

Math 1201 Final Exam Review
Relations and Functions

1. Animals can be associated with the classes they are in.
Represent this relation:

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

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

a) (ant, insecta)
(eagle, aves)
(snake, reptilia)
(turtle, reptilia)
(whale, mammalia)

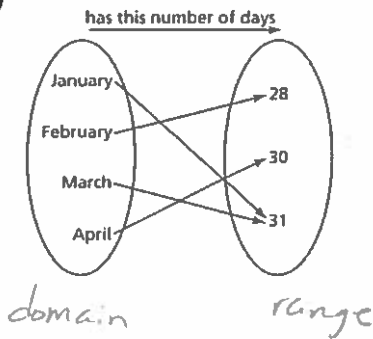
b) ant → insecta
eagle → aves
snake → reptilia
turtle → reptilia
whale → mammalia

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)}

not a function

b)



function

3. The table shows the costs of student bus tickets, C dollars, for different numbers of tickets, n .

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

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

a) each element of domain matches with 1 element of range

c) $D: \{1, 2, 3, 4, 5\}$

$R: \{1.75, 3.50, 5.25, 7.00, 8.75\}$

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?

a) flat rate \$1000
\$25 per person

b) $C(100) = 25(100) + 1000$
 $= 2500 + 1000$
 $= 3500$

for 100 people the cost is \$3500.

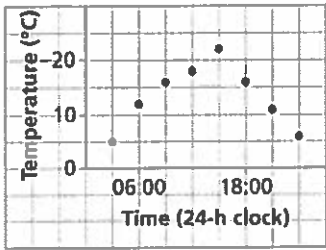
c) $25n + 1000 = 5000$
 $\quad -1000 \quad -1000$

 $\frac{25n}{25} = \frac{4000}{25}$
 $n = 160$

When the cost is \$5000 the number attending is 160 people

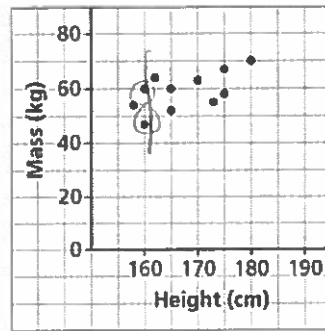
5. Which of these graphs represents a function? Justify your answer.

a) Outside Temperature over a 24-h Period



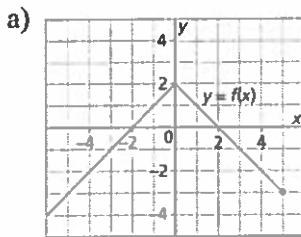
yes passes
the vertical
line test.

b) Masses of Students against Height

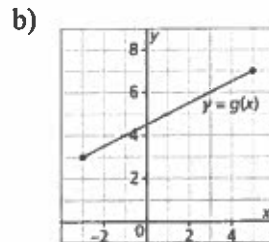


no, fails the
vertical line
test.

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



D: $\{x \mid x \leq 5, x \in \mathbb{R}\}$
 $(-\infty, 5]$
 R: $\{y \mid y \leq 2, y \in \mathbb{R}\}$
 $(-\infty, 2]$



D: $\{x \mid -3 \leq x \leq 5, x \in \mathbb{R}\}$
 $[-3, 5]$
 R: $\{y \mid 3 \leq y \leq 7, y \in \mathbb{R}\}$
 $[3, 7]$

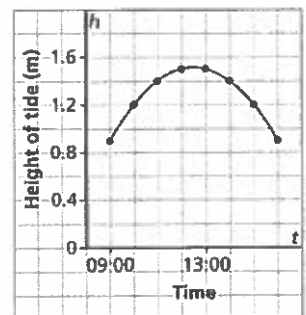
7. This graph shows the approximate height of the tide, h metres, as a function of time, t , at Port Clements, Haida Gwaii on June 17, 2009.

- 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.

b) data is continuous.

c) D: $[9:00, 16:00]$
 R: $[9, 15]$

Height of Tide at Port Clements, June 17, 2009



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

Handwritten notes: 20 C (next to each row), $+1$ (next to row 2), $+2$ (next to row 3), *not linear!*

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

Handwritten notes: 60 C (next to each row), $\times 3$ (next to each row)

Linear

9. a) Graph each equation.

i) $x = -2$

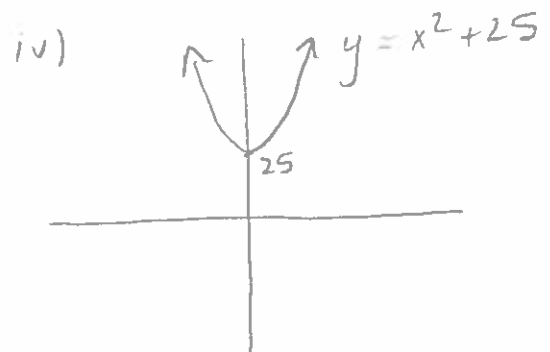
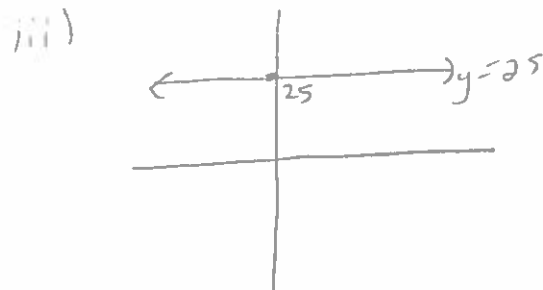
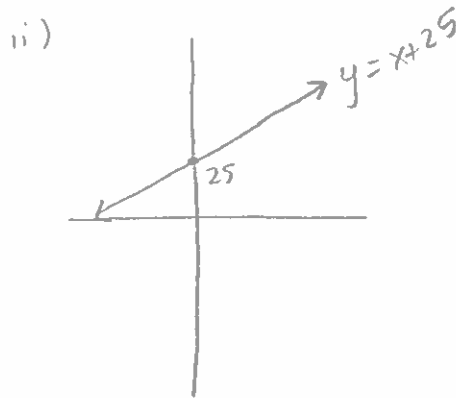
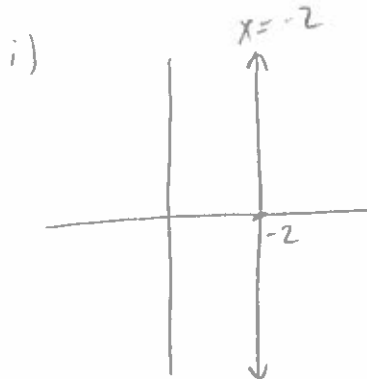
ii) $y = x + 25$

iii) $y = 25$

iv) $y = x^2 + 25$

b) Which equations in part a represent linear relations?

i ii iii



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.

a) linear $y = 10x$

b) not linear $a = s^2$

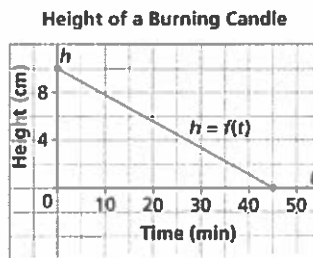
11. This graph shows how the height of a burning candle changes with time.

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?

vert $(0, 9)$ candle is originally 9cm
 hor $(45, 0)$ it takes 45 min to burn the whole candle.



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 ?

