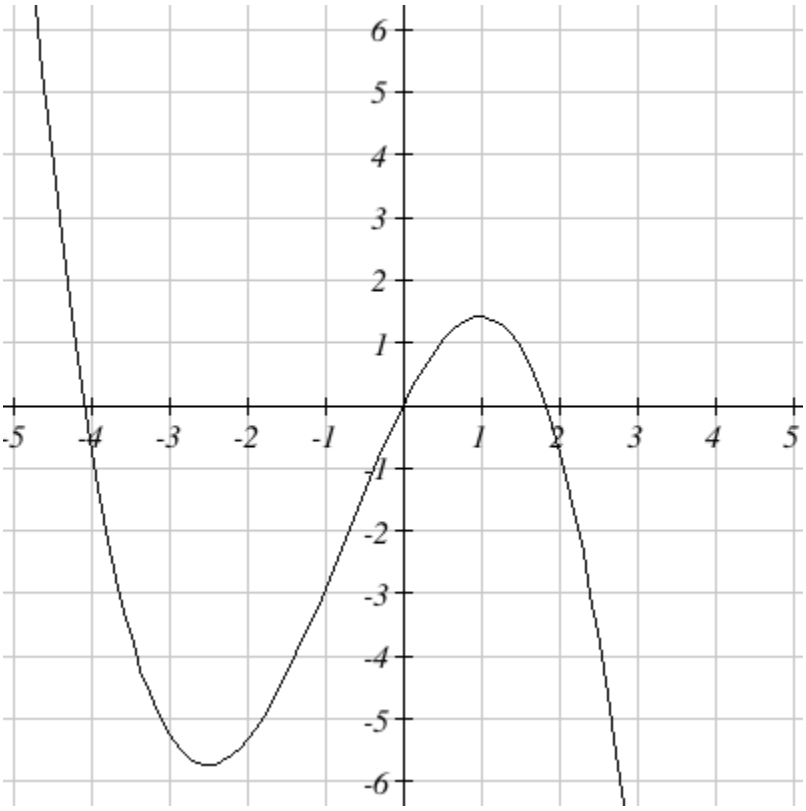
8.
Find the average rate of change of $g(x) = -2x^3 - 2$ from $x = -3$ to $x = 1$.

_____

9.
Find the average rate of change of $f(x) = 4x^2 - 9$ on the interval $[5, t]$.
Your answer will be an expression involving t.

_____

10.



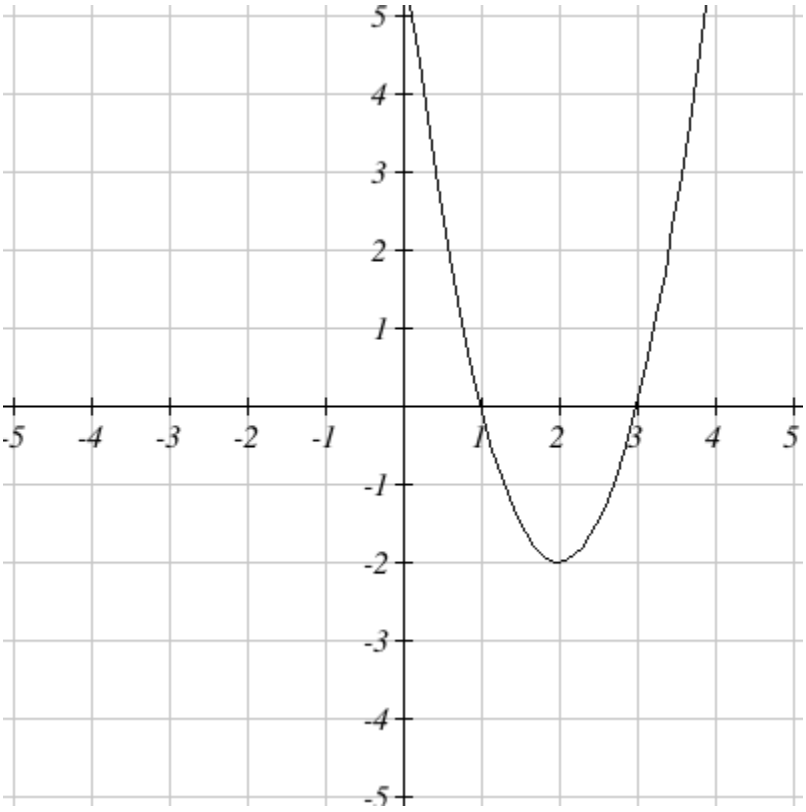
The function graphed above is:
Increasing on the interval(s) _____

Decreasing on the interval(s) _____

_____

11.

Consider the function graphed below.



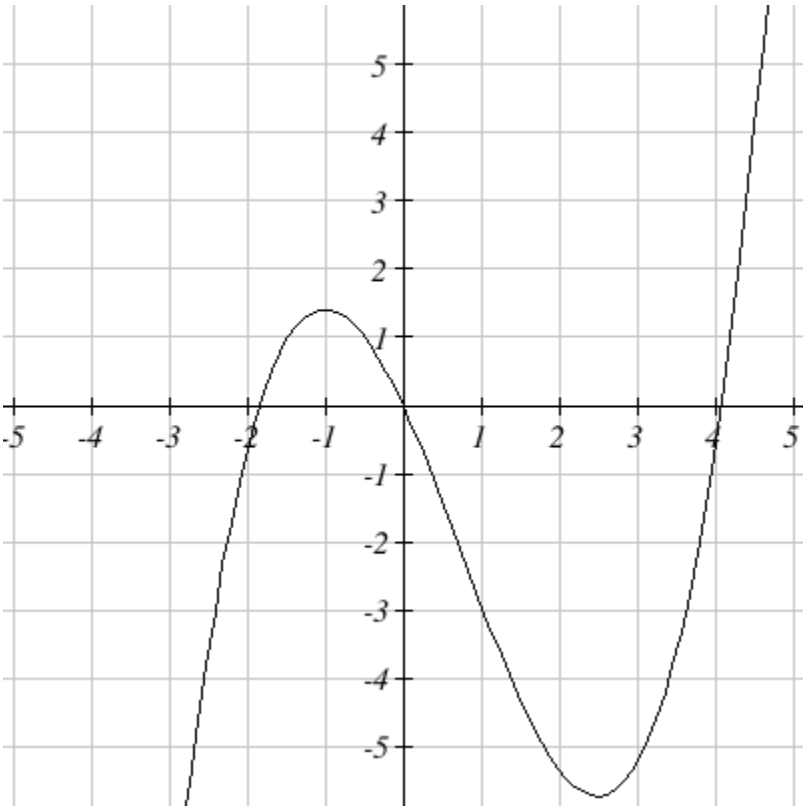
The function has a minimum/maximum (choose one) of _____ at $x =$ _____

The function is increasing on the interval(s): _____

The function is decreasing on the interval(s): _____

_____

12.



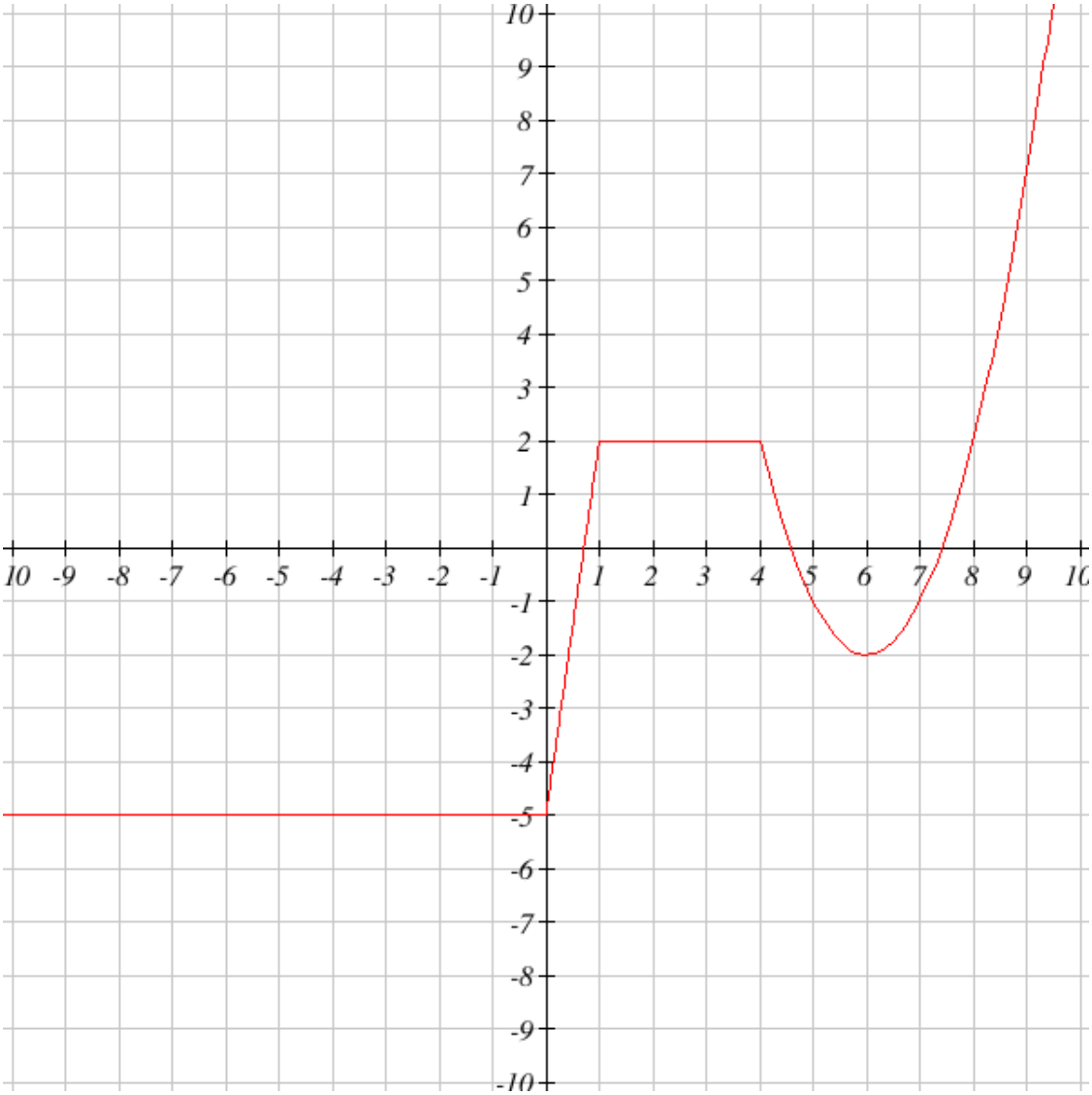
The function graphed above is decreasing on the interval

_____< x <_____

_____

13.

Consider the function graphed below

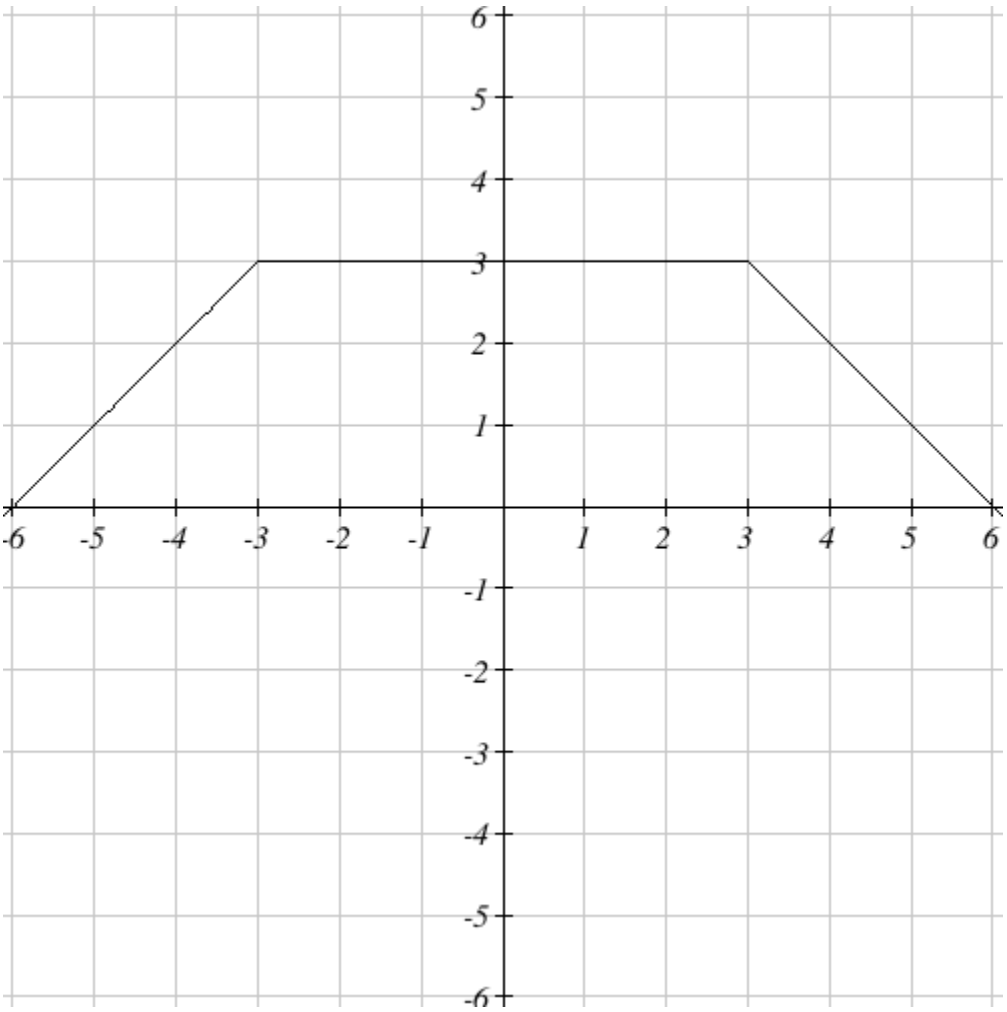


Give the interval(s) where the function is increasing and join multiple intervals with a union, U .

_____

14.

Consider the function graphed below.



The function is increasing on the interval(s): _____

The function is decreasing on the interval(s): _____

The function is constant on the interval(s): _____

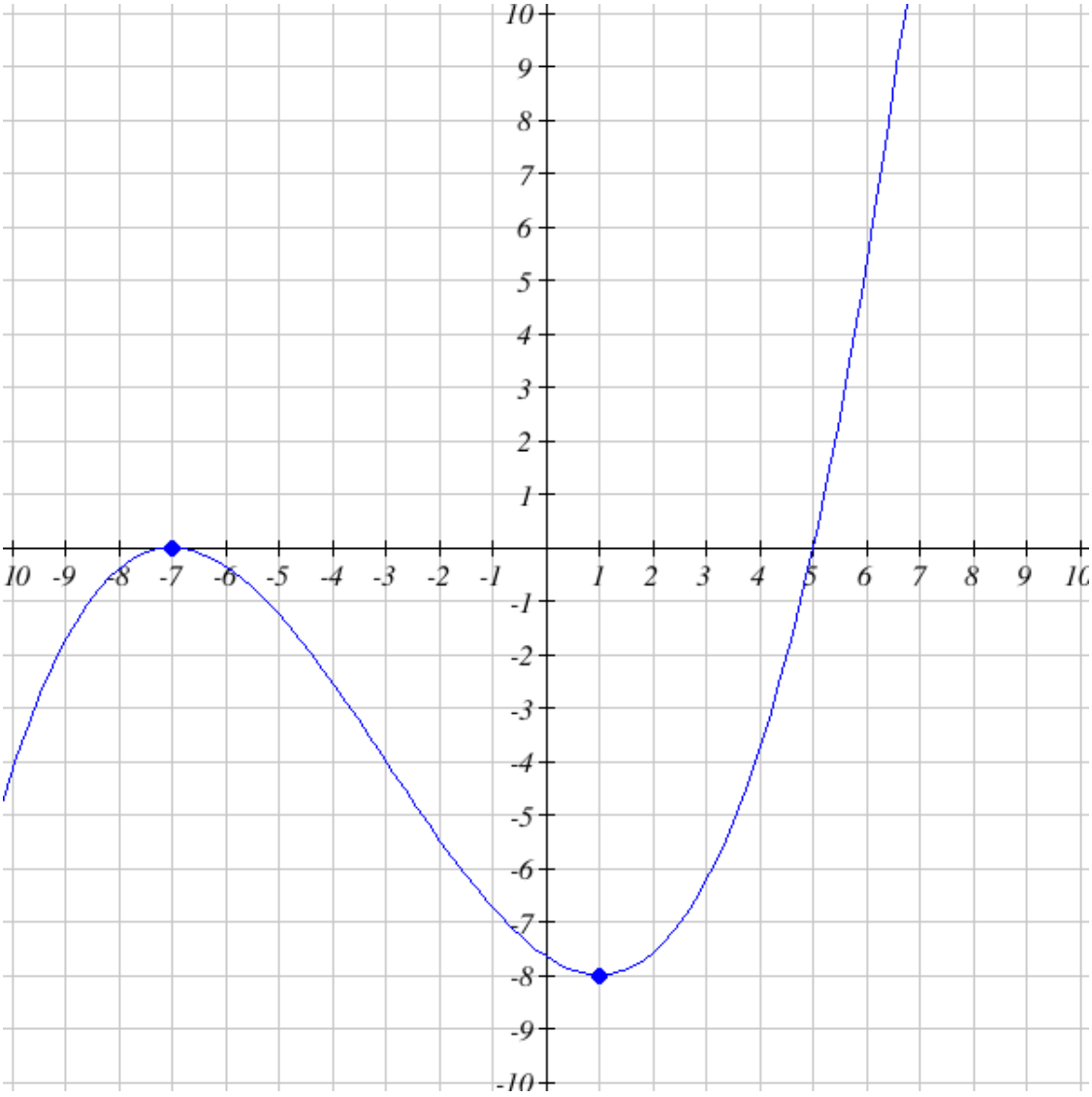
The domain of the function is: _____

The range of the function is: _____

_____

15.

Consider the function in the graph below.



The function has a maximum of _____ at x = _____

The function has a minimum of _____ at x = _____

The function is increasing on the interval(s): _____

The function is decreasing on the interval(s): _____

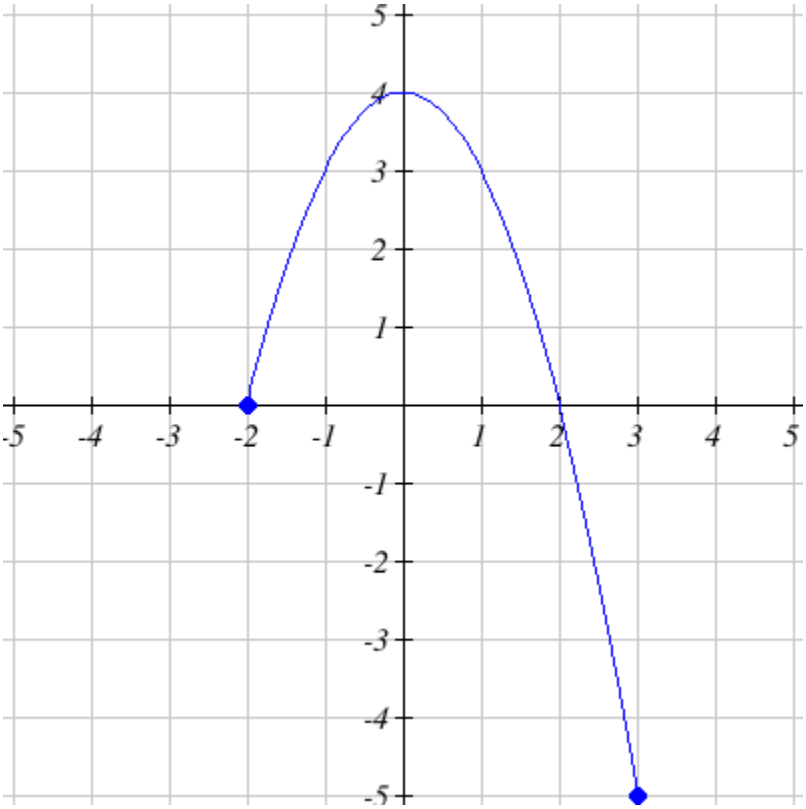
The domain of the function is: _____

The range of the function is: _____

_____

16.

Find the absolute maximum and minimum for the given graph. Give your answer as an ordered pair.

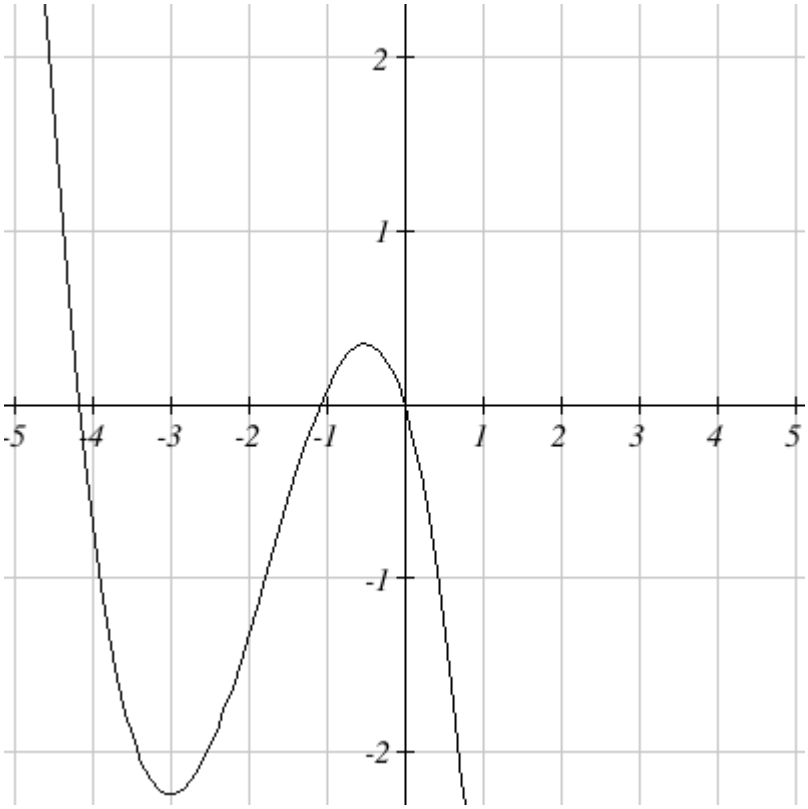


Absolute maximum: _____
Absolute minimum: _____

_____

17.

Consider the function graphed below.

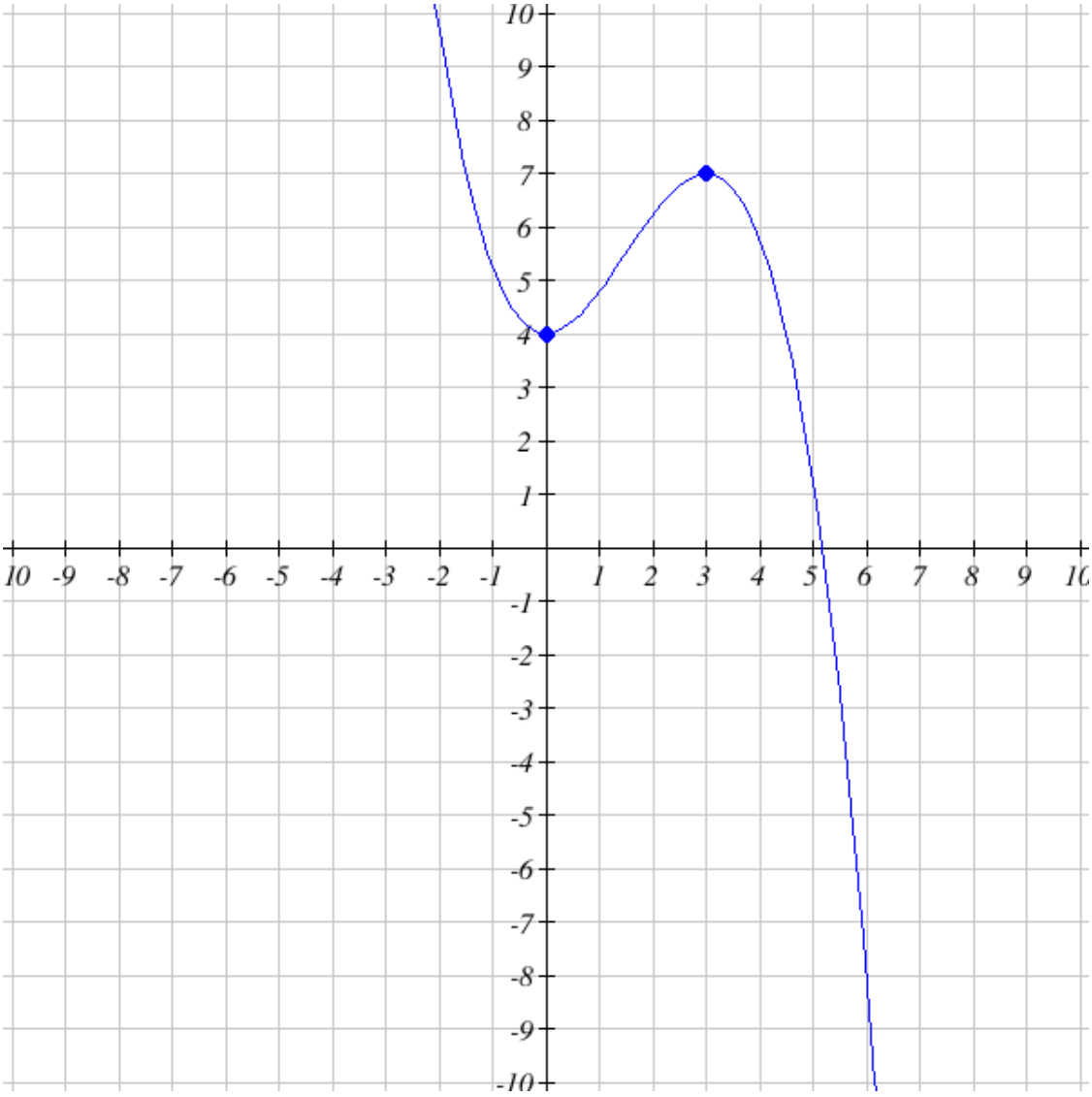


The function has local extrema at approximately _____
what point(s), accurate to within .2 units? _____

_____

18.

Consider the function in the graph below.



The function has a relative maximum of at x =_____

The function has a relative minimum of at x =_____

The function is increasing on the interval(s): _____

The function is decreasing on the interval(s): _____

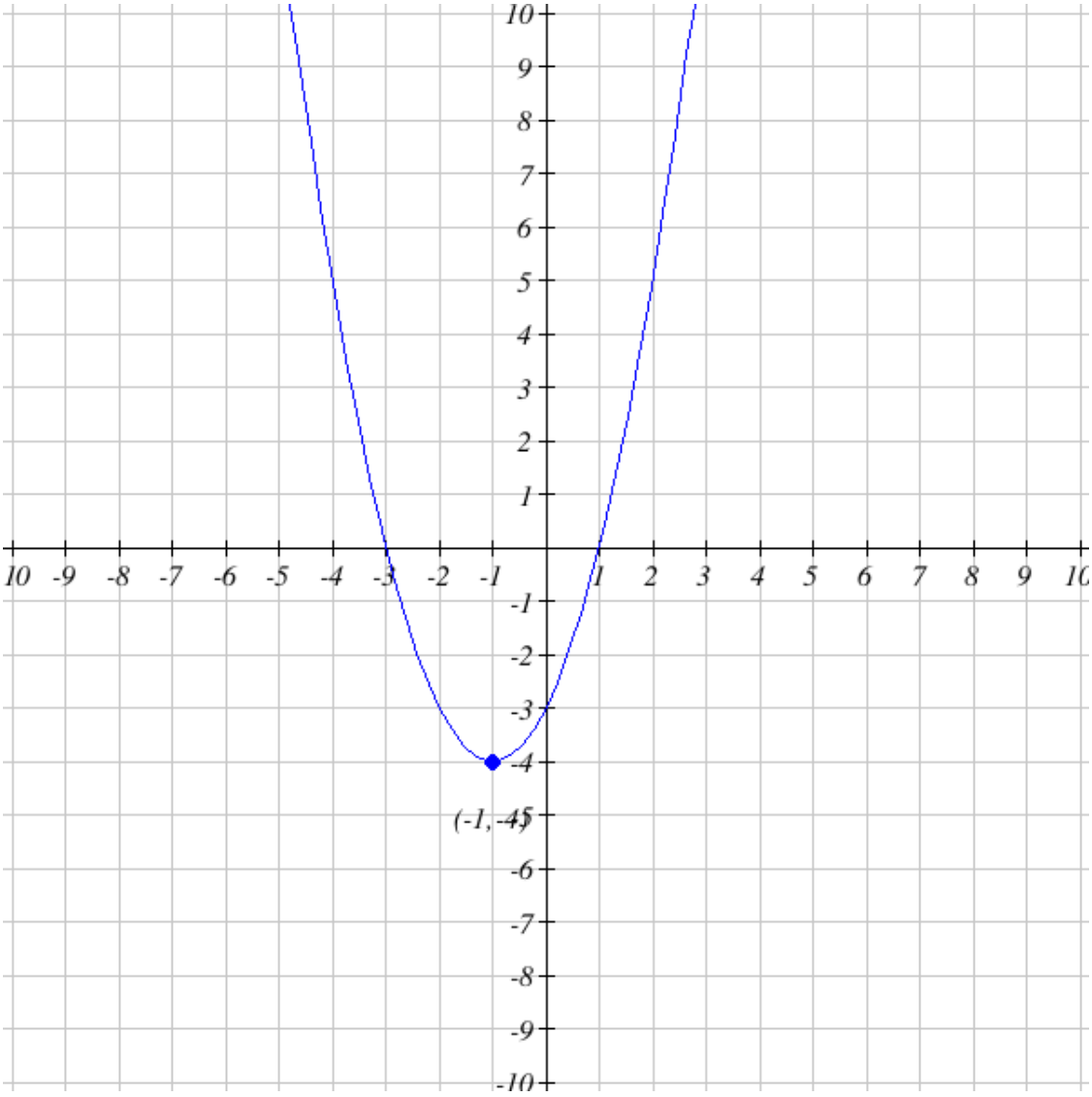
The domain of the function is: _____

The range of the function is: _____

_____

19.

Consider the function in the graph below.



The function has a minimum/maximum (choose one) of _____ at x =_____

The function is increasing on the interval(s): _____

The function is decreasing on the interval(s): _____

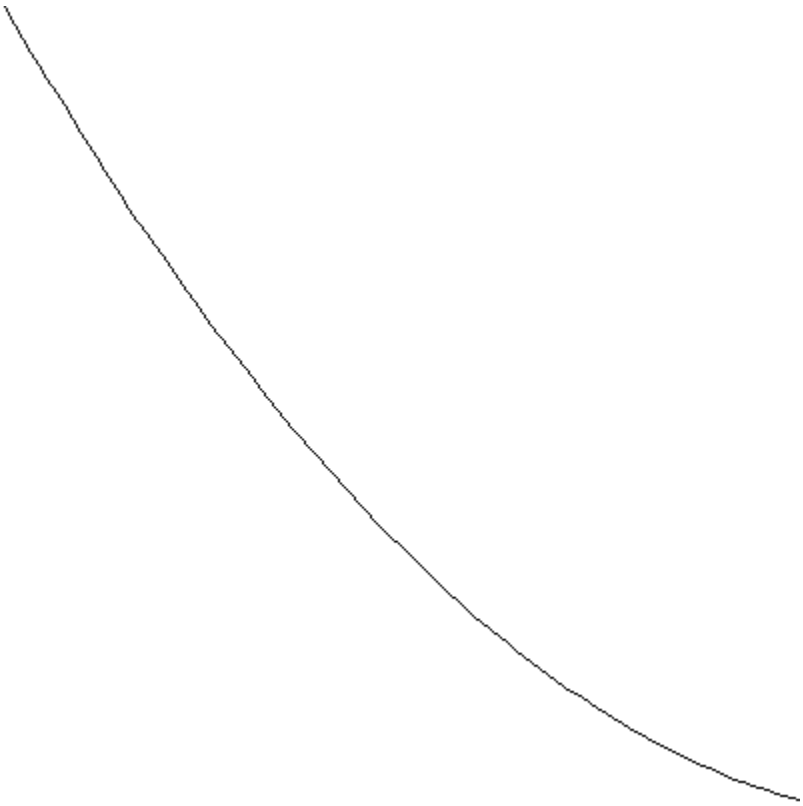
The domain of the function is: _____

The range of the function is: _____

_____

20.

For the graph below, determine if it represents a function that is increasing or decreasing, and whether the function is concave up or concave down.

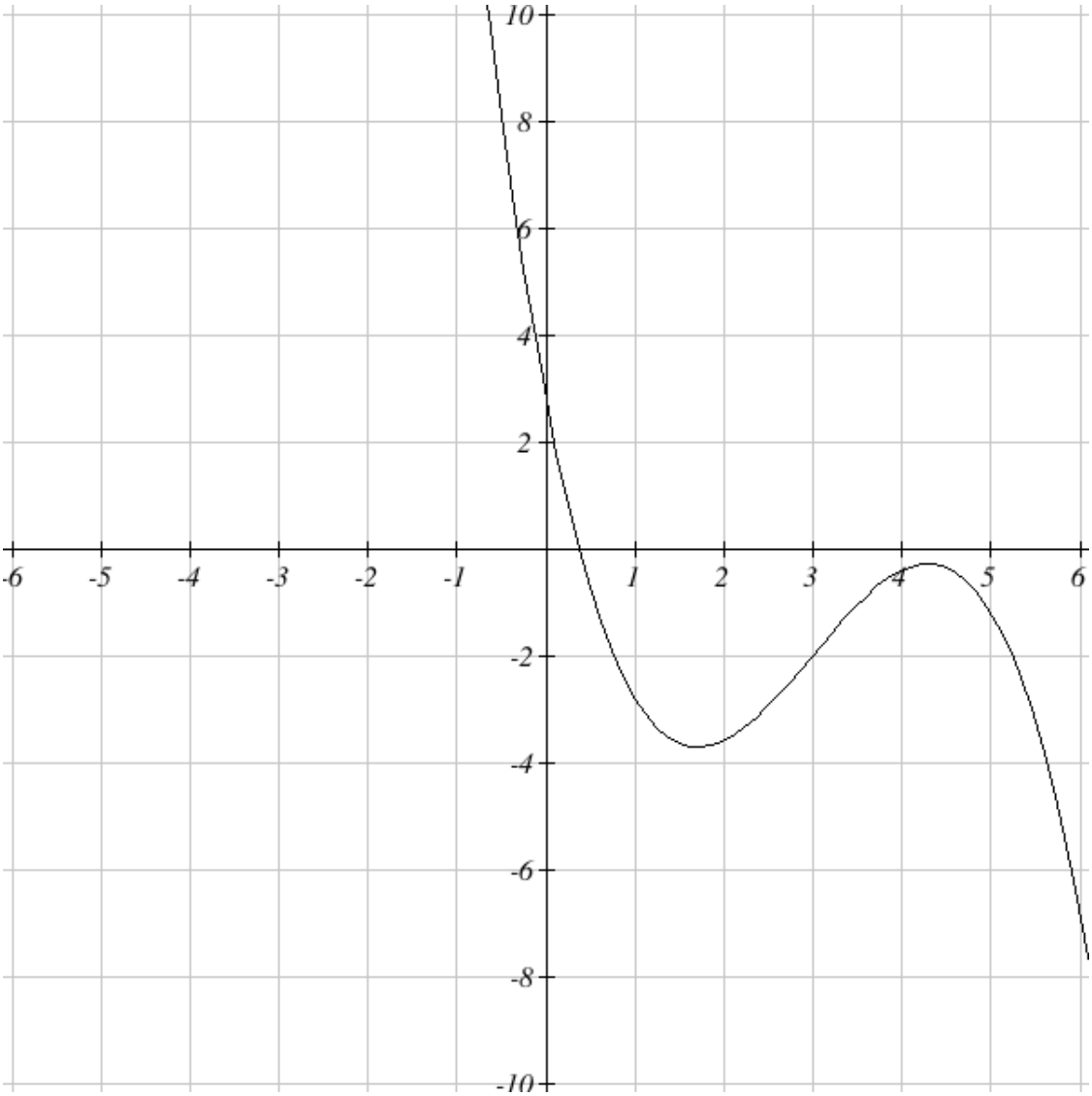


- Increasing
- Decreasing

- Concave up
- Concave down

_____

21.



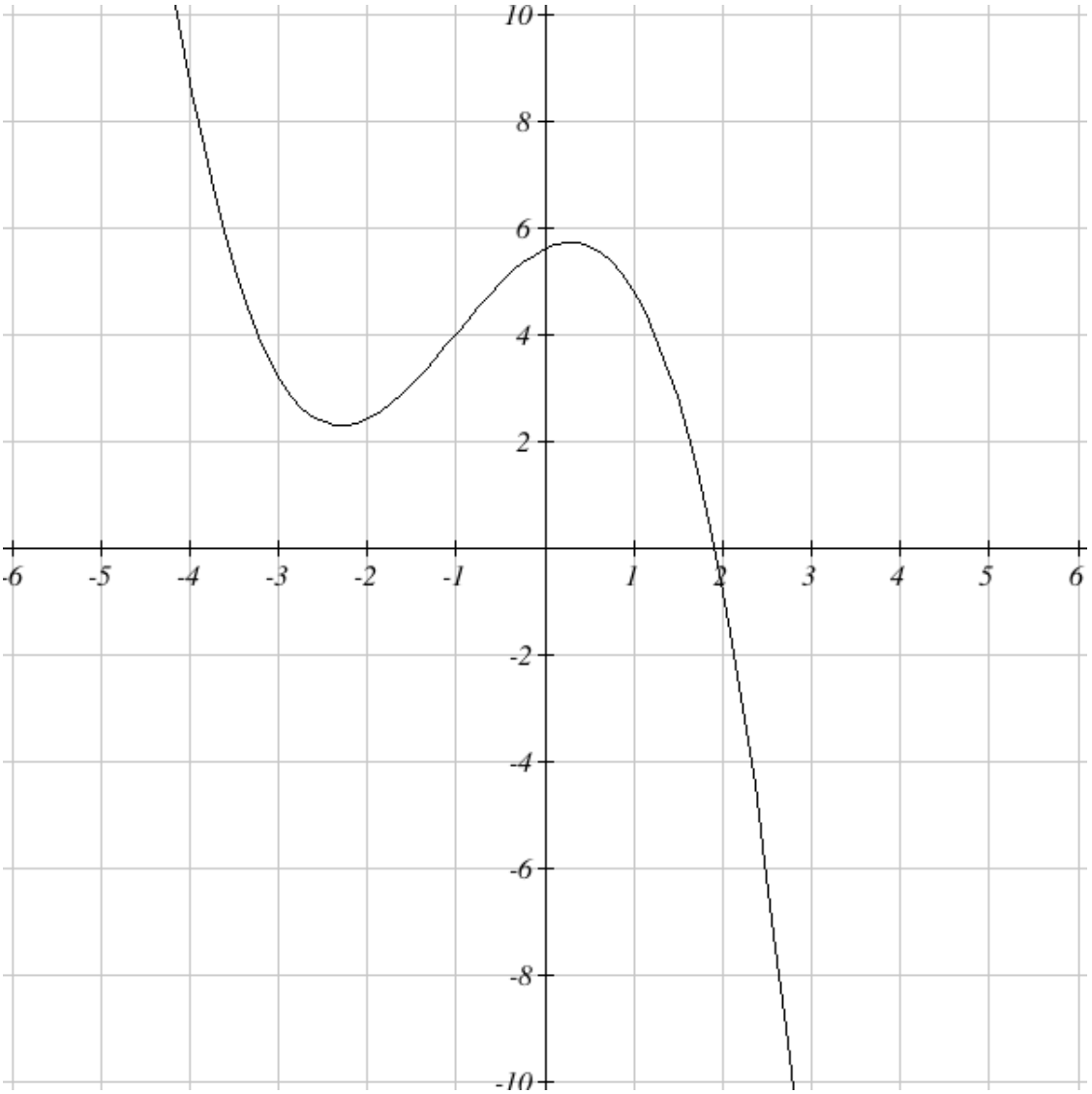
The function graphed above is:
Concave up on the interval(s) _____

Concave down on the interval(s) _____

There is an inflection point at: _____

_____

22.



The function graphed above is:

Concave up on the interval(s)_____

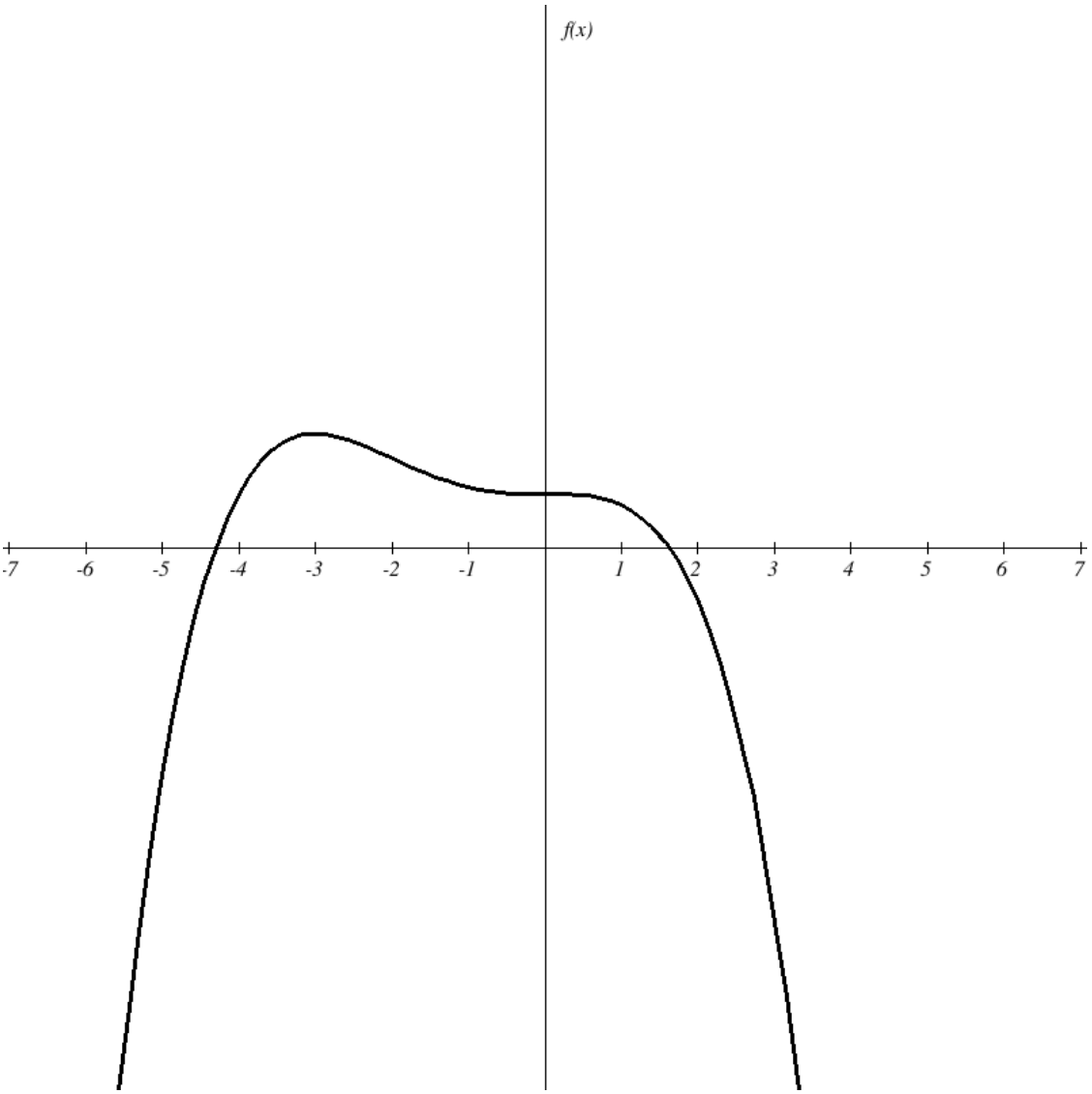
Concave down on the interval(s) _____

There is an inflection point at: _____

_____

23.

At which values of x does the function graphed below have inflection points?

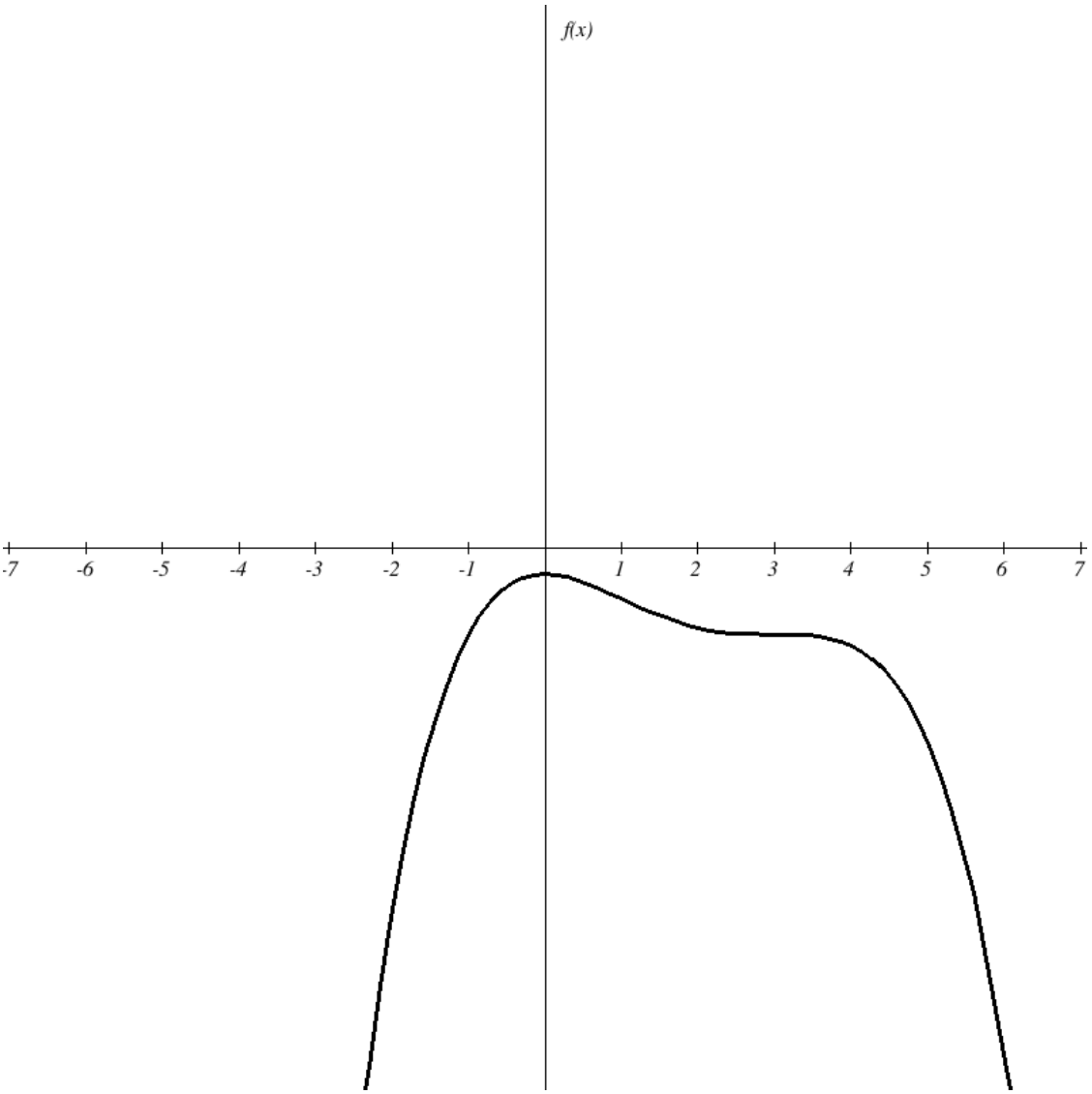


The graph has inflection points at $x =$ _____

_____

24.

At which values of x does the function graphed below have inflection points?

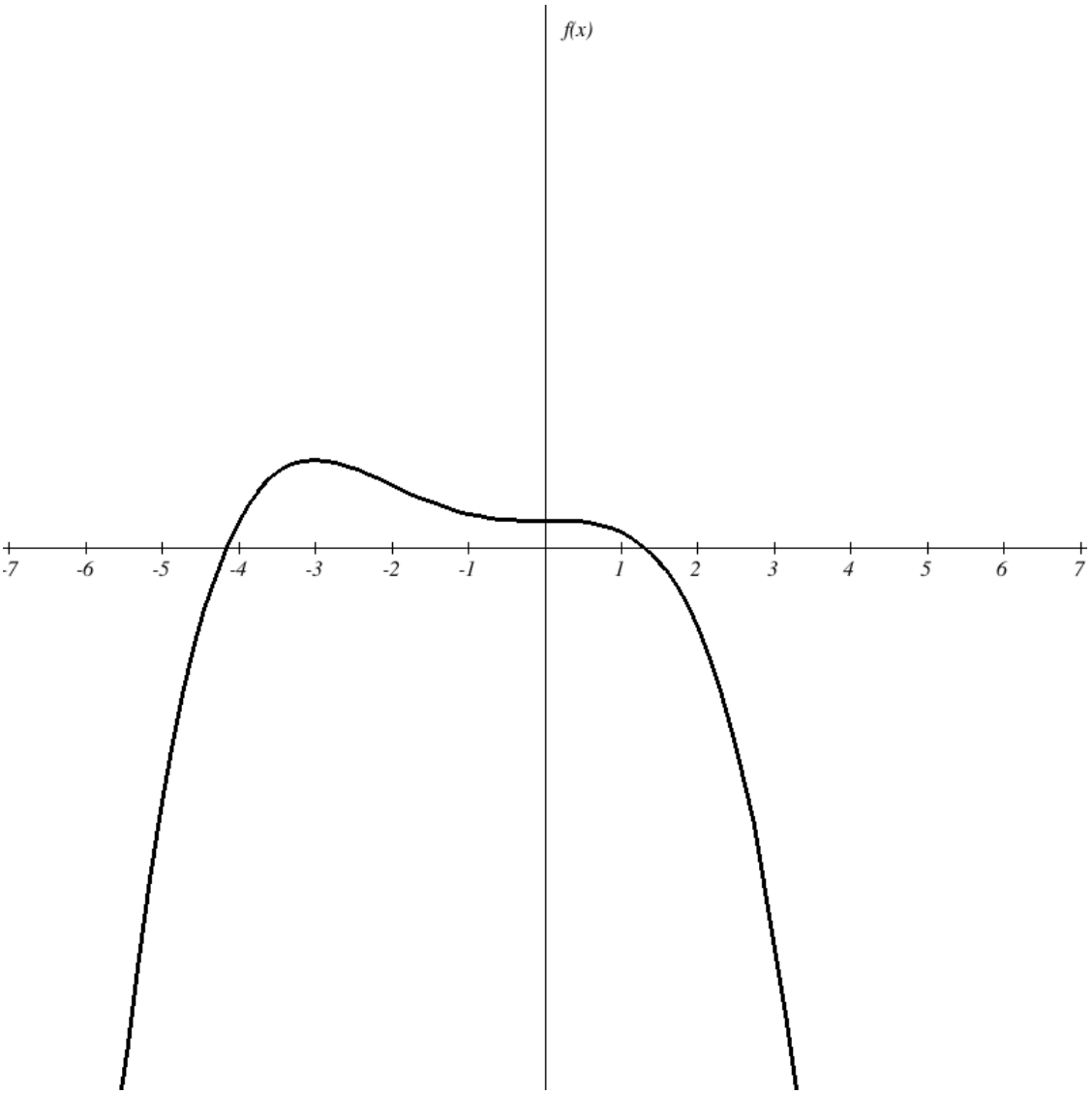


The graph has inflection points at $x =$_____

_____

25.

At which values of x does the function graphed below have inflection points?

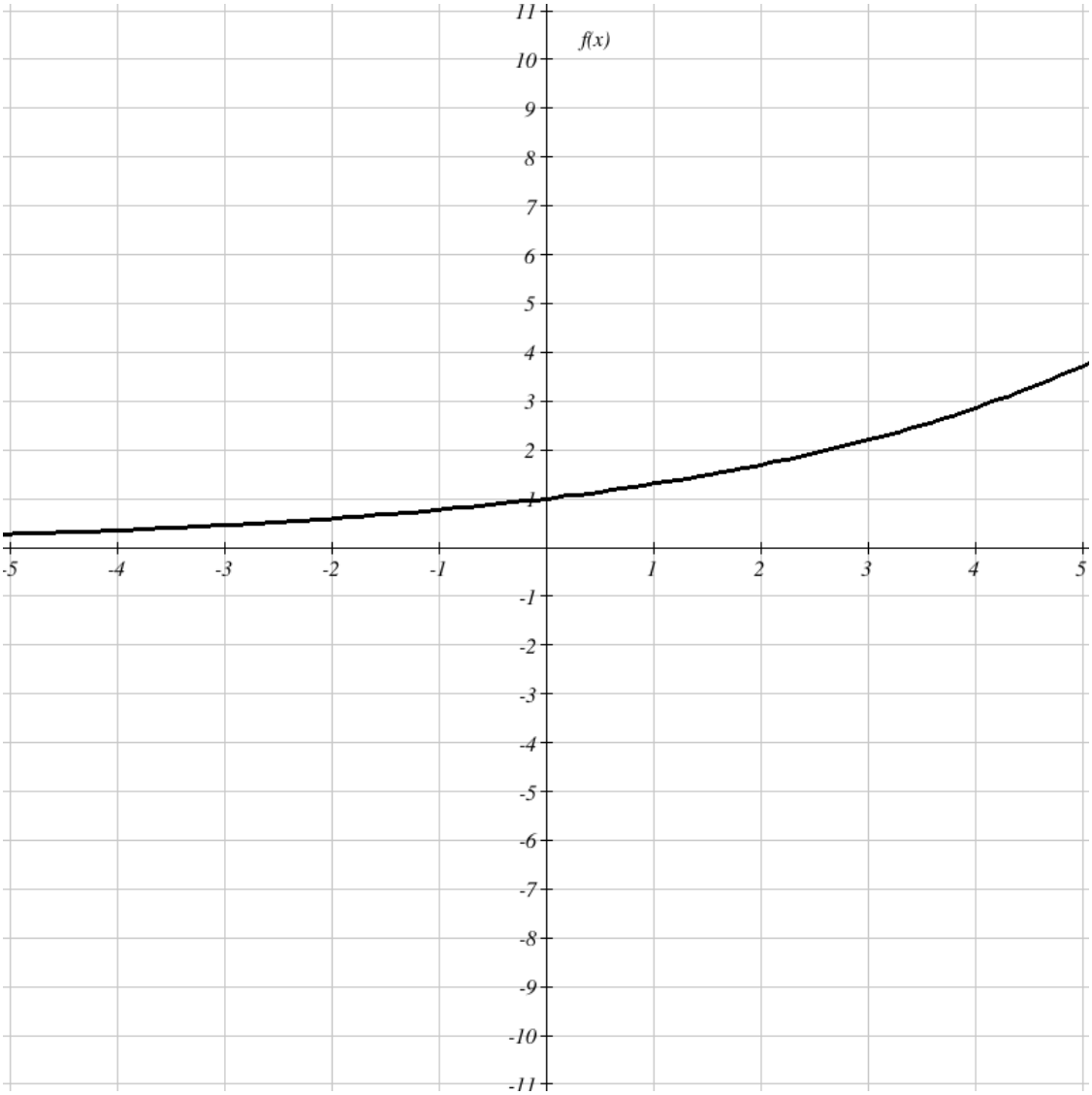


The graph has inflection points at $x =$_____

_____

26.

For the graph of $f(x)$ below, identify the zeros of $f(x)$ and the intervals of each specified behavior. Answer DNE if there is no such interval/value.



The zeros of $f(x)$ are_____

$f(x)$ is positive on the inverval(s) _____

$f(x)$ is negative on the interval(s) _____

$f(x)$ is increasing on the inverval(s) _____

$f(x)$ is decreasing on the inverval(s) _____

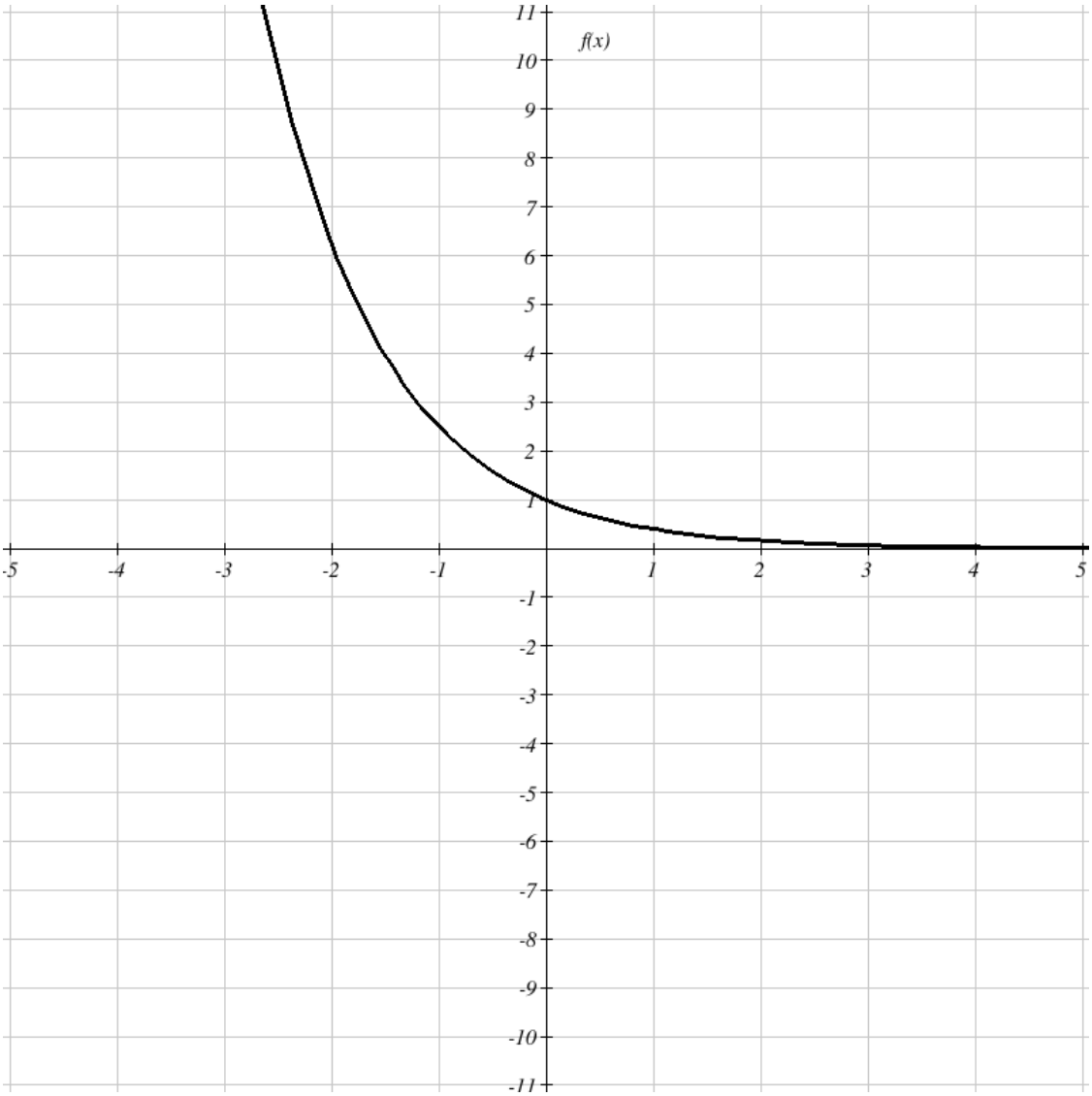
$f(x)$ is concave up on the inverval(s) _____

$f(x)$ is concave down on the inverval(s) _____

_____

27.

For the graph of $f(x)$ below, identify the zeros of $f(x)$ and the intervals of each specified behavior. Answer DNE if there is no such interval/value.



The zeros of $f(x)$ are_____

$f(x)$ is positive on the inverval(s) _____

$f(x)$ is negative on the interval(s) _____

$f(x)$ is increasing on the inverval(s) _____

$f(x)$ is decreasing on the inverval(s) _____

$f(x)$ is concave up on the inverval(s) _____

$f(x)$ is concave down on the inverval(s) _____

_____

28.
Sketch the graph of a function that is increasing and concave up.

_____

29.
Sketch the graph of a function that is increasing and concave down.

_____

30.
Sketch the graph of a function that is decreasing and concave up.

_____

31.
Sketch the graph of a function that is decreasing and concave down.

_____

32.
Sketch the graph of a function that is decreasing on the interval $(-\infty, 2)$, constant on the interval $(2,5)$ and increasing on the interval $(5, \infty)$.

_____

33.
Sketch the graph of a function that is decreasing on the interval $(-\infty, -1)$, increasing on the interval $(-1,3)$ and constant on the interval $(3, \infty)$.

_____

34.
Sketch the graph of a function that is constant on the interval $(-\infty, 2)$, increasing on the interval $(2,7)$ and decreasing on the interval $(7, \infty)$.

Lecture 7

Arithmetic combinations with domain analysis, composition with domain analysis, Decomposing functions

1.
Given the following functions, find each of the values:

$f(x) = x^2 + 5x - 6$

$g(x) = x - 1$

$(f + g)(1) =$_____

$(f - g)(4) =$_____

$(f \cdot g)(3) =$_____

$\left(\frac{f}{g}\right)(-4) =$_____

2.
Given the following functions, evaluate each of the following:

$f(x) = x^2 - 4x - 5$

$g(x) = x + 1$

$(f + g)(-5) =$_____

$(f - g)(-5) =$_____

$(f \cdot g)(-5) =$_____

$\left(\frac{f}{g}\right)(-5) =$_____

3.

Complete the table below.

x	-1	1	2	3	4
$f(x)$	4	-8		-5	
$g(x)$	10	3	1		
$(f - g)(x)$		-11		-4	-10
$(f + g)(x)$	14		-3		8

4.

Answer the following True or False:

If $f(x) = ax^2 + c$, then $f(x+9) - f(x) = a(x+9)^2 + c - ax^2 + c$.

- True
- False

5.

Let $f(x) = 2x + 4$ and $g(x) = 2x^2 + 2x$.
After simplifying,
$(f + g)(x) =$_____

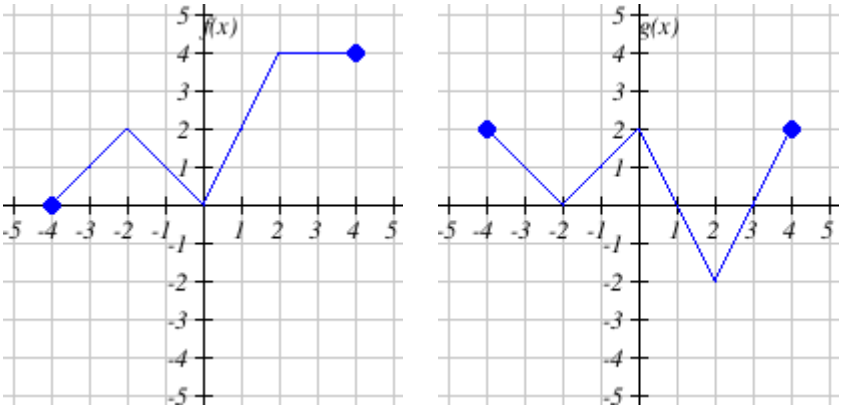
6.

Let $f(x) = 2x + 2$ and $g(x) = 3x^2 + 3x$. After simplifying,

$(fg)(x) =$_____

7.

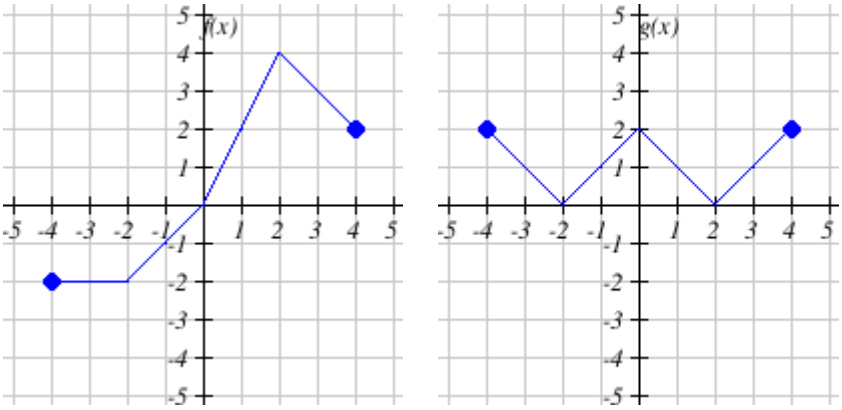
The functions $f(x)$ and $g(x)$ are graphed below.



Determine $f(-2) =$_____
Determine $g(-2) =$_____
Determine $(f + g)(-2) =$_____
Determine $f(2) =$_____
Determine $g(2) =$_____
Determine $(f - g)(2) =$_____
Determine $f(4) =$_____
Determine $g(4) =$_____
Determine $(g - f)(4) =$_____
Determine $f(0) =$_____
Determine $g(0) =$_____
Determine $(fg)(0) =$_____

8.

The functions $f(x)$ and $g(x)$ are graphed below.



Determine $(f+g)(4)$ =_____

Determine $(f-g)(2)$ =_____

Determine $(fg)(3)$ =_____

Determine $\left(\frac{f}{g}\right)(-3)$ =_____

9.

Given the following functions, find each:

$f(x) = x^2 + 2x - 24$

$g(x) = x - 4$

$(f+g)(x)$ =_____

$(f-g)(x)$ =_____

$(f \cdot g)(x)$ =_____

$\left(\frac{f}{g}\right)(x)$ =_____

10.

Answer the following True or False:

Let f and g be functions. Then the domain of $\frac{f}{g}$ is the intersection of the domain of f and the domain of g

- True
- False

11.

Answer the following True or False:

Let f and g be functions. The domain of $f \cdot g$ is the intersection of the domain of f and the domain of g

- True
- False

12.

$f(x) = x^2 + x - 20$

$g(x) = x - 4$

Find $\left(\frac{f}{g}\right)(x)$

$\left(\frac{f}{g}\right)(x) =$_____

The domain of $\left(\frac{f}{g}\right)(x)$ is $x \neq$_____

13.

Suppose that

$f(x) = 7x + 35$

$g(x) = x^2 - 3x - 40$

The domain of $\left(\frac{f}{g}\right)(x)$ is $x \neq$_____

14.
Use the table of values to evaluate the expressions below.

x	$f(x)$	$g(x)$
0	7	0
1	0	9
2	8	6
3	5	1
4	1	7
5	2	2
6	6	5
7	3	8
8	4	4
9	9	3

$f\big(g(1)\big) =$_____

$g\big(f(8)\big) =$_____

$f\big(f(5)\big) =$_____

$g\big(g(9)\big) =$_____

15.
Use the table below to evaluate.

x	-10	-5	-3	2	3	6	8	12
$f(x)$	3	-3	-5	2	-10	8	12	6
$g(x)$	-10	3	6	-5	12	2	8	-3

$(f \circ g)(-5) =$_____

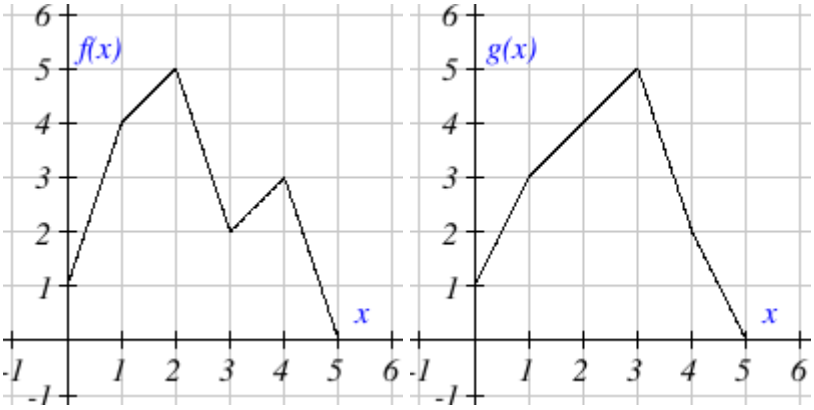
$(g \circ f)(-10) =$_____

$(f \circ f)(-3) =$_____

$(g \circ g)(12) =$_____

16.

Use the graphs to evaluate the expressions below.



$f(g(3)) =$_____

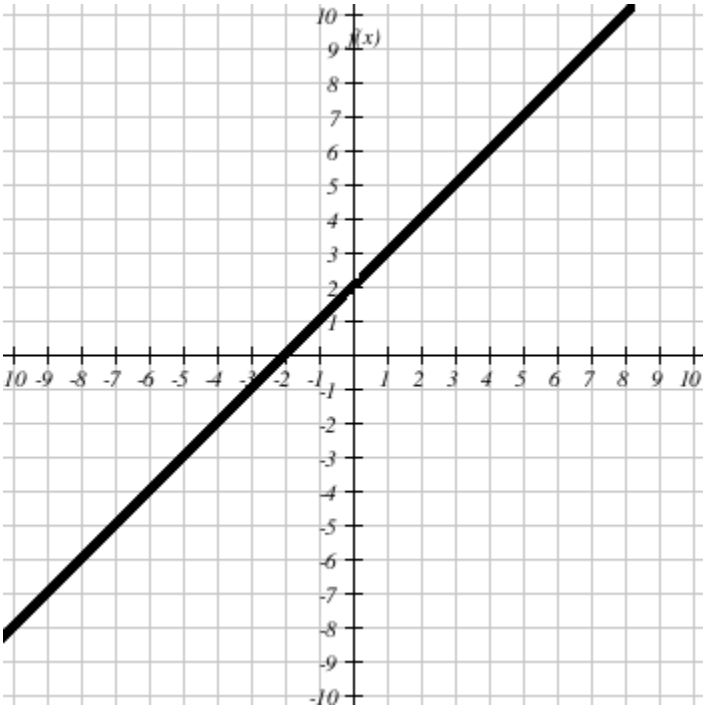
$g(f(5)) =$_____

$f(f(1)) =$_____

$g(g(2)) =$_____

17.

The graph of $f(x)$ and a table of values for $g(x)$ are given below. Use them to evaluate the given statements.



x	0	1	2	3	4	5	6	7	8	9
$g(x)$	7	8	5	6	4	2	3	0	1	9

$(f+g)(4)$ =_____

$(fg)(3)$ =_____

$(g \circ f)(-1)$ =_____

$(g \circ g)(7)$ =_____

18.

The function $D(p)$ gives the number of items that will be demanded when the price is p.
The production cost, $C(x)$, is the cost of producing x items.

To determine the cost of production when the price is \$7, you would:

- Evaluate $D\big(C(7)\big)$
- Solve $C\big(D(p)\big) = 7$
- Solve $D\big(C(x)\big) = 7$
- Evaluate $C\big(D(7)\big)$

19.

Given that $f(x) = 2x - 8$ and $g(x) = 9 - x^2$, calculate

(a) $f\big(g(0)\big)$ =_____

(b) $g\big(f(0)\big)$ =_____

20.

Given that $f(x) = 8x - 3$ and $g(x) = -6x - 1$, determine each of the following. Make sure to fully simplify your answer.

(a) $(f \circ g)(x)$ =_____

(b) $(g \circ f)(x)$ =_____

(c) $(f \circ f)(x)$ =_____

(d) $(g \circ g)(x)$ =_____

21.

Given that $f(x) = -2x^2 - 5x$ and $g(x) = -5x + 6$, determine each of the following. Make sure to fully simplify your answer.

(a) $(f \circ g)(x)$ =_____

(b) $(g \circ f)(x)$ =_____

(c) $(f \circ f)(x)$ =_____

(d) $(g \circ g)(x)$ =_____

22.

Given that $f(x) = -2x^2 - 5x + 9$ and $g(x) = 4x + 6$, determine each of the following. Make sure to fully simplify your answer.

(a) $(f \circ g)(x)$ =_____

(b) $(g \circ f)(x)$ =_____

23.

Let $f(x) = 3x + 3$ and $g(x) = 3x^2 + 2x$.

After simplifying,

$(f \circ g)(x)$ =_____

24.

$f(x) = x^2 + 5x$

$(f \circ f)(x)$ =_____

25.
Given functions $m(x) = \frac{1}{\sqrt{x}}$ and $g(x) = x^2 - 4$, state the domains of the following functions using interval notation.

Domain of $\frac{m(x)}{g(x)}$: _____

Domain of $m\big(g(x)\big)$: _____

Domain of $g\big(m(x)\big)$: _____

26.
If $f(x) = x^2 + 4x + 5$, simplify each of the following.

$f(x + h)$ =_____

$f(x + h) - f(x)$ =_____

27.
Let $f(x) = 4x + 3$. Determine $(f \circ f \circ f)(x)$.

$(f \circ f \circ f)(x)$ =_____

28.
If $f(x) = x^4 + 2, g(x) = x - 2$ and $h(x) = \sqrt{x}$, then

$f\left(g\big(h(x)\big)\right)$ = _____

29.
If $f(x) = x^4 + 8, g(x) = x - 3, h(x) = \sqrt{x}$, then
$f \circ g \circ h(x)$ = _____

30.
The function $h(x) = (x + 8)^7$ can be expressed in the form $f\big(g(x)\big)$, where $f(x) = x^7$, and $g(x)$ is defined below:

$g(x)$ =_____

31.

The function $h(x) = \frac{1}{x+2}$ can be expressed in the form $f\big(g(x)\big)$, where $g(x) = (x + 2)$, and $f(x)$ is defined as:

$f(x)$ =_____

32.

Suppose that $h(x) = \frac{1}{9x^3+8}$.

Creat two different decompositions for $h(x)$.
In other words, construct four functions $f(x), g(x), m(x), n(x)$ so that:

$h(x) = f\big(g(x)\big)$
$h(x) = m\big(n(x)\big)$
$f(x) \neq m(x)$
$g(x) \neq n(x)$

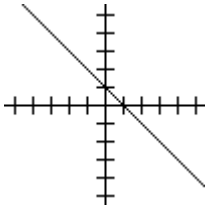
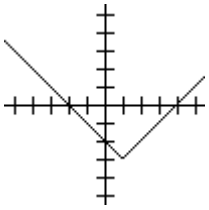
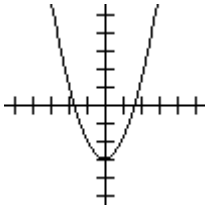
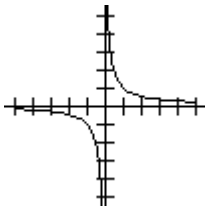
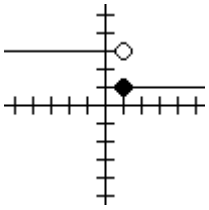
Lecture 8

Library of basic functions (linear, square, cube, square root, reciprocal, abs value, piecewise)

Rigid Transformations(Translations, Reflections)

Nonrigid Transformations (Stretch/compression)

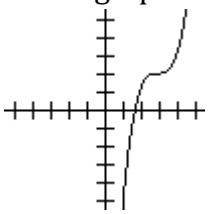
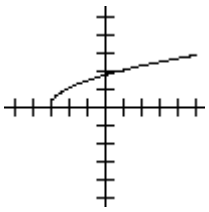
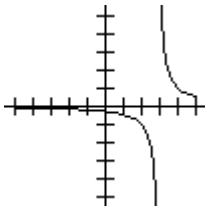
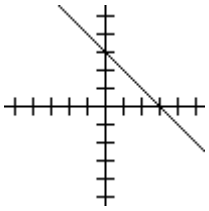
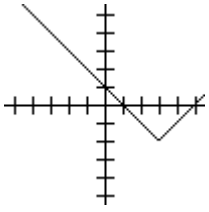
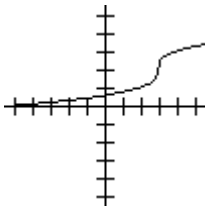
1.
Match each graph with the corresponding function type.

- 
- 
- 
- 
- 

a) Reciprocal
b) Piecewise
c) Linear
d) Absolute Value
e) Quadratic

2.

Match each graph with the corresponding function type.

- 
- 
- 
- 
- 
- 

a) Absolute Value
b) Rational
c) Square Root
d) Linear
e) Cube Root
f) Cubic

3.
If $f(5) = -5$, write an ordered pair that must be on the graph of $y = f(x - 1) - 3$

(_____ , _____)

4.
The graph of the function $y = f(x + 98)$ can be obtained from the graph of $y = f(x)$ by one of the following actions:

- shifting the graph of $f(x)$ to the left 98 units
- shifting the graph of $f(x)$ upwards 98 units
- shifting the graph of $f(x)$ to the right 98 units
- shifting the graph of $f(x)$ downwards 98 units

5.
Let $f(x) = 4\sqrt{x}$.

If $g(x)$ is the graph of $f(x)$ shifted up 6 units and right 3 units, write a formula for $g(x)$.

$g(x)$ =_____

6.
A table for $f(x)$ is shown below:

x	-2	-1	0	1	2
f(x)	2	1	-4	0	-1

A table for $g(x)$ is shown below:

x	-1	0	1	2	3
g(x)	2	1	-4	0	-1

Based on the table, $g(x)$ =

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

A table for $h(x)$ is shown below:

x	-2	-1	0	1	2
h(x)	1	0	-5	-1	-2

Based on the table, $h(x)$ =

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

7.
A table for $f(x)$ is shown below:

x	-2	-1	0	1	2
f(x)	-3	4	-1	-4	2

A table for $h(x)$ is shown below:

x	-2	-1	0	1	2
h(x)	-4	3	-2	-5	1

Based on the table, $h(x)$ =

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

8.
Let $f(x)=x^3$

If $g(x)$ is the graph of $f(x)$ shifted up 4 units, write a formula for $g(x)$

$g(x)$ =_____

9.
Let $f(x) = x^4$

If $g(x)$ is the graph of $f(x)$ shifted left 2 units, write a formula for $g(x)$

$g(x)$ =_____

10.
Let $f(x) = 3\sqrt{x}$

If $g(x)$ is the graph of $f(x)$ shifted up 6 units and right 5 units, write a formula for $g(x)$

$g(x)$ =_____

11.
Given $f(x) = x^2$, after performing the following transformations: shift upward 32 units and shift 95 units to the right, the new function $g(x)$ =_____

12.
Suppose the graph of $y = 9x^2 + 7x - 1$ is stretched horizontally by a factor of 3 .

The equation of the new graph will be $y =$ _____

13.
Suppose the graph of $y = 5x^2 - x - 10$ is stretched vertically by a factor of 3 .

The equation of the new graph will be $y =$ _____

14.
Suppose the graph of $y = -4x^2 - 2x + 1$ is reflected across the x -axis.

The equation of the new graph will be $y =$ _____

15.
Suppose the graph of $y = -2x^2 - 4x + 4$ is reflected across the y -axis.

The equation of the new graph will be $y =$ _____

16.
Starting with the graph of $f(x) = 4^x$, write the formula for the function that results from

(a) shifting $f(x)$ 6 units upward. $y =$_____

(b) shifting $f(x)$ 9 units to the right. $y =$_____

(c) reflecting $f(x)$ about the y-axis. $y =$_____

17.
The graph of the function $f\left(\frac{1}{8}x\right)$ can be obtained from the graph of $y = f(x)$
by one of the following actions:

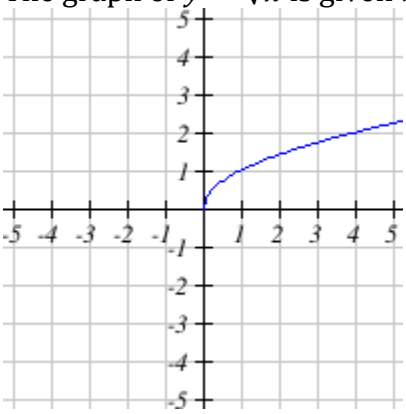
- horizontally stretching the graph of $f(x)$ by a factor 8
- horizontally compressing the graph of $f(x)$ by a factor 8
- vertically stretching the graph of $f(x)$ by a factor 8
- vertically compressing the graph of $f(x)$ by a factor 8

18.
Describe a function $g(x)$ in terms of $f(x)$ if the graph of g is obtained by vertically stretching f by a factor of 9, then shifting the graph of f to the right 2 units and upward 2 units.

$g(x) = Af(x + B) + C$, where
$A =$_____
$B =$_____
$C =$_____

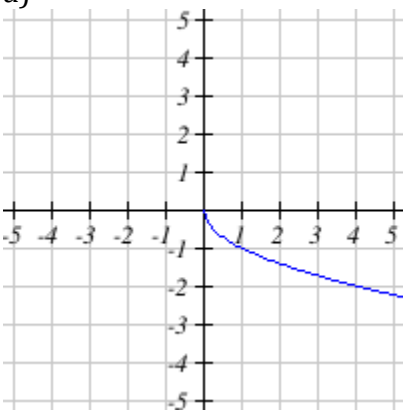
19.

The graph of $y = \sqrt{x}$ is given below:



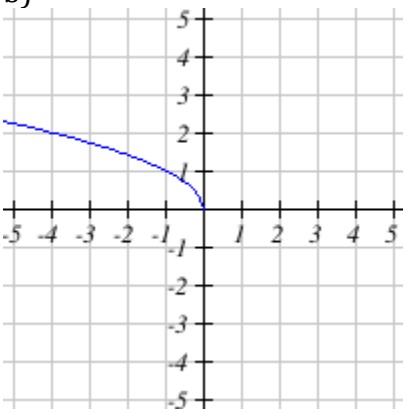
Find a formula for each of the transformations whose graphs are given below.
Recall that square root is entered as sqrt.

a)



$y =$_____

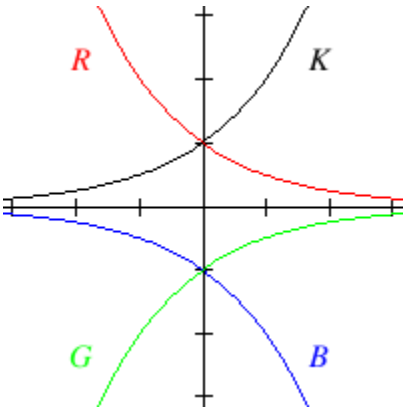
b)



$y =$_____

20.

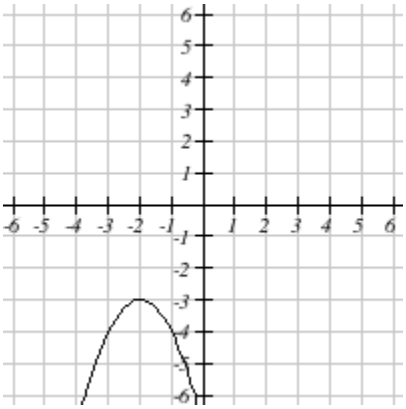
The graph of $f(x) = 2^x$ is shown in black (K). Match each transformation of this function with a graph below.



- 2^{-x}
- -2^{-x}
- -2^{x}

a) red (R)
b) blue (B)
c) green (G)

21.

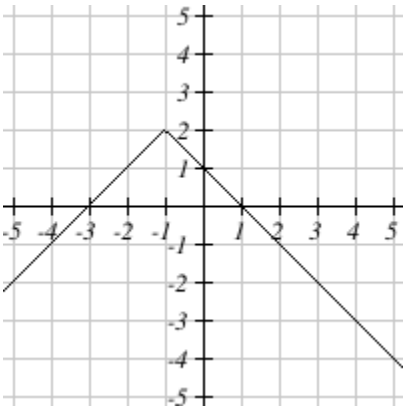


The graph above is a transformation of the function x^2 .

Give the function in the graph above.

$g(x) =$_____

22.

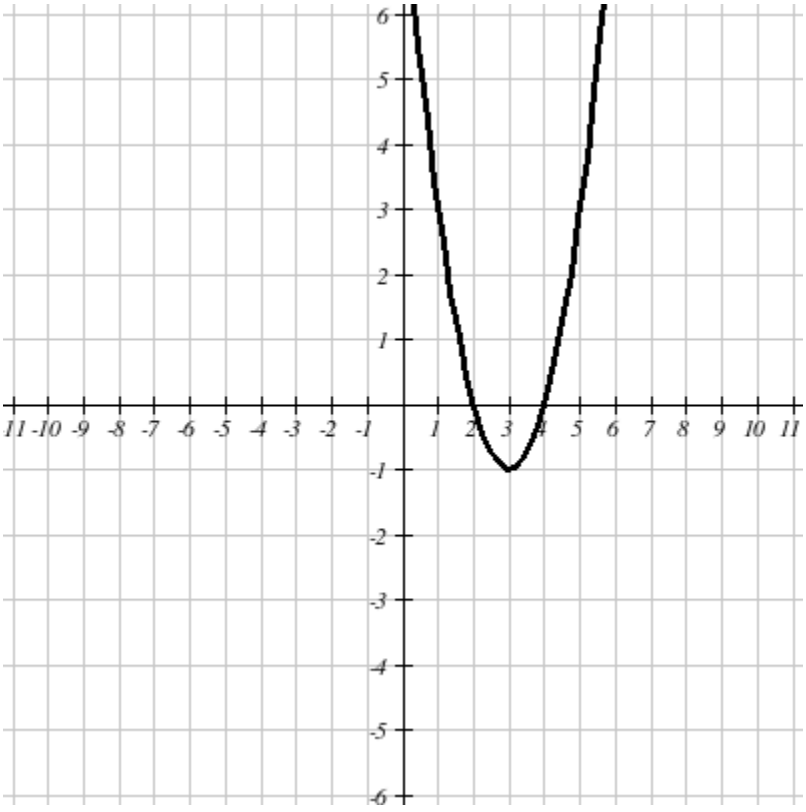


Write an equation for the function graphed above

y =_____

23.

Consider the function $f(x) = (x-3)^2 - 1$ graphed below: Graph the function $h(x)$, if $h(x)$ is the translation of f 3 units right and 2 units down.



Give the coordinates of the local minimum of $h(x)$ are: _____

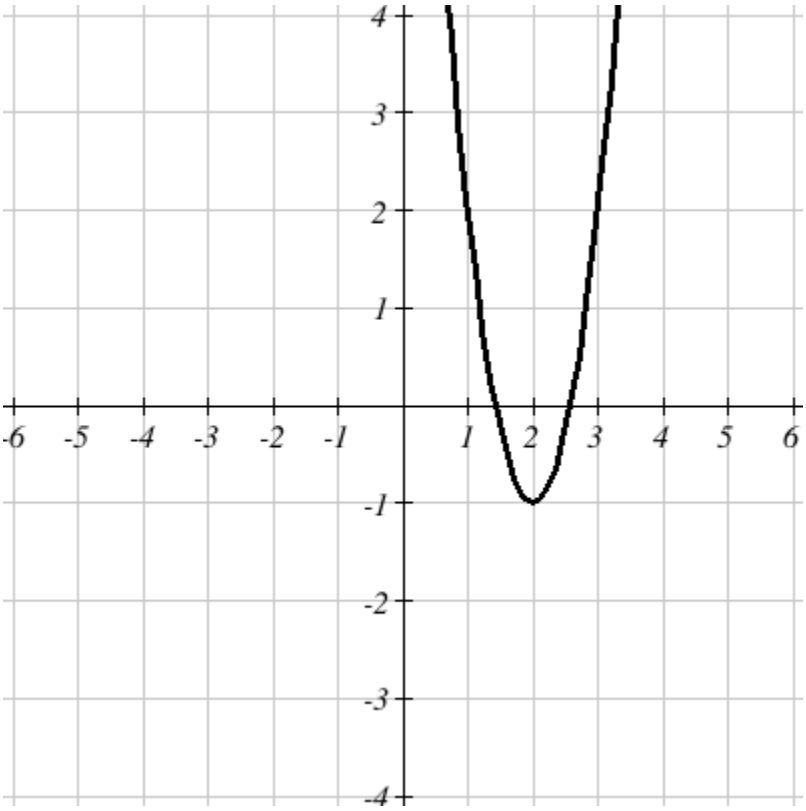
What is the formula for $h(x)$?

$h(x)$ =_____

24.

Consider the function $f(x) = 3(x-2)^2 - 1$ passing through the point $(1,2)$.

Graph the function $h(x)$, if $h(x)$ is the reflection of f across the x-axis and y-axis

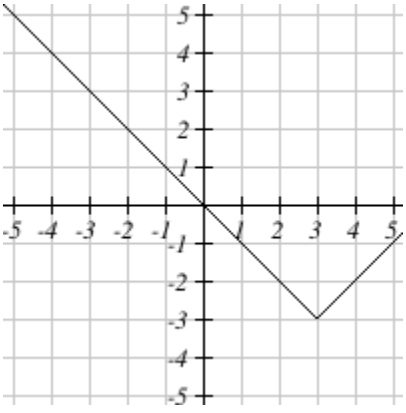


What is the coordinates of the local minimum of $h(x)$? _____

What is the formula of $h(x)$?

$h(x) =$_____

25.

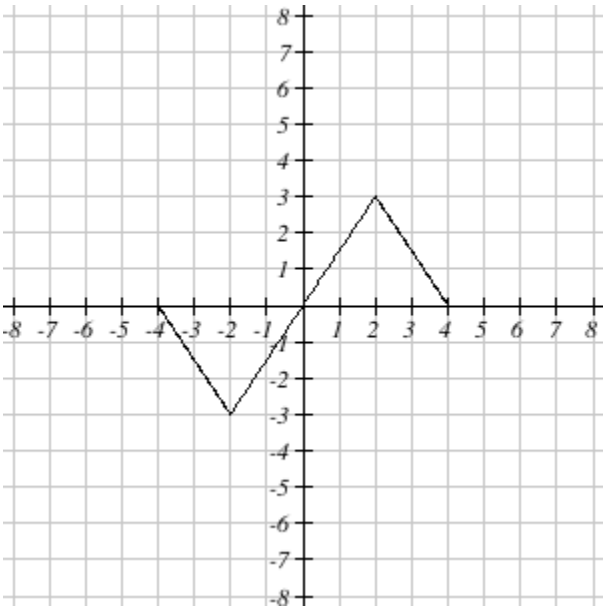


Complete an equation for the function graphed above

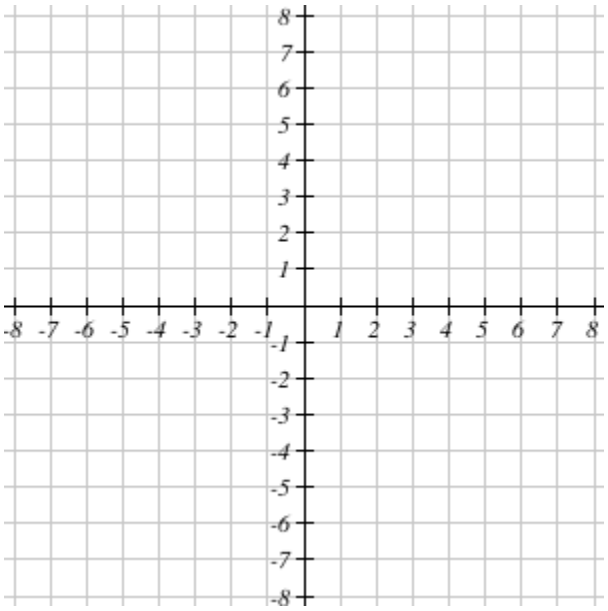
y =_____

26.

The graph of $y = f(x)$ is shown below.



Draw the graph of $g(x) = f(x + 2)$ below.



27.

Determine the parent function from which the graph of the function shown below can be obtained. Next, identify each transformation that can be applied to the parent function in order to obtain the graph of the function shown below.

$f(x) = 5\sqrt[3]{x + 7}$

a) Choose the correct parent function.

- $y = x^2$
- $y = x^3$
- $y = |x|$
- $y = \sqrt{x}$
- $y = \sqrt[3]{x}$

b) Identify any reflections needed
c) Identify any stretch/compressions needed
d) Identify any vertical shift needed
e) Identify any horizontal shift needed

28.
Determine the parent function from which the graph of the function shown below can be obtained. Next, identify each transformation that can be applied to the parent function in order to obtain the graph of the function shown below.

$g(x) = \frac{3}{4}\sqrt[3]{x+8} - 6$

a) Choose the correct parent function.

- $y = x^2$
- $y = x^3$
- $y = |x|$
- $y = \sqrt{x}$
- $y = \sqrt[3]{x}$

b) Identify any reflections needed
c) Identify any stretch/compressions needed
d) Identify any vertical shift needed
e) Identify any horizontal shift needed

29.
Determine the parent function from which the graph of the function shown below can be obtained. Next, identify each transformation that can be applied to the parent function in order to obtain the graph of the function shown below.

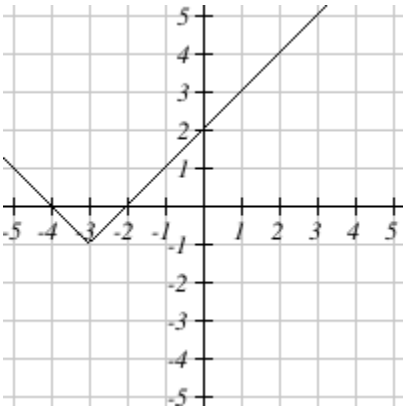
$g(x) = 8\sqrt[3]{-x} - 2$

a) Choose the correct parent function.

- $y = x^2$
- $y = x^3$
- $y = |x|$
- $y = \sqrt{x}$
- $y = \sqrt[3]{x}$

b) Identify any reflections needed
c) Identify any stretch/compressions needed
d) Identify any vertical shift needed
e) Identify any horizontal shift needed

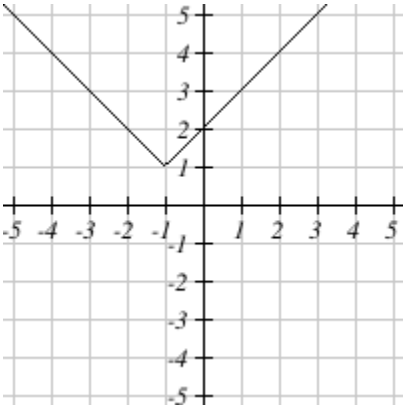
30.



The graph above is the graph of:

- $y = |x + 3| - 1$
- $y = |x - 1| - 3$
- $y = |x - 3| - 1$

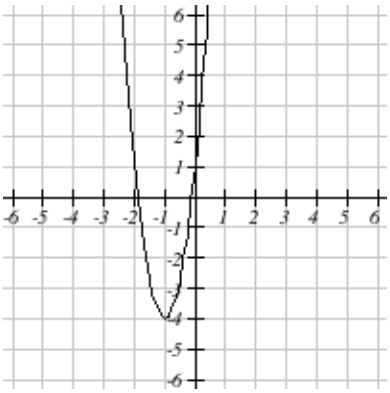
31.

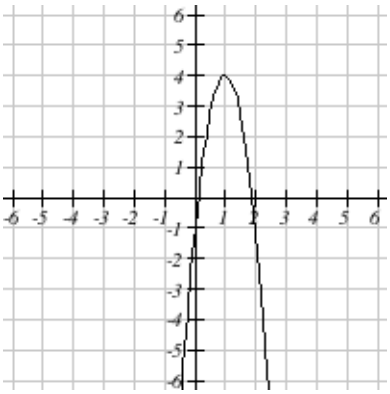


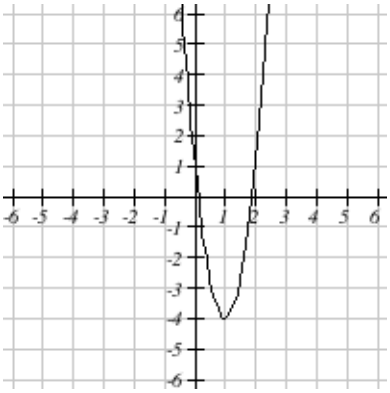
Write an expression for the function graphed above:_____

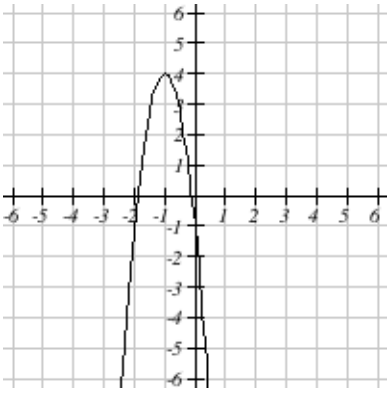
32.
Match the function with its graph.

$y = 5(x + 1)^2 - 4$

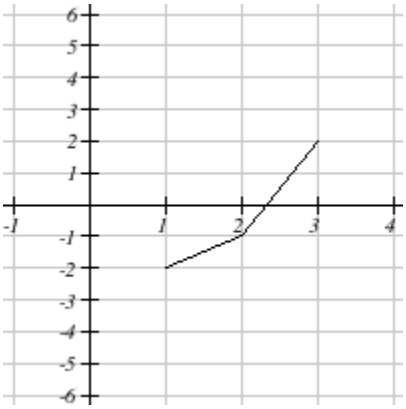




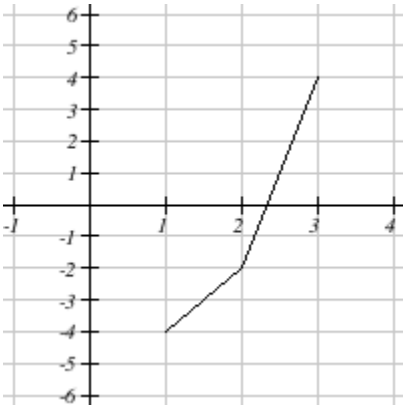




33.



The graph **above** shows the function $f(x)$. The graph **below** shows $g(x)$.



$g(x)$ is a transformation of $f(x)$.

$g(x) = Af(Bx)$, where:

A =_____

B =_____

Lecture 9

Inverse of a relation, One-to-one functions, Horizontal Line test, Inverse functions, properties of inverses, Finding inverses graphically/algebraically, Restricting domain to get inverse

1.
Which of the following are one-to-one functions?

- $G = \{(-5,0), (-1,1), (-3,0), (9,1), (-4,-2), (3,-1)\}$
- $R = \{(-3,0), (1,3), (4,6), (9,7), (11,13), (15,16)\}$
- $F = \{(-3,-2), (0,0), (1,3), (6,5), (9,7), (16,13)\}$
- $S = \{(-5,0), (2,-6), (9,1), (-2,-7), (-3,-8), (8,4)\}$
- $M = \{(0,-2), (2,3), (2,5), (6,9), (7,-6), (16,10)\}$

2.
Select all of the following tables which represent y as a function of x **and** are one-to-one.

x	5	6	6
y	2	8	11

x	5	6	13
y	2	8	11

x	5	6	13
y	2	8	8

3.

Answer the following True or False:

If the graph of $y = f(x)$ passes the horizontal line test then $f(x)$ has an inverse.

- True
- False

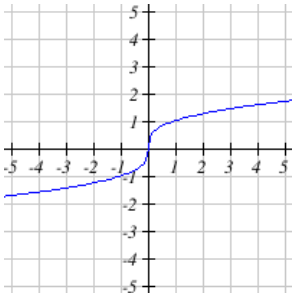
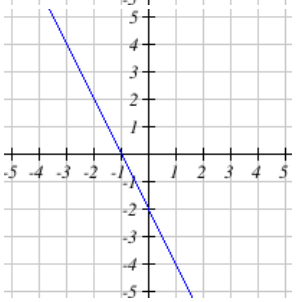
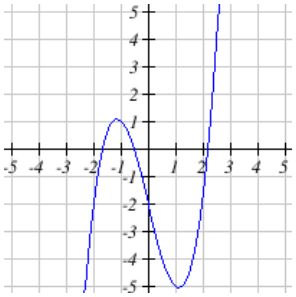
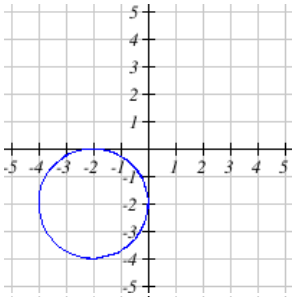
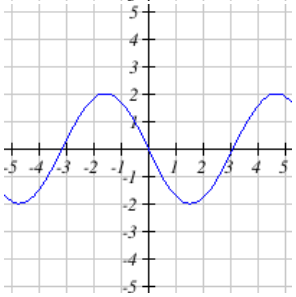
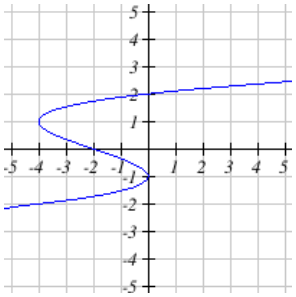
4.

Why does the horizontal line test tell us whether the graph of a function is one-to-one?

- When a horizontal line intersects the graph of a relation more than once, it indicates that for that input there is more than one output, which means the relation is not one-to-one.
- When a horizontal line intersects the graph of a function more than once, it indicates that for that output there is more than one input, which means the function is not one-to-one.
- When a horizontal line intersects the graph of a relation only once, it indicates that for that output there is more than one input, which means the relation is not one-to-one.
- When a horizontal line intersects with the graph of a function more than once, it indicates that for that input there is more than one output, which means the function is not one to one.

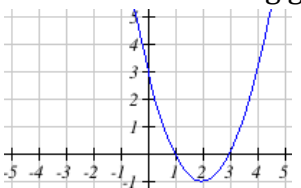
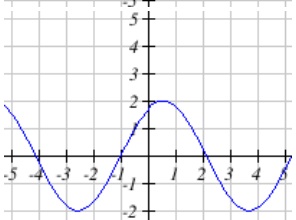
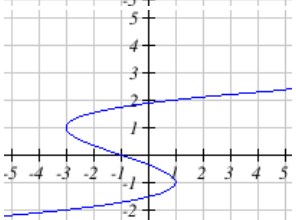
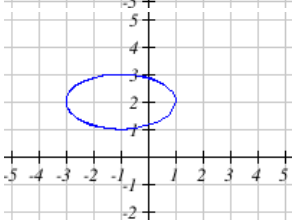
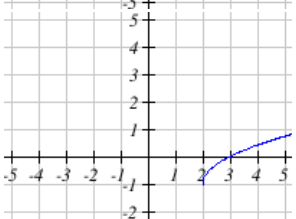
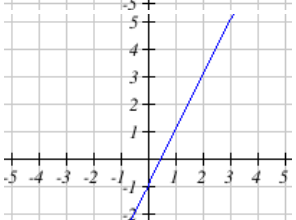
5.

Select all of the following graphs which represent y as a function of x , and is **one-to-one**.

- 
- 
- 
- 
- 
- 

6.

Select all of the following graphs which are **one-to-one** functions.

- 
- 
- 
- 
- 
- 
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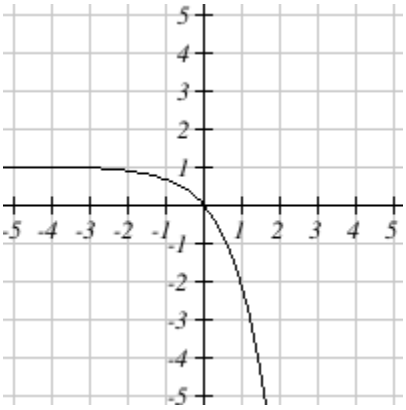
7.

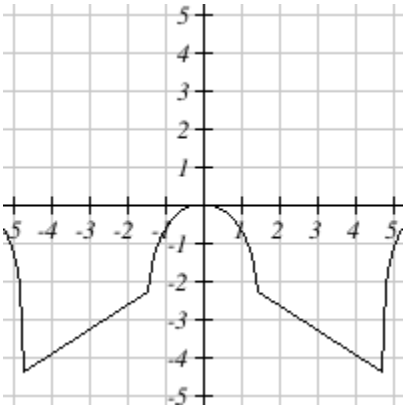
Determine if the given graph is a one-to-one function.



- This relation is not a one-to-one function
- This relation is a one-to-one function

8.

Determine if the given graph is a one-to-one function.



- This relation is a one-to-one function
- This relation is not a one-to-one function

9.

Answer the following True or False:

If the domain of $f(x)$ is $(3,11)$ then the domain of $f^{-1}(x)$ is also $(3,11)$.

- True
- False

10.

Answer the following True or False:

If $f(x) = \frac{1}{6x^2+2x-4}$ then the inverse of $f(x)$ is $f^{-1}(x) = 6x^2 + 2x - 4$.

- True
- False

11.

If f is one-to-one and $f(-5) = 6$, then
$f^{-1}(6) =$ _____ and $\big(f(-5)\big)^{-1} =$ _____.

12.
Assume that the function f is a one-to-one function.

(a) If $f(6) = 4$, then $f^{-1}(4) =$ _____.

(b) If $f^{-1}(-4) = -3$, then $f(-3) =$_____ .

13.
Use the table below to fill in the missing values.

x	0	1	2	3	4	5	6	7	8	9
$f(x)$	4	9	0	3	8	6	7	2	5	1

$f(5) =$_____

if $f(x) = 8$, then $x =$_____

$f^{-1}(6) =$_____

if $f^{-1}(x) = 4$, then $x =$_____

14.

Below is the table for the function $f(x)$.

x	1	4	9	11	16
y	3	5	8	12	15

Choose the one table below which is the inverse function $f^{-1}(x)$.

x	1/3	1/5	1/8	1/12	1/15
y	3	5	8	12	15

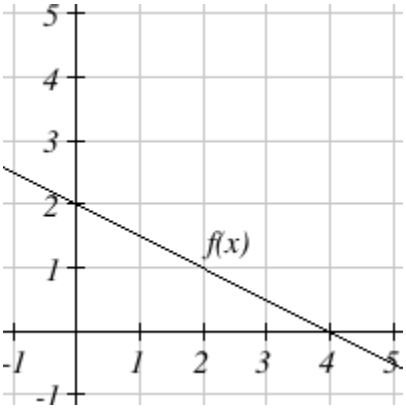
x	3	5	8	12	15
y	1	4	9	11	16

x	1	4	9	11	16
y	1/3	1/5	1/8	1/12	1/15

x	16	11	9	4	1
y	15	12	8	5	3

15.

Use the graph below to fill in the missing values.



$f(0) =$_____

If $f(x) = 0, \quad x =$_____

$f^{-1}(0) =$_____

If $f^{-1}(x) = 0, \quad x =$_____

16.
If $f(x) = x + 3$ and $g(x) = x - 3$,
(a) $f\big(g(x)\big) =$_____
(b) $g\big(f(x)\big) =$_____
(c) Thus $g(x)$ is called an _____ function of $f(x)$

17.
Are the following functions inverses?

$f(x) = 4x + 5$

$g(x) = \frac{x}{4} - 5$

- Yes, they are inverses
- No, they are not inverses

18.
Are the following functions inverses?

$f(x) = \sqrt[3]{x - 1}$

$f(x) = (x + 1)^3$

- Yes, they are inverse
- No, they are not inverses

19.
Are the following functions inverses?

$f(x) = \sqrt[3]{x + 6}$

$g(x) = x^3 - 6$

- No, they are not inverses
- Yes, they are inverse

20.
Let $f(x) = 9 - x$

$f^{-1}(x) =$_____

21.
Let $f(x) = 3x + 2$

$f^{-1}(x) =$_____

22.
Find the inverse function of $f(x) = 4 + \sqrt[3]{x}$.
$f^{-1}(x) =$_____

23.
Find the inverse function of $f(x) = 6 + \sqrt[3]{x}$.
$f^{-1}(x) =$_____

24.
(a) Find the inverse function of $f(x) = 9x - 6$.
$f^{-1}(x) =$_____

(b) The graphs of f and f^{-1} are symmetric with respect to the line defined by $y =$_____

25.
Use algebra to find the inverse of the function
$f(x) = x^8$, $x \geq 0$, $y \geq 0$

The inverse function is $f^{-1}(x) =$_____ where $x \geq 0$, $y \geq 0$

26.
Use algebra to find the inverse of the function
$f(x) = x^3$

The inverse function is $f^{-1}(x) =$_____

27.
Use algebra to find the inverse of the function
$f(x) = \frac{1}{4}x$

The inverse function is $f^{-1}(x) =$_____

28.
Use algebra to find the inverse of the function $f(x) = 5x^9 - 2$

The inverse function is $f^{-1}(x) =$_____

29.
Let $f(x) = (x - 8)^2$

Find a domain on which f is one-to-one and non-decreasing: _____

Find the inverse of f restricted to this domain.
$f^{-1}(x) =$_____

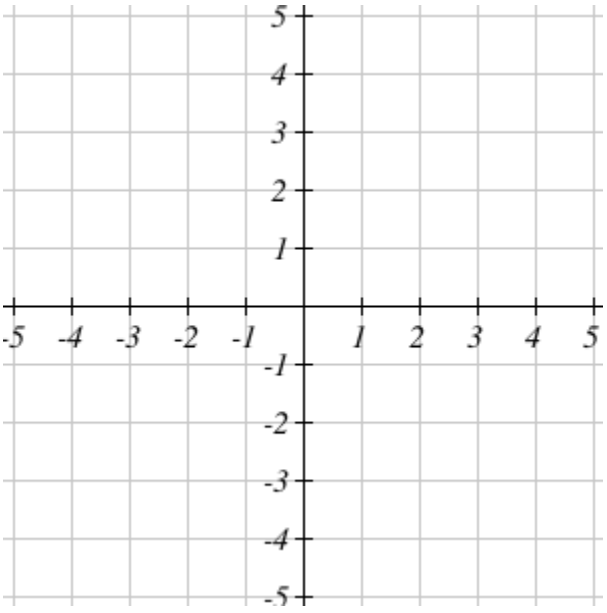
30.
Find the inverse function of the function $f(x) = -5x^2$ if $x \geq 0$.

$f^{-1}(x) =$ _____where _____ (give the domain of the inverse function in this second answer box)

31.
Find the inverse of the function $f(x) = 4x - 1$.

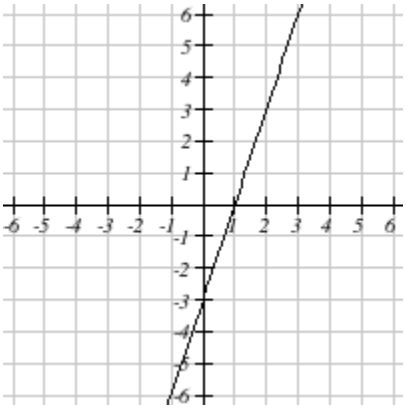
$f^{-1}(x) =$ _____

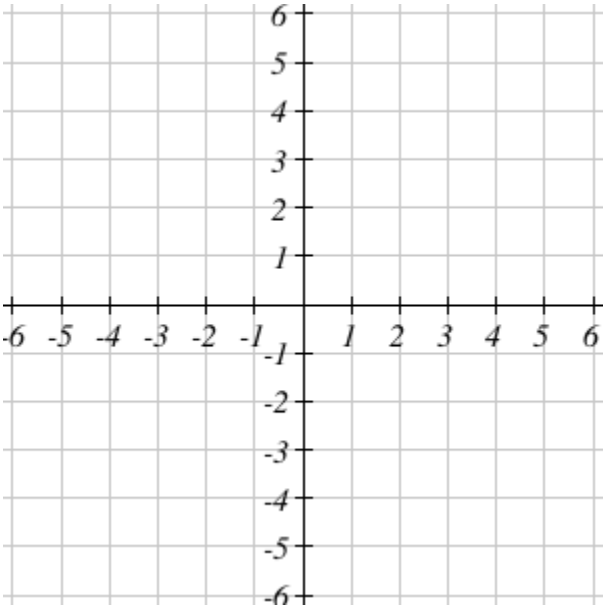
Draw the functions f and f^{-1}



32.

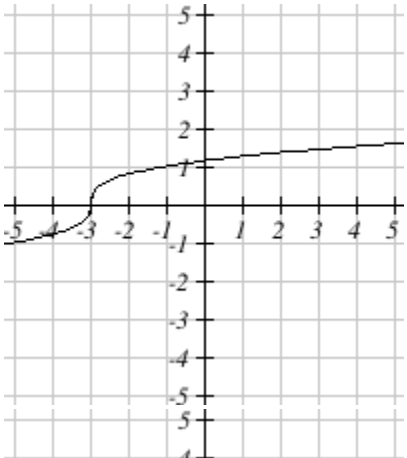
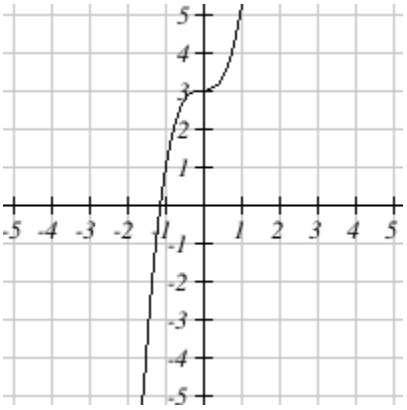
The graph of $y = f(x)$ is shown. Sketch the graph of $y = f^{-1}(x)$.





33.

Given that $f(x) = 2x^3 - 3$, which of the following is the graph of $f^{-1}(x)$?

- 
- 
-