1. Animals can be associated with the classes they are in.

Represent this relation:

   a) as a set of ordered pairs
   b) as an arrow diagram

| Animal | Class |
|--------|-------|
| ant | Insecta |
| eagle | Aves |
| snake | Reptilia |
| turtle | Reptilia |
| whale | Mammalia |

2.    For each relation below. Determine whether the relation is a function.
      Identify the domain and range of each relation that is a function.

   a) A relation that associates a number with a prime factor of the number:
   $\{(4, 2), (6, 2), (6, 3), (8, 2), (9, 3)\}$

   b)



   has this number of days

   January, February, March, April → 28, 30, 31
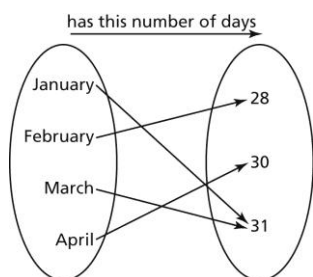
3. The table shows the costs of student bus tickets, $C$ dollars, for different numbers of tickets, $n$.

   a) Why is this relation also a function?
   b) Identify the independent variable and the dependent variable.
   c) Write the domain and range.

| Number of Tickets, $n$ | Cost, $C$ ($) |
|------------------------|----------------|
| 1 | 1.75 |
| 2 | 3.50 |
| 3 | 5.25 |
| 4 | 7.00 |
| 5 | 8.75 |

4. The equation $C = 25n + 1000$ represents the cost, $C$ dollars, for a feast following an Arctic sports competition, where $n$ is the number of people attending.

   a) Describe the function. Write the equation in function notation.
   b) Determine the value of $C(100)$. What does this number represent?
   c) Determine the value of $n$ when $C(n) = 5000$. What does this number represent?

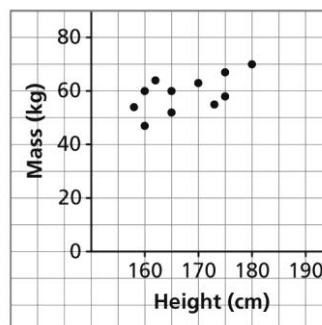5. Which of these graphs represents a function? Justify your answer.

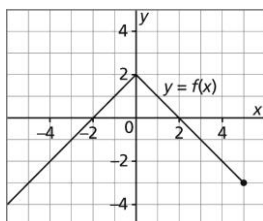   a)  **Outside Temperature over a 24-h Period**
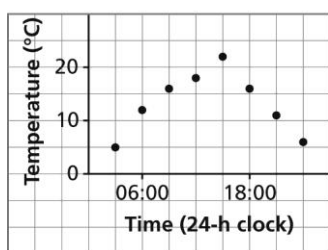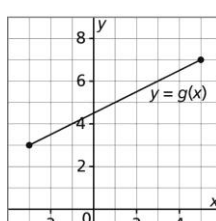
   

   b)  **Masses of Students against Height**

   

6.    Determine the domain and range of the graph of each function in set notation AND interval notation.
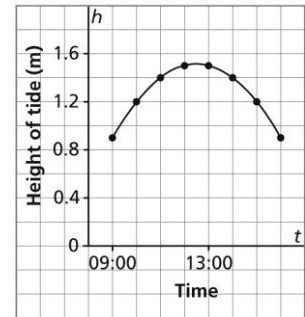
   a)

   

   $y = f(x)$

   b)

   

   $y = g(x)$

7. This graph shows the approximate height of the tide, $h$ metres, as a function of time, $t$, at Port Clements, Haida Gwaii on June 17, 2009.

**Height of Tide at Port Clements, June 17, 2009**



a) Identify the dependent variable and the independent variable.
b) Why are the points on the graph connected? Explain.
c) Determine the domain and range of the graph.

8. Which table of values represents a linear relation?

a) The relation between the number of bacteria in a culture, $n$, and time, $t$ minutes.

| $t$ | $n$ |
|---|---|
| 0 | 1 |
| 20 | 2 |
| 40 | 4 |
| 60 | 8 |
| 80 | 16 |
| 100 | 32 |

b) The relation between the amount of goods and services tax charged, $T$ dollars, and the amount of the purchase, $A$ dollars

| $A$ | $T$ |
|---|---|
| 60 | 3 |
| 120 | 6 |
| 180 | 9 |
| 240 | 12 |
| 300 | 15 |

9. a) Graph each equation.
   i) $x = -2$     ii) $y = x + 25$     iii) $y = 25$     iv) $y = x^2 + 25$
   b) Which equations in part a represent linear relations?

10. Which relation is linear?

a) A dogsled moves at an average speed of 10 km/h along a frozen river. The distance travelled is related to time.
b) The area of a square is related to the side length of the square.

11. This graph shows how the height of a burning candle changes with time.

**Height of a Burning Candle**



a) Write the coordinates of the points where the graph intersects the axes. Determine the vertical and horizontal intercepts. Describe what the points of intersection represent.
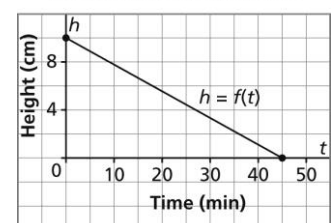
b) What are the domain and range of this function?

12. a) Sketch a graph of the linear function $f(x) = 4x - 3$.

b)   Which graph has a rate of change of $-5$ and a vertical intercept of 100?

a)


b)