Problem 1

If $f(x) = x + \sqrt{2 - x}$ *and* $g(x) = u + \sqrt{2 - u}$, *is it true that* $f = g$*?*

Solution

True

Problem 2

If

$$f(x) = \frac{x^2 - x}{x - 1} \quad \text{and} \quad g(x) = x$$

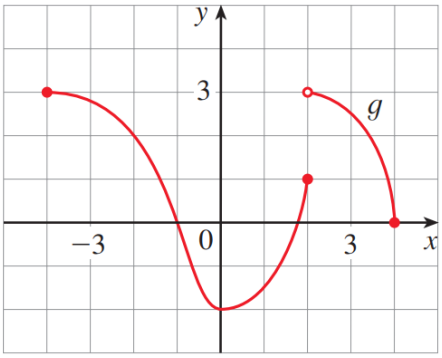
is it true that $f = g$*?*

Solution

False

Problem 3

The graph of a function g *is given:*



Source: James Stewart, Calculus: Early Transcendentals [9e]

1. *State the values of* $g(-2)$, $g(0)$, $g(2)$ *and* $g(3)$

   ### Solution

   $g(-2) = 2 \quad g(0) = -2 \quad g(2) = 1 \quad g(3) = 2.5$

2. *For what value(s) of* x *is* $g(x) = 3$*?*

   ### Solution

   $g(x) = 3 \Rightarrow x = -4$

3. *For what value(s) of* x *is* $g(x) \leq 3$*?*

Solution

$g(x) \leq 3 \Rightarrow x \in [-4, 4]$

4. *State the domain and range of g*

Solution

Domain : $[-4, 4]$ Range : $[-2, 3]$

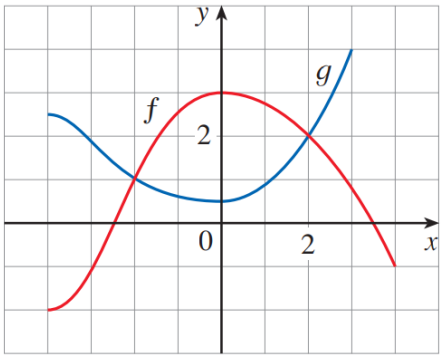
5. *On what interval(s) is g increasing?*

Solution

$[0, 2]$

Problem 4

The graph of f and g are given:



Source: James Stewart, Calculus: Early Transcendentals [9e]

1. *State the values of $f(-4)$ and $g(3)$*

Solution

$f(-4) = -2 \quad g(3) = 4$

2. *Which is larger, $f(-3)$ or $g(-3)$?*

Solution

$g(-3)$

3. *For what values of x is $f(x) = g(x)$?*

Solution

$x = \pm 2$

4. *On what interval(s) is* $f(x) \leq g(x)$*?*

Solution

$[-4, -2] \cup [2, 3]$

5. *State the solution of the equation* $f(x) = -1$

Solution

$f(x) = -1 \Rightarrow x = -3$

6. *On what interval(s) is* g *decreasing?*

Solution

$[-4, 0]$

7. *State the domain and range of* f

Solution

Domain : $[-4, 4]$ Range : $[-2, 3]$

8. *State the domain and range of* g

Solution

Domain : $[-4, 3]$ Range : $[0.5, 4]$

Problem 5

Figure 1 was recorded by an instrument operated by the California Department of Mines and Geology at the University Hospital of the University of Southern California in Los Angeles. Use it to estimate the range of the vertical ground acceleration function at USC during the North-ridge earthquake.

Solution

Problem 6

In this section we discussed examples of ordinary, everyday functions: population is a function of time, postage cost is a function of package weight, water temperature is a function of time. Give three other examples of function from everyday life that are described verbally. What can you say about the domain and range of each of your functions? If possible, sketch a rough graph of each function.

Solution

Problem 7

Determine whether the equation or table defines y as a function of x:

$$3x - 5y = 7$$

Solution

True

$$y = \frac{3x - 7}{5}$$

Problem 8

Determine whether the equation or table defines y as a function of x:

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

Solution

True

$$y = \frac{3x^2 - 5}{2}$$

Problem 9

Determine whether the equation or table defines y as a function of x:

$$x^2 + (y - 3)^2 = 5$$

Solution

False

$$y = \pm(\sqrt{3x^2 - 5} + 3)$$

Problem 10

Determine whether the equation or table defines y as a function of x:

$$2xy + 5y^2 = 4$$

Solution

False

$$y = \frac{-x \pm \sqrt{x^2 + 20}}{5}$$

Problem 11

Determine whether the equation or table defines y as a function of x:

$$(y+3)^3 + 1 = 2x$$

Solution

True

$$y = \sqrt[3]{2x-1} - 3$$

Problem 12

Determine whether the equation or table defines y as a function of x:

$$2x - |y| = 0$$

Solution

False

$$y = \pm 2x$$

Problem 13

Determine whether the equation or table defines y as a function of x:

x (Height) (in)	y (Shoe size)
72	12
60	8
60	7
63	9
70	10

Solution

False

Problem 14

Determine whether the equation or table defines y as a function of x:

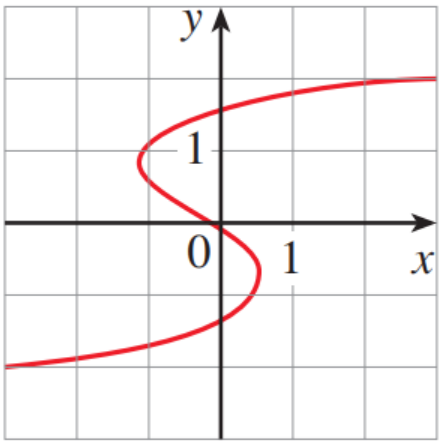
x (Year)	y (Tuition cost) ($)
2016	10,900
2017	11,000
2018	11,200
2019	11,200
2020	11,300

Solution

True

Problem 15

Determine whether the curve is the graph of a function of x. If it is, state the domain and range of the function



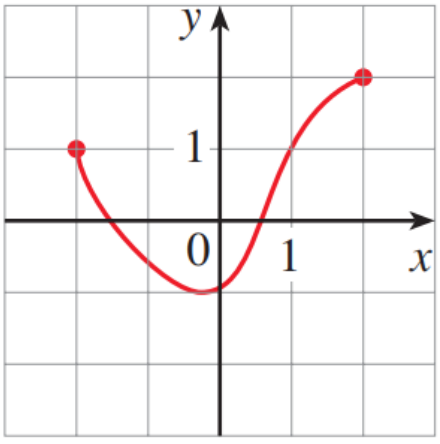
Source: James Stewart, Calculus: Early Transcendentals [9e]

Solution

False

Problem 16

Determine whether the curve is the graph of a function of x. If it is, state the domain and range of the function



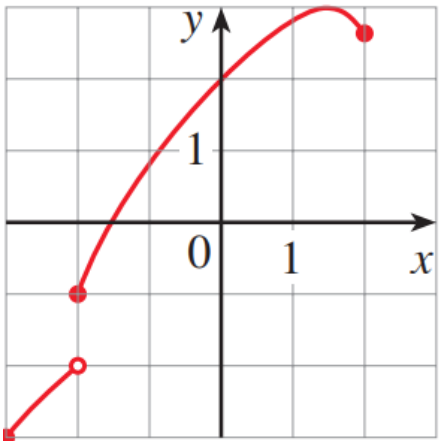
Source: James Stewart, Calculus: Early Transcendentals [9e]

Solution

Domain : $[-2, 2]$ Range : $[-1, 2]$

Problem 17

Determine whether the curve is the graph of a function of x. If it is, state the domain and range of the function



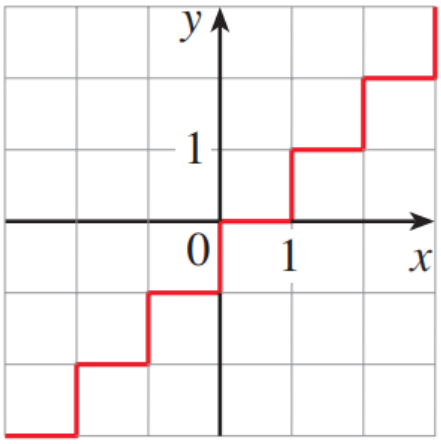
Source: James Stewart, Calculus: Early Transcendentals [9e]

Solution

Domain : $[-3, 2]$ Range : $[-3, 3]$

Problem 18

Determine whether the curve is the graph of a function of x. If it is, state the domain and range of the function



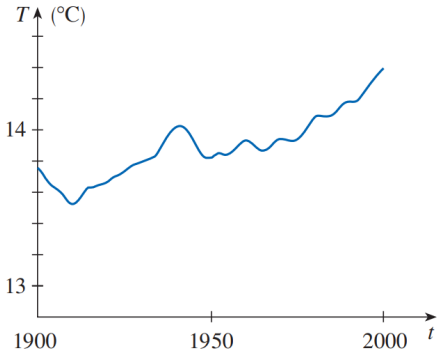
Source: James Stewart, Calculus: Early Transcendentals [9e]

Solution

False

Problem 19

Shown is a graph of the global average temperature T during the 20th century. Estimate the following:



Source: James Stewart, Calculus: Early Transcendentals [9e]

1. *The global average temperature in 1950*

   ### Solution

   ≈ 13.82

2. *The year when the average temperature was* $14.2°C$

   ### Solution

   ≈ 1992

3. *The years when the temperature was smallest and largest*

   ### Solution

   1910 and 2003

4. *The range of* T

   ### Solution

   $[13.5, 14.4]$