




Foundations of Mathematics and Pre-Calculus 10

Sample Questions for Relations and Functions

Instructions

1. You may require a protractor and a ruler (metric and imperial) for paper versions of the questions.
2. You may use math tiles.
3. When using your calculator (scientific or approved graphing calculator):
 - use the programmed value of π rather than the approximation of 3.14.
 - round only in the final step of the solution.
4. Diagrams are not necessarily drawn to scale.
5. For questions marked with , do not use your calculator.

PART A: MULTIPLE-CHOICE QUESTIONS



1. Determine the x -value of the point of intersection for the system represented by $f(x) = 3$ and $g(x) = \frac{5}{2}x + 1$.

- A. 0.8
- B. 1.6
- C. 5
- D. 8



2. In which quadrant does the following system contain a solution?

$$y = 2x + 1$$

$$y - 1 = \frac{1}{2}(x - 2)$$

- A. Quadrant I
- B. Quadrant II
- C. Quadrant III
- D. Quadrant IV

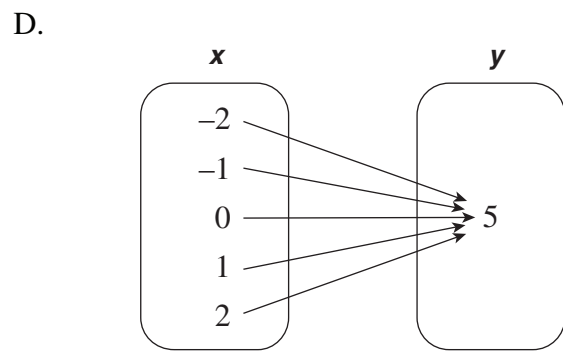
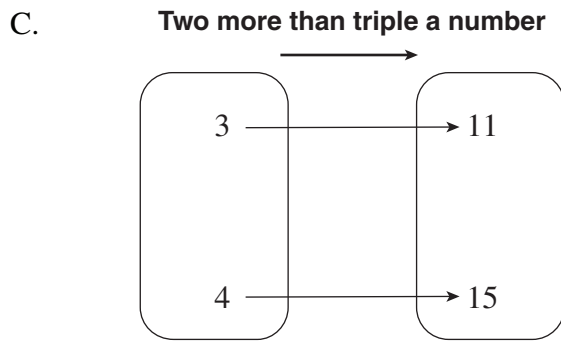
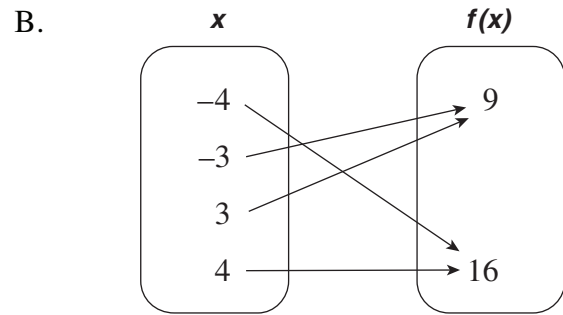
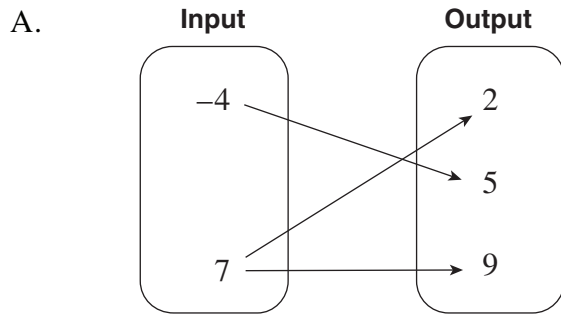
3. Determine the solution to the following linear system:

$$y = -2x + 5$$

$$4x + 2y - 15 = 0$$

- A. $(5, -5)$
- B. $(5, -2.5)$
- C. There is no solution.
- D. There are infinite solutions.

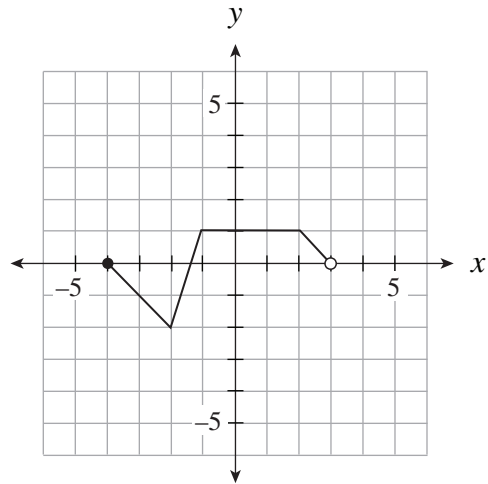
4. Which of the following relations is **not** a function?



5. The altitude of a plane is a function of the time since takeoff. Identify the dependent variable.

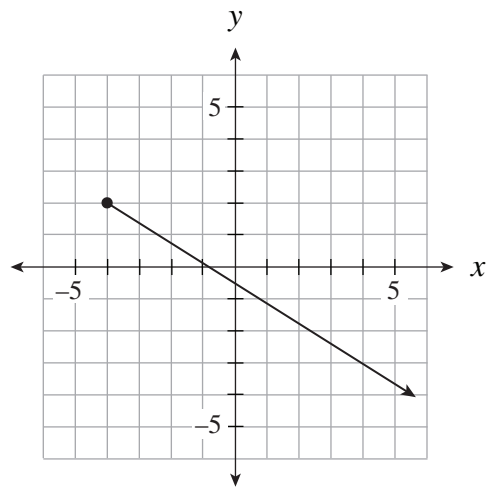
- A. time
- B. speed
- C. altitude
- D. acceleration

6. Determine the domain of the following relation.



- A. $(-4, 3)$
- B. $[-4, 3)$
- C. $(-4, 3]$
- D. $[-4, 3]$

7. Determine the range of the following relation.



- A. $(-\infty, \infty)$
- B. $(-\infty, 2]$
- C. $[-4, \infty)$
- D. $(2, \infty]$

8. A bag of caramel candies has a total mass of 180 g, excluding the mass of the bag. Each candy has a mass of 6 g. As a candy is taken out of the bag and eaten, the mass of the remaining candies is plotted versus how many candies are left in the bag. Determine the range for this relation.

- A. $\{0, 1, 2, 3, \dots, 30\}$
- B. $\{0, 6, 12, \dots, 180\}$
- C. $\{0, 1, 2, 3, 4, 5, 6\}$
- D. all real numbers

9. Determine the equation of the line that passes through $A(6, 0)$ and is perpendicular to the line formed by $B(-4, 9)$ and $C(-7, 10)$.

- A. $y = 3x - 18$
- B. $y = 3x + 18$
- C. $y = \frac{1}{3}x + 2$
- D. $y = \frac{1}{3}x - 2$

10. A boat took 3 hours to travel 24 km with the current. On the return trip, the boat took 5 hours to travel 24 km against the current. Determine the speed of the current.

- A. 1.6 km/h
- B. 4 km/h
- C. 6.4 km/h
- D. 24 km/h

PART B: NUMERIC-RESPONSE QUESTIONS

11. Two acid solutions are to be mixed together.

- Solution A is 30% acid by volume.
- Solution B is 70% acid by volume.

How much of solution A is needed to mix with solution B to make an 800 mL mixture that is 54% acid by volume? Answer to the nearest millilitre.

Record your answer neatly on the Answer Sheet.