

SHARP

Worksheet 22 Memorandum: Algebraic Equations (Term 4) Grade 8

Question 1:

Word sums involving area and perimeter.

a) $60\text{cm}^2 = 12 \times b$

$$\frac{60}{12} = b$$

$$5\text{cm} = b$$

b) $x^2 = 2070,25\text{mm}^2$

$$x = \sqrt{2070,25}$$

$$x = 45,5\text{mm}$$

c) $125\text{cm}^2 = \frac{1}{2}(25\text{cm} \times h)$

$$250 = 25 \times h$$

$$10\text{cm} = h$$

d) $56\text{m} = 2l + 2b$

$$56 = 2(3x) + 2(x)$$

let the breadth = x and the length = $3x$

$$56 = 6x + 2x$$

$$56 = 8x$$

$$\frac{56}{8} = x$$

$$7\text{cm} = x$$

The longest side is $3x = 3(7\text{cm}) = 21\text{cm}$ (length)

The shorter side is $x = 7\text{cm}$ (breadth)

e) $\text{Perimeter} = 4 \times \text{length}$

$$\frac{672\text{m}}{6} = 4l$$

$$112\text{m} = 4l$$

$$\frac{112}{4} = l$$

$$28\text{m} = l$$

Question 2:

BMI (Body Mass Index) is a method of measuring the amount of body fat a person has by looking at the ratio of your height to your weight. The formula is:

$$BMI = \frac{\text{Weight in kg}}{(\text{Height in meters})^2}$$

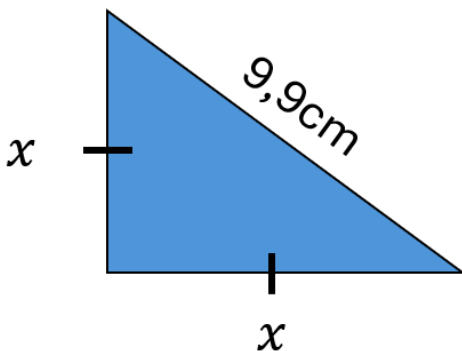
$$25,38 = \frac{\text{Weight in kg}}{(1,83\text{m})^2}$$

$$25,38 = \frac{\text{Weight in kg}}{3,3489}$$

$$25,38(3,3489) = \text{Weight in kg}$$

$$84,995 \dots \approx 85\text{kg's}$$

Question 3:



$$a^2 + b^2 = c^2$$

$$x^2 + x^2 = (9,9)^2$$

$$2x^2 = 98,01$$

$$x^2 = 49,005$$

$$x = \sqrt{49,005}$$

$$x = 7,0003 \dots \approx 7\text{cm}$$

Question 4:

The equation for a straight line is given: $y = -2x + 3$

Use the equation to complete the coordinates in the table below:

x	-3	-1	4	7	10	12
y	9	5	-5	-11	-17	-21

a) $y = -2(-3) + 3$
 $y = 6 + 3$
 $y = 9$

$$\begin{aligned} \text{b) } 5 &= -2x + 3 \\ 5 - 3 &= -2x \\ 2 &= -2x \\ -1 &= x \end{aligned}$$

$$\begin{aligned} \text{c) } y &= -2(4) + 3 \\ y &= -8 + 3 \\ y &= -5 \end{aligned}$$

$$\begin{aligned} \text{d) } y &= -2(7) + 3 \\ y &= -14 + 3 \\ y &= -11 \end{aligned}$$

$$\begin{aligned} \text{e) } -17 &= -2x + 3 \\ -17 - 3 &= -2x \\ -20 &= -2x \\ 10 &= x \end{aligned}$$

$$\begin{aligned} \text{f) } y &= -2(12) + 3 \\ y &= -24 + 3 \\ y &= -21 \end{aligned}$$

Question 5:

Complete the table below for x and y values for the equation: $y = x^2 - 4$

x	-4	-2	3	5	10
y	12	0	5	21	96

$$\begin{aligned} \text{a) } y &= (-4)^2 - 4 \\ y &= 16 - 4 \\ y &= 12 \end{aligned}$$

$$\begin{aligned} \text{b) } y &= (-2)^2 - 4 \\ y &= 4 - 4 \\ y &= 0 \end{aligned}$$

$$\begin{aligned} \text{c) } 5 &= x^2 - 4 \\ 5 + 4 &= x^2 \\ 9 &= x^2 \\ \pm 3 &= x \end{aligned}$$

$$\begin{aligned} \text{d) } 21 &= x^2 - 4 \\ 21 + 4 &= x^2 \\ 25 &= x^2 \\ \pm 5 &= x \end{aligned}$$

$$\begin{aligned} \text{e) } y &= (10)^2 - 4 \\ y &= 100 - 4 \\ y &= 96 \end{aligned}$$

Question 6:

Evaluate the expression if:

$$a = -2; b = 3 \text{ and } c = 5$$

$$\begin{aligned} \text{a) } a^2 - b & \\ &= (-2)^2 - 3 \\ &= 4 - 3 \\ &= 1 \end{aligned}$$

$$\begin{aligned} \text{b) } -2(a)^2 + b - 2c & \\ &= -2(-2)^2 + 3 - 2(5) \\ &= -8 + 3 - 10 \\ &= -15 \end{aligned}$$

$$\begin{aligned} \text{c) } a^3 \times 2b \times c & \\ &= (-2)^3 \times 2(3) \times 5 \\ &= -8 \times 6 \times 5 \\ &= -240 \end{aligned}$$

$$\begin{aligned} \text{d) } a.a.a.(b + b).c & \\ &= (-2)(-2)(-2)(3 + 3)(5) \\ &= (-8)(6)(5) \\ &= -240 \end{aligned}$$

$$\begin{aligned} \text{e) } -c^2 - a^2 + b & \\ &= -(5)^2 - (-2)^2 + 3 \\ &= -25 - 4 + 3 \\ &= -26 \end{aligned}$$

Question 7:

Solve the following equations:

$$\begin{aligned} \text{a) } 3x - 5 &= 16 \\ 3x &= 16 + 5 \\ 3x &= 21 \\ x &= 7 \end{aligned}$$

$$\begin{aligned} \text{b) } 2x - 4 &= 3x + 5 \\ -4 - 5 &= 3x - 2x \\ -9 &= x \end{aligned}$$

$$\begin{aligned} \text{c) } 5x - 3(2x + 1) &= 6 \\ 5x - 6x - 3 &= 6 \\ -x &= 6 + 3 \\ -x &= 9 \\ x &= -9 \end{aligned}$$

$$\begin{aligned} \text{d) } \frac{x}{3} + 4 &= 10 \\ \frac{x}{3} &= 6 \\ x &= 18 \end{aligned}$$

$$\begin{aligned} \text{e) } 2(x + 3) &= 18 \\ 2x + 6 &= 18 \\ 2x &= 12 \\ x &= 6 \end{aligned}$$

$$\begin{aligned} \text{f) } 4x - 5 - x &= 10 \\ 3x &= 15 \\ x &= 5 \end{aligned}$$

$$\begin{aligned} \text{g) } 7(x - 2) &= 3(2x + 1) \\ 7x - 14 &= 6x + 3 \\ x &= 3 + 14 \\ x &= 17 \end{aligned}$$

$$\begin{aligned} \text{h) } \frac{2x+1}{5} &= 3 \\ 2x + 1 &= 15 \\ 2x &= 14 \\ x &= 7 \end{aligned}$$

Question 8:

Develop algebraic equations to solve the following word problems:

$$\begin{aligned} \text{a) } 130 &= 50 + 2x \\ 130 - 50 &= 2x \\ 80 &= 2x \\ 40 &= x \end{aligned}$$

She spent 40 minutes on the phone in that month.

$$\begin{aligned} \text{b) } x + x + 20 + x + 40 &= 180 \\ 3x + 60 &= 180 \\ 3x &= 120 \\ 40 = x \text{ Book 1} &= \text{R}40,00 \text{ Book 2} = \text{R}60,00 \text{ and Book 3} = \text{R}80,00 \end{aligned}$$