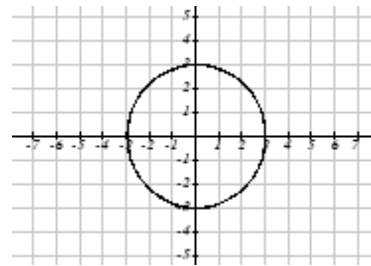
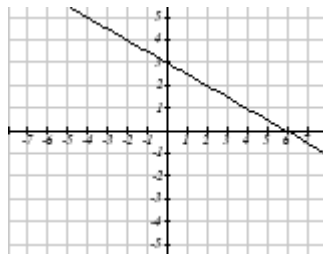
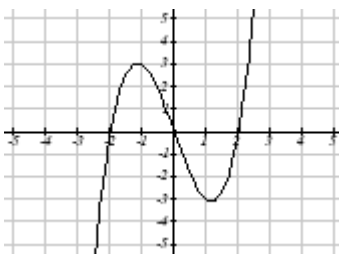


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Functions Homework

Questions 1:

Which of these graphs defines a function $y=f(x)$? Which of these graphs defines a one-to-one function?



Solution:

Looking at the three graphs above, the first two define a function $y=f(x)$, since for each input value along the horizontal axis there is exactly one output value corresponding, determined by the y -value of the graph. The 3rd graph does not define a function $y=f(x)$ since some input values, such as $x=2$, correspond with more than one output value.

Graph 1 is not a one-to-one function. For example, the output value 3 has two corresponding input values, -2 and 2.3

Graph 2 is a one-to-one function; each input corresponds to exactly one output, and every output corresponds to exactly one input.

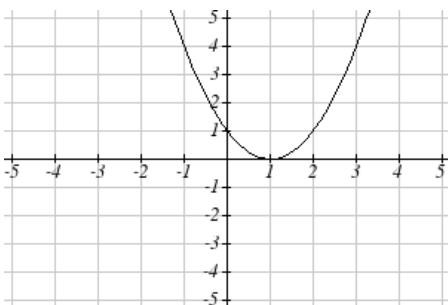
Graph 3 is not even a function so there is no reason to even check to see if it is a one-to-one function.

Questions 2:

Given the graph below,

a) Evaluate $f(2)$

b) Solve $f(x) = 4$



Solution:

a) To evaluate $f(2)$, we find the input of $x=2$ on the horizontal axis. Moving up to the graph gives the point $(2, 1)$, giving an output of $y=1$. So $f(2) = 1$

b) To solve $f(x) = 4$, we find the value 4 on the vertical axis because if $f(x) = 4$ then 4 is the output. Moving horizontally across the graph gives two points with the output of 4: $(-1,4)$ and $(3,4)$. These give the two solutions to $f(x) = 4$: $x = -1$ or $x = 3$

This means $f(-1)=4$ and $f(3)=4$, or when the input is -1 or 3, the output is 4.

Questions 3:

Given the function

a) Evaluate $k(2)$

b) Solve $k(t) = 1$

Solution:

a) To evaluate $k(2)$, we plug in the input value 2 into the formula wherever we see the input variable t , then simplify

$$k(2) = 2^3 + 2$$

$$k(2) = 8 + 2$$

$$\text{So } k(2) = 10$$

b) To solve $k(t) = 1$, we set the formula for $k(t)$ equal to 1, and solve for the input value that will produce that output

$$k(t) = 1 \quad \text{substitute the original formula } k(t) = t^3 + 2$$

$$t^3 + 2 = 1 \quad \text{subtract 2 from each side}$$

$$t^3 = -1 \quad \text{take the cube root of each side}$$

$$t = -1$$

When solving an equation using formulas, you can check your answer by using your solution in the original equation to see if your calculated answer is correct.

We want to know if $k(t) = 1$ is true when $t = -1$.

$$k(-1) = (-1)^3 + 2$$

$$= -1 + 2$$

$$= 1 \text{ which was the desired result.}$$

Questions 4:

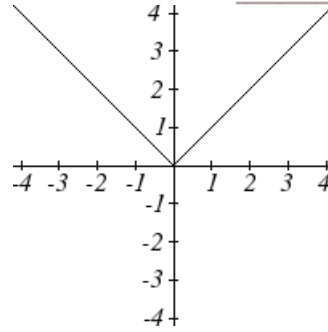
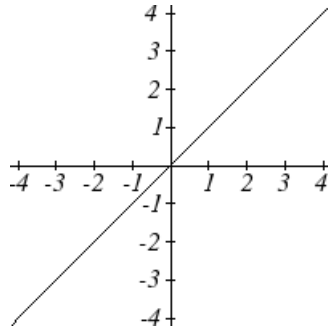
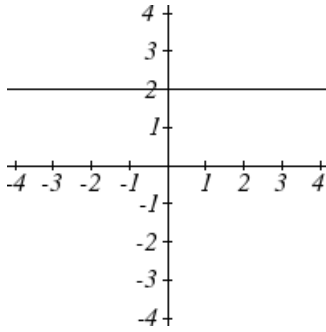
Draw graphs of the given equations

Solution:

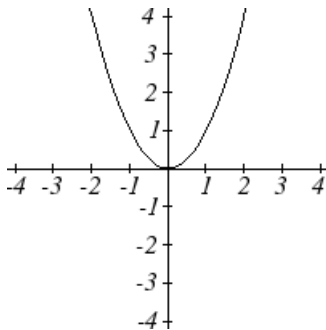
Constant Function: $f(x) = 2$

Identity: $f(x) = x$

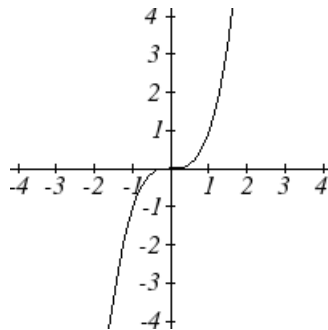
Absolute Value: $f(x) = |x|$



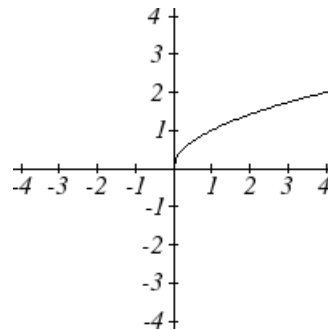
Quadratic: $f(x) = x^2$



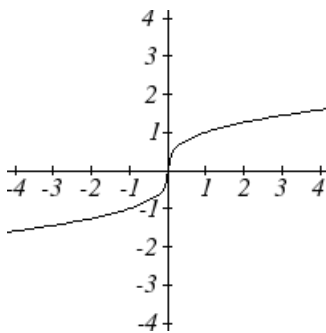
Cubic: $f(x) = x^3$



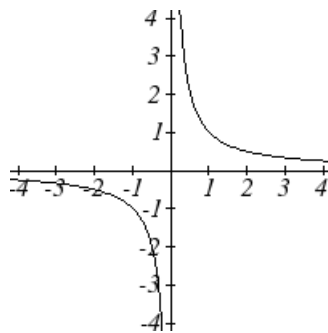
Square root: $f(x) = \sqrt{x}$



Cube root: $f(x) = \sqrt[3]{x}$



Reciprocal: $f(x) = \frac{1}{x}$



Reciprocal squared: $f(x) = \frac{1}{x^2}$

