

Lesson 3 – Basics of Functions – Day 2

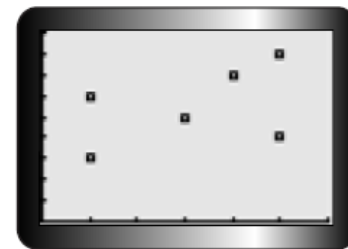
(A) Lesson Objectives

- Know what a relation, function, domain and range are.
- Find the domain and range of a relation.
- Identify if a relation is a function or not.
- Work with function notation & evaluating functions.
- Work with function notation in application based problems.

(B) Working with Functions and Relations

- Example 1

The scatter plot shows a relation. The marks on each axis indicate single units.



- State the domain and range of this relation.
- Draw an arrow diagram to illustrate the relation.
- Is this relation a function? Explain.

- Example 2

For each of the following, state

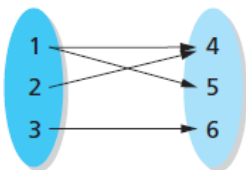
- the domain and range
- whether it defines a function or not, and justify your answer

(a) $\{(1, 2), (3, 1), (4, 2), (7, 2)\}$

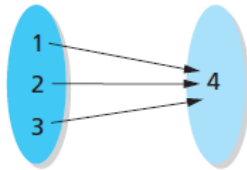
(b) $\{(1, 2), (1, 3), (4, 5), (6, 1)\}$

(c) $\{(1, 0), (0, 1), (2, 3), (3, 2)\}$

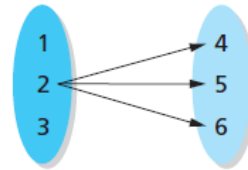
(d)



(e)



(f)



- Example 3

Consider the $\sqrt{\quad}$ key on your calculator. Recall that $\sqrt{\quad}$ means the positive square root.

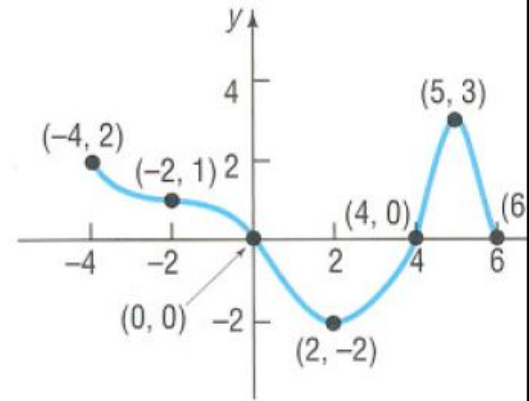
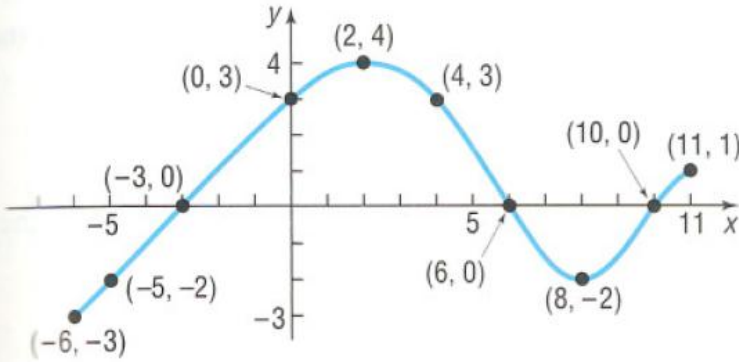
- What is the output if the input is 25?
- Does the output have more than one value for any input value?
- Why must this operation be a function? Explain.
- Are there any numbers that cannot be used as input?
- State the domain of this function.

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(C) Further Examples:

10. Use the given graph of the function f to answer parts (a)–(n).

Use the given graph of the function f to answer parts (a)–(n).



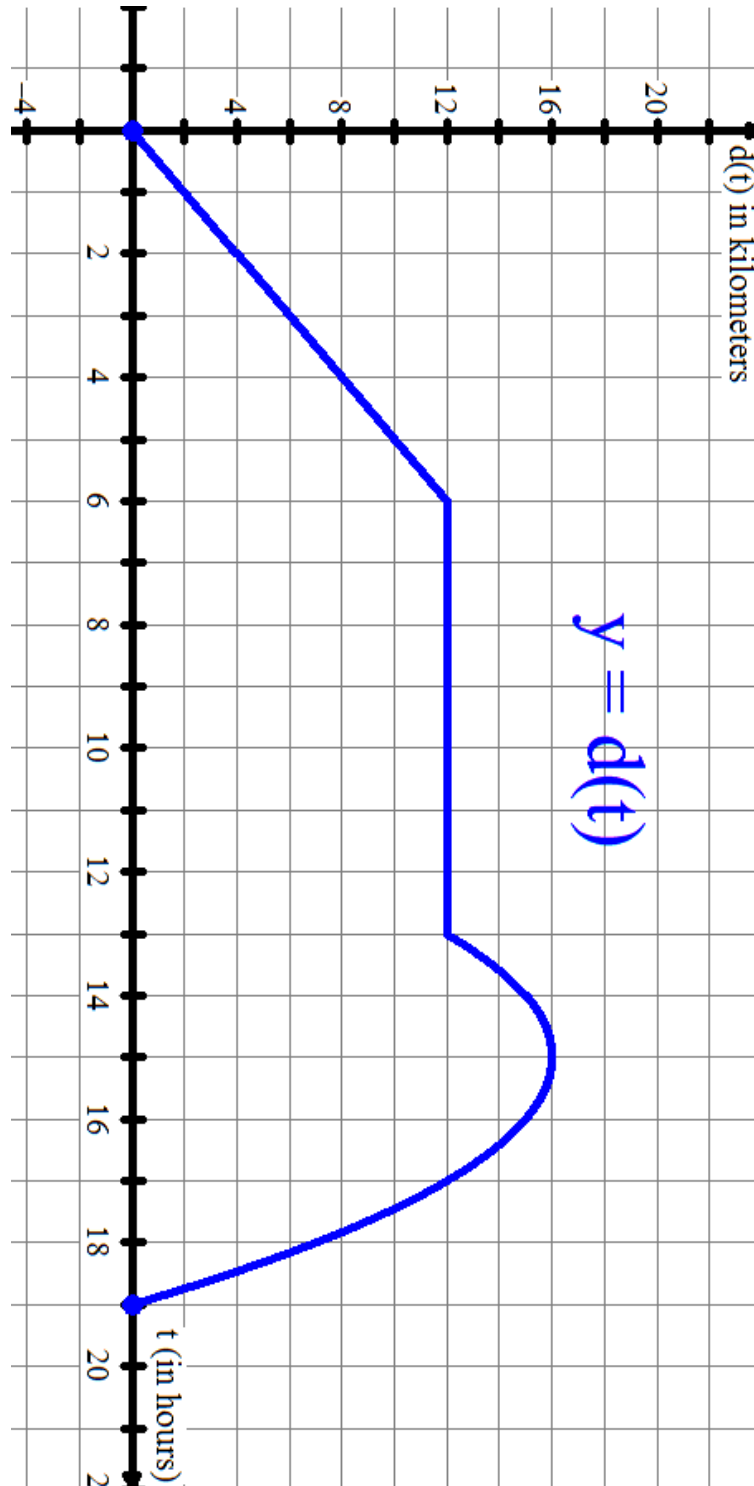
- (a) Find $f(0)$ and $f(-6)$.
- (b) Find $f(6)$ and $f(11)$.
- (c) Is $f(3)$ positive or negative?
- (d) Is $f(-4)$ positive or negative?
- (e) For what values of x is $f(x) = 0$?
- (f) For what values of x is $f(x) > 0$?
- (g) What is the domain of f ?
- (h) What is the range of f ?
- (i) What are the x -intercepts?
- (j) What is the y -intercept?
- (k) How often does the line $y = \frac{1}{2}$ intersect the graph?
- (l) How often does the line $x = 5$ intersect the graph?
- (m) For what values of x does $f(x) = 3$?
- (n) For what values of x does $f(x) = -2$?

- (a) Find $f(0)$ and $f(6)$.
- (b) Find $f(2)$ and $f(-2)$.
- (c) Is $f(3)$ positive or negative?
- (d) Is $f(-1)$ positive or negative?
- (e) For what values of x is $f(x) = 0$?
- (f) For what values of x is $f(x) < 0$?
- (g) What is the domain of f ?
- (h) What is the range of f ?
- (i) What are the x -intercepts?
- (j) What is the y -intercept?
- (k) How often does the line $y = -1$ intersect the graph?
- (l) How often does the line $x = 1$ intersect the graph?
- (m) For what value of x does $f(x) = 3$?
- (n) For what value of x does $f(x) = -2$?

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(D) Application of Functions

Mr. S. went camping with his son Andrew, and we go on a hike on our second day. Here is a function $y = d(t)$ which represents a Distance-Time graph for Mr. S's and Andrew's hike. The x axis (the independent variable) is time in hours since we left our campsite and the y-axis represents the distance from our campsite.



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- a. Evaluate $d(0)$ and interpret what this point represents. K,A
- b. Evaluate $d(5)$ and interpret what this point represents. K,A
- c. Evaluate $d(15)$ and interpret what this point represents. K,A

- d. For what values of t does $d(t) = 8$? Interpret your answer in the context of the problem. K,A
- e. For what values of t does $d(t) = 12$? Interpret your answer in the context of the problem. K,A
- f. For what values of t does $d(t) = 0$? Interpret your answer in the context of the problem. K,A

- g. For what values of t does $d(t) \geq 10$? Interpret your answer in the context of the problem. K,A
- h. For what values of t does $d(t) \leq 2$? Interpret your answer in the context of the problem. K,A

- i. What is the domain of the function $y = d(t)$? Interpret your answer in the context of the problem. K,A
- j. What is the range of the function $y = d(t)$? Interpret your answer in the context of the problem. K,A

- k. What is the slope of the function on the interval $0 < t < 6$? Interpret your answer in the context of the problem. K,A
- l. What is the slope of the function on the interval $6 < t < 13$? Interpret your answer in the context of the problem. K,A

- m. What is our average speed in the first 12 hours of our hike? A
- n. What is our average speed in the final 6 hours of our hike? A
- o. How far did we hike? A

- p. Write an equation that represents the first 13 hours of our hike. T
- q. Write an equation that represents the complete hiking trip. T

(E) HOMEWORK/Classwork → from [the Nelson 11, Chap 3.2 Lesson on pg235](#), complete Q5,6,8,9,11,18,20,21