

Question

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**Description**

This is the review for Exam #1. Please work as many problems as possible before we review in-class. As always, if you need anything, please email me [Joshua.Patterson@tamuc.edu](mailto:Joshua.Patterson@tamuc.edu)

1. Question Details

SPreCalc6 1.1.005.MI. [2684203]

List the elements of the given set that are natural numbers, integers, rational numbers, and irrational numbers. (Enter your answers as comma-separated lists.)

$$\{0, -15, 10, 40, \frac{22}{7}, 0.538, \sqrt{7}, -\frac{1}{3}, \sqrt[3]{2}\}$$

(a) natural numbers

10, 40

(b) integers

0, -15, 10, 40

(c) rational numbers

0, -15, 10, 40,  $\frac{22}{7}$ , 0.538,  $-\frac{1}{3}$ 

(d) irrational numbers

 $\sqrt{7}, \sqrt[3]{2}$ 

2. Question Details

SPreCalc6 1.1.044.MI. [1615695]

Find the indicated set if given the following.

$$A = \{x|x \geq -9\} \quad B = \{x|x < 7\} \quad C = \{x|-1 < x \leq 8\}$$

(a)  $A \cap C$ 

- $\{x|-9 \leq x < 7\}$
- $\{x|-9 \leq x \leq 7\}$
- $\{x|-1 < x \leq 8\}$
- $\{x|-1 \leq x \leq 8\}$
- none of these

(b)  $A \cap B$ 

- $\{x|-9 \leq x < 7\}$
- $\{x|-9 \leq x \leq 7\}$
- $\{x|-1 < x \leq 8\}$
- $\{x|-1 \leq x \leq 8\}$
- none of these

Simplify the expression and eliminate any negative exponent(s).

(a)  $\frac{4a^2b^{-7}}{2a^{-6}b^4}$

$$\frac{2a^8}{b^{11}}$$

(b)  $\left(\frac{y}{5x^{-5}}\right)^{-2}$

$$\frac{25}{x^{10}y^2}$$

Simplify the expression and eliminate any negative exponent(s). Assume that all letters denote positive numbers.

(a)  $\sqrt[7]{x^4y^2} \sqrt[14]{x^6y^{52}}$

$$xy^4$$

(b)  $\frac{\sqrt[4]{16x^3}}{\sqrt{x}}$

$$2x^{1/4}$$

Factor the trinomial.

$$8x^2 - 77x + 45$$

$$(x - 9)(8x - 5)$$

Factor the trinomial.

$$(5x + 1)^2 + 13(5x + 1) + 40$$

$$(5x + 6)(5x + 9)$$

Use a Special Factoring Formula to factor the expression.

$$(x + 9)^2 - 4$$

$$(x + 7)(x + 11)$$

Use a Special Factoring Formula to factor the expression.

$$27x^3 + y^3$$

$$(3x + y)(9x^2 - 3xy + y^2)$$

Factor the expression by grouping terms.

$$7x^3 + 6x^2 - 21x - 18$$

$$(7x + 6)(x^2 - 3)$$

Find the domain of the expression.

$$\frac{1}{\sqrt{x-1}}$$

- $x \geq 1$
- $x > 1$
- $x \leq 0$
- all real numbers
- $x < 1$

Perform the addition or subtraction and simplify.

$$\frac{1}{x+6} + \frac{6}{x-3}$$

$$\frac{7x+33}{(x-3)(x+6)}$$

The given equation is either linear or equivalent to a linear equation. Solve the equation. (If there is no solution, enter NO SOLUTION. If all real numbers are solutions, enter REALS.)

$$\frac{1}{x-1} + \frac{4}{x+1} = \frac{4}{x^2-1}$$

$x =$

Solve the equation by factoring. (Enter your answers as a comma-separated list.)

$$6x(x-1) = 6 - 11x$$

$x =$

Evaluate the function at the indicated values. (If an answer is undefined, enter UNDEFINED.)

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

$f(-3) =$

$f(3) =$

$f(0) =$

$f\left(\frac{1}{2}\right) =$

$f(10) =$

Evaluate the function at the indicated values. (If an answer is undefined, enter UNDEFINED.)

$$f(x) = 6x^2 + 4x - 12$$

$f(0) =$

$f(2) =$

$f(-2) =$






$f(\sqrt{2}) =$

$f(x+1) =$

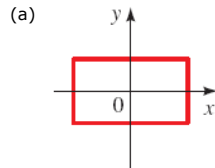
$f(-x) =$


Evaluate the piecewise defined function at the indicated values.

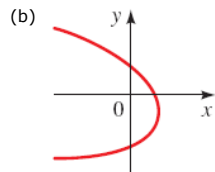
$$f(x) = \begin{cases} x^2 & \text{if } x < 0 \\ x + 1 & \text{if } x \geq 0 \end{cases}$$


$f(-2) =$    4  
 $f(-1) =$    1  
 $f(0) =$    1  
 $f(1) =$    2  
 $f(2) =$    3

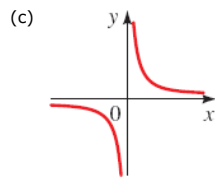
Use the Vertical Line Test to determine whether the curve is the graph of a function of  $x$ .




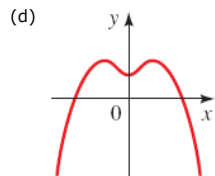
- is a function
-  is not a function




- is a function
-  is not a function

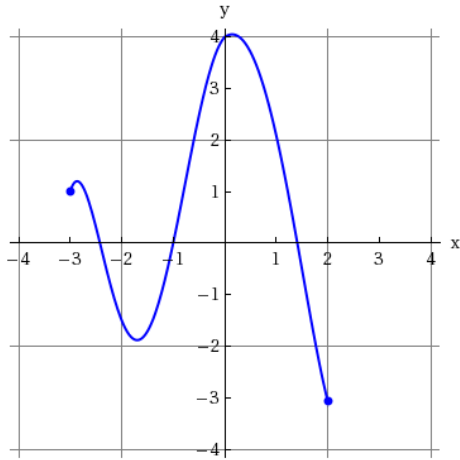


-  is a function
- is not a function




-  is a function
- is not a function

Consider the following graph.



Use the Vertical Line Test to determine whether the curve is the graph of a function of  $x$ .

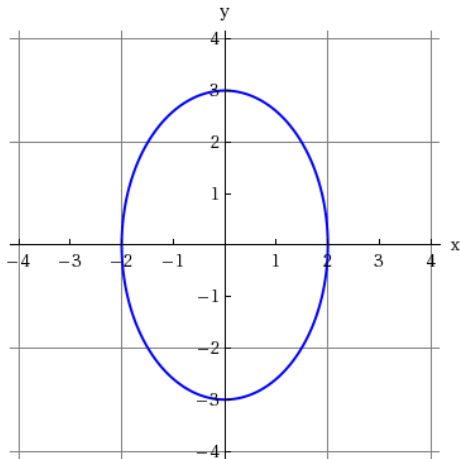
-  Yes, the curve is a function of  $x$ .  
 No, the curve is not a function of  $x$ .

If the curve is a function, state the domain and range. (Enter your answers using interval notation. If the curve is not a function enter NONE.)


domain

range

Consider the following graph.



Use the Vertical Line Test to determine whether the curve is the graph of a function of  $x$ .

- Yes, the curve is a function of  $x$ .  
  No, the curve is not a function of  $x$ .


If the curve is a function, state the domain and range. (Enter your answers using interval notation. If the curve is not a function enter NONE.)

domain

range


Determine whether the equation defines  $y$  as a function of  $x$ . (See Example 9.)

$$x^2 + (y - 8)^2 = 3$$


- is a function
-  is not a function


Determine whether the equation defines  $y$  as a function of  $x$ . (See Example 9.)

$$x^2y + y = 2$$

-  is a function
- is not a function


Fill in the blank with the appropriate axis ( $x$ -axis or  $y$ -axis).

(a) The graph of  $y = -f(x)$  is obtained from the graph of  $y = f(x)$  by reflecting in the  .


(b) The graph of  $y = f(-x)$  is obtained from the graph of  $y = f(x)$  by reflecting in the  .

Suppose the graph of  $f$  is given. Describe how the graph of each function can be obtained from the graph of  $f$ .

(a)  $y = 2f(x + 9) - 8$

-  shift left 9 units, stretch vertically by a factor of 2, then shift down 8 units
- shift left 9 units, stretch horizontally by a factor of 2, then shift down 8 units
- shift right 9 units, stretch horizontally by a factor of 2, then shift down 8 units
- shift right 9 units, stretch horizontally by a factor of 2, then shift up 8 units
- shift left 9 units, stretch vertically by a factor of 2, then shift up 8 units

(b)  $y = 2f(x - 9) + 8$

- shift right 9 units, stretch horizontally by a factor of 2, then shift up 8 units
-  shift right 9 units, stretch vertically by a factor of 2, then shift up 8 units
- shift left 9 units, stretch horizontally by a factor of 2, then shift up 8 units
- shift left 9 units, stretch horizontally by a factor of 2, then shift down 8 units
- shift right 9 units, stretch vertically by a factor of 2, then shift down 8 units

Suppose the graph of  $f$  is given. Describe how the graph of each function can be obtained from the graph of  $f$ .

(a)  $y = 2 - 7f(x)$

- stretch vertically by a factor of 7, reflect about the  $x$ -axis, then shift down 2 units
- stretch vertically by a factor of 7 then shift down 2 units
- stretch horizontally by a factor of 7, reflect about the  $x$ -axis, then shift up 2 units
- stretch vertically by a factor of 7, reflect about the  $y$ -axis, then shift up 2 units
- stretch vertically by a factor of 7, reflect about the  $x$ -axis, then shift up 2 units

(b)  $y = 7 - f(-x)$

- shift up 7 units, reflect about the  $x$ -axis, then reflect about the  $y$ -axis
- reflect about the  $x$ -axis, reflect about the  $y$ -axis, then shift right 7 units
- reflect about the  $x$ -axis, reflect about the  $y$ -axis, then shift up 2 units
- reflect about the  $x$ -axis, reflect about the  $y$ -axis, then shift up 7 units
- reflect about the  $x$ -axis, then shift up 7 units

True or false?

(a) If  $f$  has an inverse, then  $f^{-1}(x)$  is the same as  $\frac{1}{f(x)}$ .

- True
- False

(b) If  $f$  has an inverse, then  $f^{-1}(f(x)) = x$ .

- True
- False

A function  $f$  is given, and the indicated transformations are applied to its graph (in the given order). Write the equation for the final transformed graph.

$f(x) = \sqrt[4]{x}$ ; reflect in the  $y$ -axis and shift upward 5 units

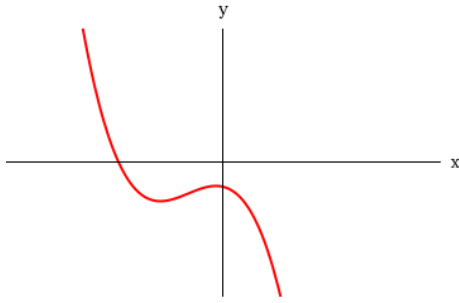
$y =$

A function  $f$  is given, and the indicated transformations are applied to its graph (in the given order). Write the equation for the final transformed graph.

$f(x) = x^2$ ; shift 3 units to the left and reflect in the  $x$ -axis

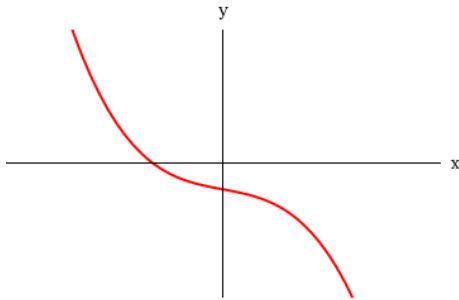
$y =$

The graph of a function  $f$  is given. Determine whether  $f$  is one-to-one.



- is one-to-one  
 is not one-to-one

The graph of a function  $f$  is given. Determine whether  $f$  is one-to-one.



- is one-to-one  
 is not one-to-one

Determine whether the function is one-to-one.

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

- is one-to-one  
 is not one-to-one

Determine whether the function is one-to-one.

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

- is one-to-one  
 is not one-to-one