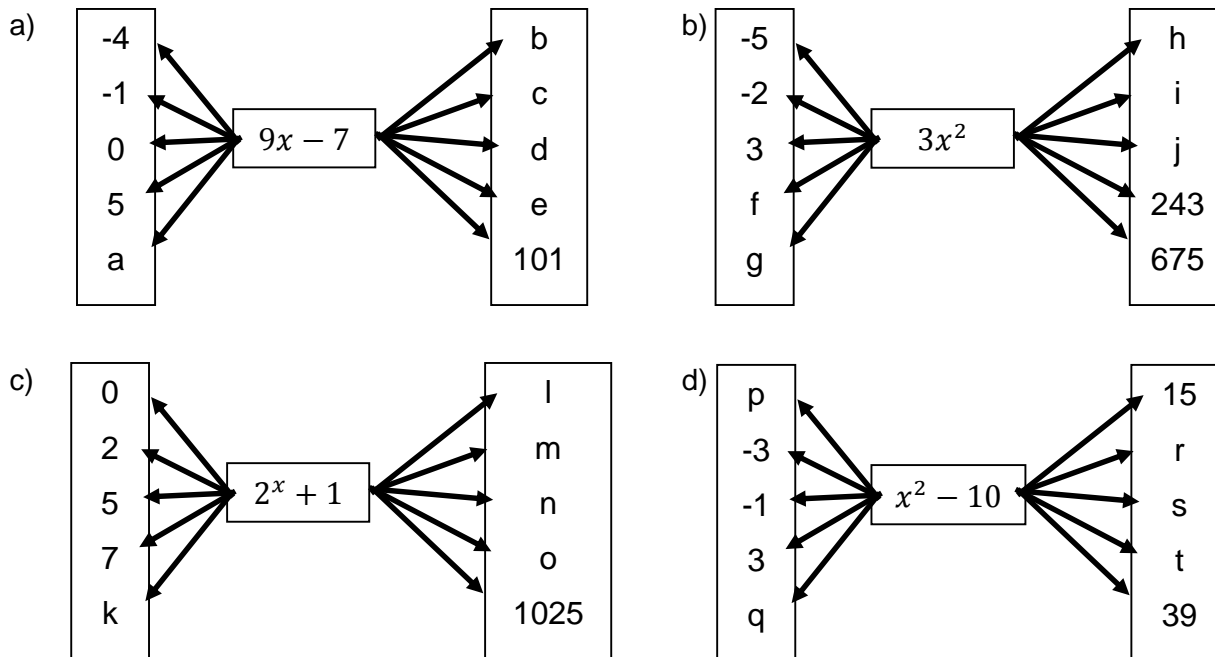# Worksheet 15: Functions and Relationships (Term 3)

Grade 9 Mathematics

1. Find the missing values for the following flow diagrams:

a)

b)

c)

d)

2. Complete the following tables by filling in the missing values and determine the rule for each table:

a)

x	-2	-1	0	1	2	3	5		
y	$\frac{3}{4}$	$1\frac{1}{2}$	3	6	12			768	24576

b)

x	-3	-1	0	1	3	6	12		
y	-1	$-\frac{1}{3}$	0	$\frac{1}{3}$	1			$5\frac{2}{3}$	$8\frac{1}{3}$

c)

x	-2	-1	0	1	2	4	6		
y	7	4	3	4	7			84	228

d)

x	0	1	2	3	4	5	8		
y	-1	0	7	26	63			728	1330

e)

x	-3	-2	-1	0	2	5	8		
y	14	11	8		-1			-28	-37

3. Use the formulae given to find the y value for each of the x values given.

a) $y = -4x + 3$ for $x = -5; \quad x = 0; \quad x = \frac{3}{4}; \quad x = 1; \quad x = 6 \text{ and } x = 20$

b) $y = 5x^2 - 10$ for $x = -4; \quad x = -1; \quad x = \sqrt{2}; \quad x = 3 \text{ and } x = 5$

c) $y = 2x^2 + 7x - 8$ for $x = -6; \quad x = -2; \quad x = 0; \quad x = 2 \text{ and } x = 7$

d) $y = \frac{16}{x}$ for $x = -8; \quad x = -4; \quad x = 0; \quad x = 1 \text{ and } x = 16$

e) $y = \frac{x}{2} + 1$ for $x = -16; \quad x = -4; \quad x = 0; \quad x = 3 \text{ and } x = 8$

4. Draw a Cartesian plane and plot the following coordinates onto the plane and then connect the points in the order you drew them.

A $(0; 0);$ B $(3; 1)$ C $\left(4\frac{1}{3}; 2\frac{2}{3}\right)$ D $\left(3\frac{1}{2}; 3\frac{1}{2}\right)$

E $\left(4\frac{2}{3}; 3\frac{1}{2}\right)$ F $\left(3\frac{1}{3}; 5\frac{1}{3}\right)$ G $\left(5\frac{1}{2}; 3\frac{1}{2}\right)$ H $\left(7\frac{1}{2}; 2\frac{2}{3}\right)$

I $\left(7; 2\frac{1}{4}\right)$ J $\left(5\frac{3}{4}; 2\frac{1}{4}\right)$ K $\left(4\frac{1}{2}; 0\right)$ L $\left(5\frac{1}{2}; 0\right)$

M $\left(3; -2\frac{2}{3}\right)$ N $\left(2; -2\frac{1}{2}\right)$ O $\left(2\frac{1}{2}; -2\right)$ P $(3; -2)$

Q $(4; -1)$ R $\left(1; -2\frac{1}{4}\right)$ S $\left(\frac{1}{2}; -2\right)$ T $\left(0; -2\frac{1}{2}\right)$

U $\left(-3\frac{3}{4}; -3\frac{3}{4}\right)$ V $\left(-7\frac{1}{2}; -6\right)$ W $(-7; -5)$ X $\left(-4\frac{1}{2}; -3\right)$

Y $\left(-2\frac{2}{3}; -1\frac{1}{2}\right)$ Z $\left(-3; -1\frac{1}{3}\right)$ AA $\left(-5; -\frac{1}{2}\right)$ AB $\left(-2\frac{1}{2}; -\frac{3}{4}\right)$
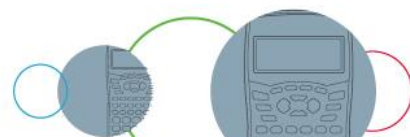
5.   Use the given coordinates to find the equation of the straight line graphs passing through them.

   a)   (16; 5) and (7; 2)   b)   (21; 3) and (-5; 13)

   c)   (5; -1) and (-3; 8)   d) $\left(-\frac{1}{2}; 8\right)$ and (-6; -3)

   e) $\left(2\frac{2}{3}; 6\right)$ and $\left(\frac{1}{3}; -3\right)$

6.   For each of the graphs in question 5, find the equation parallel to the graph and passing through the point:

   a)   (3; 8)   b)   (-13; 3)

   c)   (4; -9)   d) $\left(1\frac{4}{5}; 2\right)$

   e) $\left(2\frac{2}{3}; -2\right)$

7.   For each of the graphs in question 5, find the equation of the straight line perpendicular to the graph and passing through the point:

   a)   (16; 5)   b)   (2; 4)

   c) $\left(-4; \frac{1}{4}\right)$ d)   (1; -1)

   e)   (2; 3)

8.   For each of the matching equations in questions 5, 6 and 7, draw the straight line graphs on their own Cartesian plane, for example draw 5a), 6a) and 7a) on the same Cartesian plane and draw 5b), 6b) and 7b) on a different Cartesian plane.

9.   What do you notice about the three graphs on each Cartesian plane in question 8?

10.   a)   On the same Cartesian plane draw the graphs y = 4 and x = 4.

      b)   What is the gradient for each graph?

      c)   What do you notice about these two graphs?