pp. 116-117, #1-20 all, #23, #25, #31-34 all

1. yes; Each input has exactly one output.

2. no; The input 3 has two outputs, -8 and 6.

3. no; The input 2 has two outputs, 3 and 2.

4. yes; Each input has exactly one output.

5. no; The input 16 has two outputs, -2 and 2, and the input 1 has two outputs, -1 and 1.

6. yes; Each input has exactly one output.

7. yes; No vertical line can be drawn through more than one point on the graph.

8. no; Three vertical lines can be drawn through more than one point on the graph, including one through (2, 1) and (2, 5).

9. no; A vertical line can be drawn through more than one point on the graph, including one through (2, 2) and 2, 4).

10. yes; No vertical line can be drawn through more than one point on the graph.

11. Write the ordered pairs. Identify the inputs and outputs.
$(-2, -2), (-1, 0), (0, 2), (1, 0), (2, -2)$
The domain is $-2, -1, 0, 1$, and 2.
The range is $-2, 0$, and 2.

12. Write the ordered pairs. Identify the inputs and outputs.
$(-2, 3), (0, 3), (2, 3), (4, 3)$
The domain is $-2, 0, 2$, and 4.
The range is 3.

13. Identify the x- and y-values represented by the graph.
The domain is $-4 \leq x \leq 2$. The range is $2 \leq y \leq 6$.

14. Identify the x- and y-values represented by the graph.
The domain is $0.5 < x < 1.75$. The range is $0.25 < y < 1.5$.

15. The amount of time you have on a meter depends on the amount of quarters you put into the meter. So, the independent variable is the number of quarters and the dependent variable is the amount of time.

16. The amount of gasoline in a car's fuel tank depends on the amount of time spent driving. So, the independent variable is the time spent driving and the dependent variable is the amount of gasoline.

17. **a.** yes; The cost of the cell phone plan depends on the number of lines. So, the independent variable is the number of lines and the dependent variable is the cost.

b. The domain is 1, 2, 3, and 4.
The range is 30, 60, 90, and 120.

18. **a.** yes; The cost y of a taxi ride depends on the distance x in miles of the ride. So, y is the dependent variable and x is the independent variable.

b. The domain is $0 \leq x \leq 20$. If $x = 0$, then $y = 3.5(0) + 2.8 = 2.8$, and if $x = 20$, then $y = 35(20) + 2.8 = 72.8$. So, the range is $2.8 \leq y \leq 72.8$. So, if you have enough money to travel at most 20 miles in the taxi, then you will spend between \$2.80 and \$72.80 on your taxi ride.

19. *Sample answer:* A function can have the same output paired with more than one input, but a relation is not a function if the same input is paired with more than one output; The relation is a function. Each input is paired with exactly one output.

20. The output values should be used for the range. The relation is a function. The range is $6\frac{1}{2}$, $7\frac{1}{2}$, $8\frac{1}{2}$, and $9\frac{1}{2}$.

23. The graph has a y-value of 2 when the x-value is $x = -2$.

25. no; A vertical line does not represent a function.

31. true

32. false; *Sample answer:* A relation is not a function when an input value has more than one output value.

33. false; *Sample answer:* A function may have more than one output paired with the same input, and it is still a function, but if this is switched, then there will be at least one input paired with more than one output, and it will no longer be a function.

34. false; *Sample answer:* Because more than one input can be paired with the same output, the outputs could be selected from a finite list.