

TT 2. Possible Solutions

a. *Foundations and Pre-calculus Mathematics 10* (Pearson), questions 4, 8, and 12 on pages 270 to 272

4. The arrow diagrams in a) and c) represent functions, since those mappings have only one arrow originating out of each element of the domain. The arrow diagram in b) has multiple arrows originating out of the domain, so b) is not a function.

8. a) This relation is a function, since each x has only one corresponding y -value.

x	y
1	1
2	8
3	27
4	64

The domain is $\{1, 2, 3, 4\}$, and the range is $\{1, 8, 27, 64\}$

- 8.b) This relation is not a function, since 3 has four corresponding y -values.

x	y
3	4
3	5
3	6
3	7

12. The statement, "All functions are relations, but not all relations are functions" is true. Examples may vary. A sample example is given.

Set A = $\{(1, 9), (2, 10), (3, 11)\}$

Set B = $\{(1, 9), (1, 10), (2, 11)\}$

Both sets are relations as they can be expressed as ordered pairs. However, only Set A is a function. Set B has two range values for the domain value of 1.

TT 2.b. *Foundations and Pre-calculus Mathematics 10* (Pearson), questions 5, 6, and 8 on page 294

5. You can tell if a graph represents a function by drawing a vertical line at any place on the graph to see if the line crosses more than once. If the vertical line crosses a value more than once, it is not a function. Another option is to look at the domain and range elements. If any domain element has more than one range element, it is not a function.

- 6. a) This graph represents a function because drawing a vertical line at any place on the graph only intersects the graph once. Every domain element has only one range element.
- 6. b) This graph does not represent a function because drawing a vertical line at $x = 1$ intersects the line more than once. The domain element 1 has many range elements.
- 8. a) This graph represents a function because drawing a vertical line at any place on the graph only intersects the graph once. Every domain element has only one range element.

The domain is the all real numbers, and the range is all real numbers between and including 1 and 3.

- 8. b) This graph does not represent a function because drawing a vertical line at $x = 1$ intersects the line more than once. The domain element 1 has many range elements.
- 8. c) This graph does not represent a function because drawing a vertical line at $x = 5$ intersects the line twice. The domain element 5 has two range elements.
- 8. d) This graph represents a function because drawing a vertical line at any place on the graph only intersects the graph once. Every domain element has only one range element.

The domain is all real numbers greater than or equal to -2 , and the range is all real numbers between and including 2 and 4.

- 8. e) This graph does not represent a function because drawing a vertical line between $x = 0$ and $x = 2$ intersects the line twice. The domain elements between 0 and 2 have two range elements.