

# SHARP

## Worksheet 21 memorandum: Functions and Relationships Grade 8 Mathematics

1) Use the given equation to determine the output values in the table below:

a)  $y = 3(-2 - 4)$   
 $y = -18$

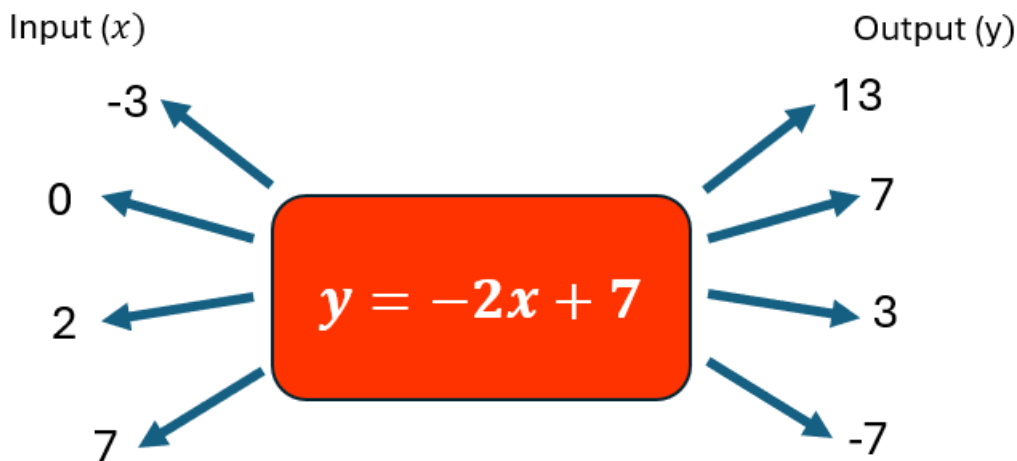
b)  $y = 3(-1 - 4)$   
 $y = -15$

c)  $y = 3(0 - 4)$   
 $y = -12$

d)  $y = 3(1 - 4)$   
 $y = -9$

e)  $y = 3(2 - 4)$   
 $y = -6$

2) Use the given equation to determine the output values in the spider diagram below:



3) The equation  $\frac{n}{2} + 3$  is given. If the input values are  $\{-4; 0; 1; 2; 6\}$ . Determine the output values.

a)  $y = \frac{-4}{2} + 3$   
 $y = 1$

b)  $y = \frac{0}{2} + 3$   
 $y = 3$

c)  $y = \frac{1}{2} + 3$   
 $y = 3,5$

d)  $y = \frac{2}{2} + 3$   
 $y = 4$

e)  $y = \frac{6}{2} + 3$   
 $y = 6$

4) The equation  $2x^2 - 8$  is given. If the input values are  $\{-4; -2; 0; 2; 4; 6\}$ . Determine the output values.

a)  $y = 2(-4)^2 - 8$   
 $y = 24$

b)  $y = 2(-2)^2 - 8$   
 $y = 0$

c)  $y = 2(0)^2 - 8$   
 $y = -8$

d)  $y = 2(2)^2 - 8$   
 $y = 0$

e)  $y = 2(4)^2 - 8$   
 $y = 24$

f)  $y = 2(6)^2 - 8$   
 $y = 64$

5) The following output values are given. Use inverse operations to determine the input values in the table below.

a)  $-26 = 5x - 6$   
 $-20 = 5x$   
 $-4 = x$

b)  $-11 = 5x - 6$   
 $-5 = 5x$   
 $-1 = x$

c)  $9 = 5x - 6$   
 $15 = 5x$   
 $3 = x$

d)  $34 = 5x - 6$   
 $40 = 5x$   
 $8 = x$

e)  $44 = 5x - 6$   
 $50 = 5x$   
 $10 = x$

6) The equation  $y = -2x - 5$  is given. If the output values are  $\{5; -1; -5; -11; -13\}$ . Determine the input values.

a)  $5 = -2x - 5$   
 $10 = -2x$   
 $\frac{10}{-2} = x$   
 $-5 = x$

b)  $-1 = -2x - 5$   
 $4 = -2x$   
 $\frac{4}{-2} = x$   
 $-2 = x$

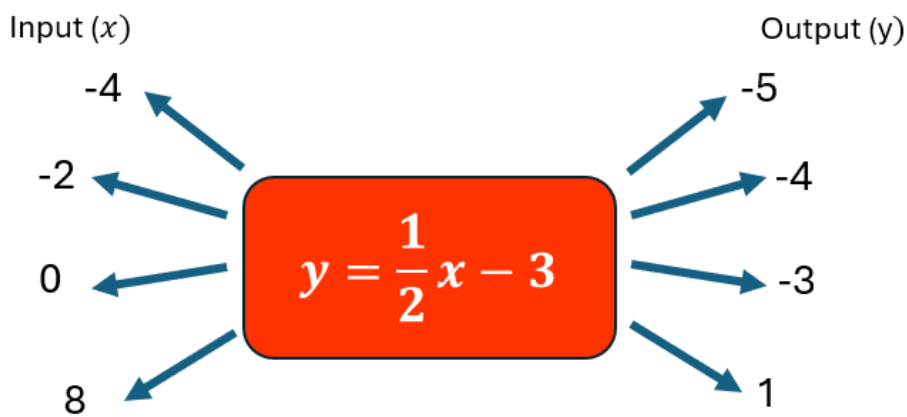
c)  $-5 = -2x - 5$   
 $0 = -2x$   
 $\frac{0}{-2} = x$   
 $0 = x$

$$\begin{aligned} \text{d) } -11 &= -2x - 5 \\ -6 &= -2x \\ -6 & \\ \frac{-6}{-2} &= x \\ 3 &= x \end{aligned}$$

$$\begin{aligned} \text{e) } -13 &= -2x - 5 \\ -8 &= -2x \\ -8 & \\ \frac{-8}{-2} &= x \\ 4 &= x \end{aligned}$$

Therefore, the input values are:  $\{-5; -2; 0; 3; 4\}$ .

7) Determine in the missing values in the spider diagram below:



$$\begin{aligned} \text{a) } -5 &= \frac{1}{2}x - 3 \\ -2 &= \frac{1}{2}x \\ -2 \times 2 &= x \\ -4 &= x \end{aligned}$$

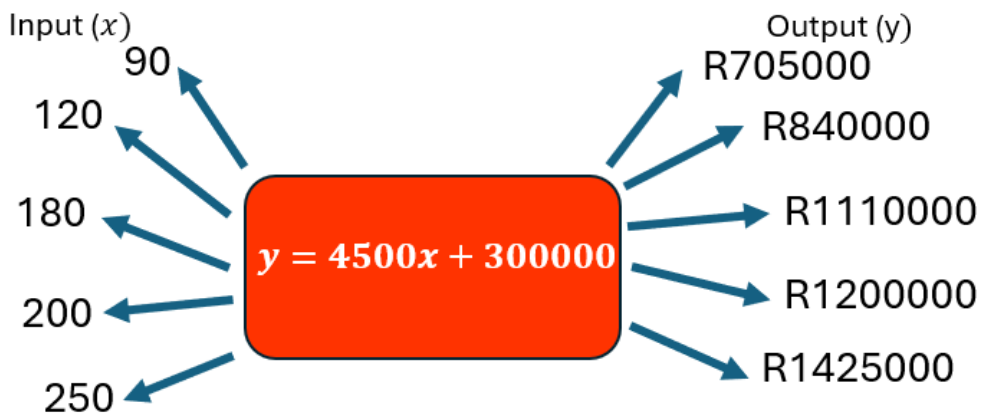
$$\begin{aligned} \text{b) } -4 &= \frac{1}{2}x - 3 \\ -1 &= \frac{1}{2}x \\ -1 \times 2 &= x \\ -2 &= x \end{aligned}$$

$$\begin{aligned} \text{c) } -3 &= \frac{1}{2}x - 3 \\ 0 &= \frac{1}{2}x \\ 0 \times 2 &= x \\ 0 &= x \end{aligned}$$

$$\begin{aligned} \text{d) } 1 &= \frac{1}{2}x - 3 \\ 4 &= \frac{1}{2}x \\ 4 \times 2 &= x \\ 8 &= x \end{aligned}$$

- 8) A new housing development in your area displays the following data. An empty stand costs R300 000. Represent the data below as a flow diagram. Make sure to include the equation.

Floor Space in m <sup>2</sup>	90	120	180	200	250
Total cost of house including stand.	R705000	R840000	R1110000	R1200000	R1425000



- 9) Determine the equation for the spider diagram below:

In number patterns, you learnt about the following formula  $T_n = d \times n + c$ . The constant difference is 2 and the value of the output is 6 when the input is zero. Therefore, the equation is  $T_n = 2n + 6$ . We can also use the formula  $T_n = a + (n - 1)d$ . The constant difference is 2 and the output is 8 when the input is 1.

- 10) Determine the equation for the table below.

The constant difference:

$$\begin{aligned} T_2 - T_1 &= T_3 - T_2 \\ 3,75 - 3,5 &= 4 - 3,75 \\ 0,25 &= 0,25 \end{aligned}$$

When  $x = 0$ ;  $y = 4$  (The constant) Therefore, the equation is:  $y = 0,25x + 4$