BASIC MATHEMATICS.

FORM TWO MARKING SCHEME.

1. (a) $295,931 + 3,846 = 299,777$

Two hundred and ninety-nine thousand, seven hundred and seventy seven (05)

(b). 6°C (05)

2. (a) Your class

$\frac{5}{20} = \frac{1}{4}$

Another class

$\frac{8}{32} = \frac{4}{16} = \frac{2}{8} = \frac{1}{4}$

All of us does a better job. (05)

(b). $100\% - 37.5\% - 28.75\% - 15\% = 18.75\%$

As decimal

$\frac{18.75}{100} = \frac{1875}{10000}$

$= 0.1875.$ (05)

3. a). i). $\sqrt{75} \div \sqrt{12} = \frac{\sqrt{75}}{\sqrt{12}}$ (divisor and dividend in the fraction form)

$= \sqrt{\frac{75}{12}}$ (divisor and dividend have the same root).

$= \sqrt{\frac{25}{4}}$

$= \frac{5}{2}$ (02)

ii). $5\sqrt{\frac{18}{50}} = 5 \times \sqrt{\frac{18}{50}}$

$= 5 \times \frac{\sqrt{18}}{\sqrt{50}}$

$= 5 \times \frac{3\sqrt{2}}{5\sqrt{2}}$

$= 5 \times \frac{3 \times \sqrt{2}}{5 \times \sqrt{2}}$

$= 3.$ (02)

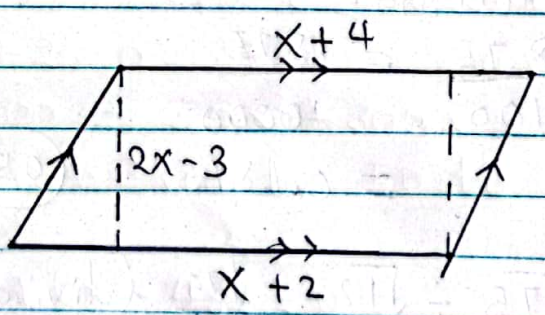
iii). $\frac{6\sqrt{5} \times 2\sqrt{3}}{\sqrt{20} \times 3\sqrt{12}} = \frac{6\sqrt{5} \times 2\sqrt{3}}{\sqrt{(4\times5)} \times 3(\sqrt{(4\times3)}}$

$= \frac{6\sqrt{5} \times 2\sqrt{3}}{2\sqrt{5} \times 3 \times 2\sqrt{3}}$

$= \frac{3}{3}$

$= 1.$ (03)

b).



(01)

$A = \frac{1}{2}(a+b)h$

$= \frac{1}{2}(x - 2 + x + 4)(2x - 3).$

$= \frac{1}{2}(2x + 6)(2x - 3)$

$= \frac{1}{2}(4x^2 - 6x + 12x - 18)$.

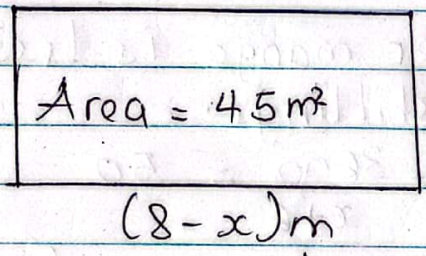
$= \frac{1}{2}(4x^2 + 6x - 18)$

$= (2x^2 + 3x - 9)$. (02)

∴ Area $= (2x^2 + 3x - 9)$ square Units.

4 a) Let x metres represent the added Length. Then, the sides of the rectangular garden will be:

Width $= (6+x)$ m and Length $= (8-x)$ as shown in following fugure:



(01)

Area of the new rectangular garden is given by: $(8-x)(6+x) = 45$

$(8-x)(6-x) = 45$

$48 - 8x - 6x - x^2 = 45$

$x^2 - 2x - 3 = 0$

$x^2 - 3x + x - 3 = 0$.

$x(x-3) + 1(x-3) = 0$.

$(x-3)(x+1) = 0$.

$x - 3 = 0$ and $x + 1 = 0$.

$x = 3$ and $x = -1$.

But Length cannot be negative

Hence $x = -1$ is rejected

Therefore, $x = 3$ metres.

Verifying: New width = (6+3) metres
= 9 metres.
New Length = (8-3) metres = 5 metres.
Therefore, area = 9 metres x 5 metres
= 45 square metres. (04)

b). Let x represent the number of mangoes bought. Then the price of each mango was $\frac{3600}{x}$ shillings. Six more mangoes correspond to $(x+6)$ mangoes.
Therefore, each mango would cost $\frac{3600}{x+6}$ (01)

This price per mango is less than the previous one by 50 shillings.
Then, $\frac{3600}{x} - \frac{3600}{x+6} = 50$

$3600(x+6) - 3600x = 50x(x+6)$.
$3600x + 21600 - 3600x = 50x^2 + 300x$
$21600 = 50x^2 + 300x$.
Divide each term by 50 to obtain the following:
$x^2 + 6x - 432 = 0$.
$(x-18)(x+24) = 0$.
$x - 18 = 0$ and $x + 24 = 0$.
$x = 18$ and $x = -24$.
Therefore, the number of mangoes bought was 18 because it is impossible to have a negative number of mangoes. (04)

Checking: With 18 mangoes each costs 200 shillings. Six more mangoes each costs 150 shillings.

The difference is (200 − 150) shillings
= 50 shillings

∴ 18 mangoes.

5. a).

$$\begin{cases} \frac{1}{3}x + \frac{1}{2}y = 0 \quad \text{——(i)} \\ \frac{1}{2}x + \frac{1}{3}y = \frac{5}{6} \quad \text{——(ii)} \end{cases}$$

By combination method.

$$\begin{cases} 2x + 3y = 0 \quad \text{—— (iii)} \\ 3x + 2y = 5 \quad \text{—— (iv)} \end{cases}$$ (01)

Eliminate x to get y.

$$3\begin{cases} 2x + 3y = 0 \\ 2\begin{cases} 3x + 2y = 5 \end{cases} \end{cases}$$

$$-\begin{cases} 6x + 9y = 0 \\ 6x + 4y = 10 \end{cases}$$

$$\frac{5y}{5} = \frac{-10}{5}$$

$$y = -2 \quad (02)$$

Substitute the value of y into eqn (ii)

$$2x + 3y = 0$$
$$2x + 3(-2) = 0$$
$$2x - 6 = 0$$
$$\frac{2x}{2} = \frac{6}{2}$$
$$x = 3$$

$\therefore x = 3, \; y = 2$ (02)

(b) Let the price of a tie be x Tanzanian shillings.
Let the price of a shirt be y Tanzanian shillings.
Thus,

$$\begin{cases} 83,000 - (2x + 2y) = 9\,000 & (1) \\ 83\,000 - (x + 3y) = 0 & (2) \end{cases}$$

Rearranging the equations (1) and (2) gives,

$$\begin{cases} 2x + 2y = 74\,000 & (3) \\ x + 3y = 83\,000 & (4) \end{cases} \quad (01)$$

Use any method to solve equations (3) and (4). In this case, substitution method is used.
Using equation (4); express x in terms of y as follows:

$$x = 83\,000 - 3y \quad (01)$$

Substituting equation (5) into equation (3), we have,

$$2(83\,000 + 3y) + 2y = 74\,000$$
$$166\,000 - 6y + 2y = 74\,000$$
$$-4y = 74\,000 - 166\,000$$
$$-4y = -92\,000$$

$$y = \frac{-92\,000}{-4}$$

Hence, $y = 23000$ (01)

Substitute $y = 23\,000$ into (5) to obtain the value of x, that is,

$x = 83\,000 - (3 \times 23\,000)$

$x = 83\,000 - 69\,000 = 14\,000.$

Hence, $x = 14\,000$.

Substitute Therefore, the price of each tie is 14 000 Tanzanian shillings and the price of each shirt is 23 000 Tanzanian shillings (02)

6 (a) Solution

$2y - 5 < 11$

$2y - 5 + 5 < 11 + 5$ (Add 5 to both sides)

$2y < 16$

$\frac{2y}{2} < \frac{16}{2}$

$y < 8$ (05)

(b) Let x be the minimum score in the second Test for her to pass the examination. This implies that, the average of the scores in the two tests should be greater or equal to 61

Thus,

$\frac{1}{2}(54 + x) \geq 61$

$27 + \frac{1}{2}x \geq 61$

$\frac{1}{2}x + 27 - 27 \geq 61 - 27$

$\frac{1}{2}x \geq 34$

$2\left(\frac{1}{2}x \geq 34\right)$

$x \geq 68.$

Therefore, the lowest possible marks that Nivian should obtain in the second test in order for her to pass the examination 68. (05)

7 (a) Let the money he had at first be x.

If $\frac{x}{4}$ of his money was used in one shop, he remained with $\frac{3x}{4}$ of the total amount

The money used in another shop $\frac{7}{8} \times \frac{3x}{4} = \frac{21x}{32}$

The fraction that remained is $x - \frac{x}{4} - \frac{21x}{32} \Rightarrow \frac{32x - 8x - 21x}{32} = \frac{3x}{32}$

This fraction is equivalent to Tsh. 9000.

$\frac{3x}{32} = 9000$ (05)

(b) let x be the buying price.

$x = 100\%$

Tsh $480 = 113\frac{1}{3}\%$

$\frac{\text{Sh } 480 \times 100}{133\frac{1}{3}}$

Buying price = Tsh 460

Loss made = 360 - 288 = 72

Percentage loss = $\frac{\text{Loss made}}{\text{Buying price}} \times 100\% = \frac{72}{360} \times 100\% = 20\%$ (05)

8 (a) Let $y = 0.2\dot{5} = 0.255\ldots$

$10y = 2.\dot{5}$

$100y = 25.5$

$90y = 23$

$y = 23/90 = 2.3/9$

Thus, $2.5 = 23/90$ (05)

(b) For two similar triangles:

$$\left[\frac{\text{Side of } \Delta 1}{\text{Side of } \Delta 2}\right] = \frac{\text{Area of } \Delta 1}{\text{Area of } \Delta 2}$$

$$\left[\frac{\text{Side of } \Delta 1}{\text{Side of } \Delta 2}\right]^2 = \frac{1}{4}$$

or $\dfrac{\text{Side of } \Delta 1}{\text{Side of } \Delta 2} = \dfrac{1}{2}$

The ratio of their corresponding sides will be 1:2 (05)

9 (a) Slope $m = \dfrac{5-(-1)}{-3-0} = \dfrac{6}{3} = -2$

The equation of the line is:

$$\frac{y-(-1)}{x-0} = -2$$

$y + 1 = -2x$

$y = -2x - 1$

x-intercept, put $y = 0$

This is the x-intercept (05)

(b) Let amount divided be m. The difference between largest and smallest share is:

$$\frac{5}{10}m - \frac{2}{10}m = \frac{3}{10}m$$

But $\frac{3}{10}$ m = 7500

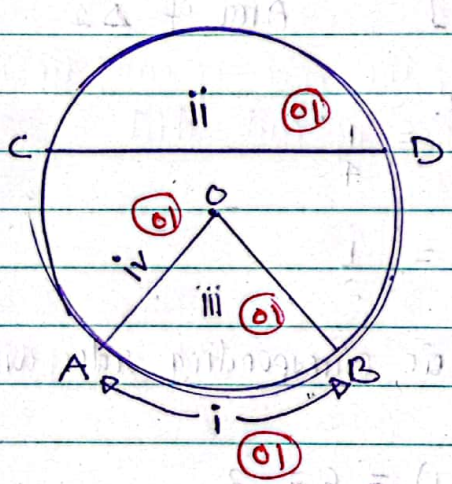
$$m = \frac{7500 \times 10}{3} = 25\,000$$

Hence the largest share

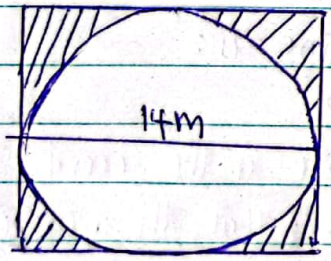
$$= \frac{5}{10} \times 25000$$

$$= \text{Tsh } 12,500$$ (05)

10 (a)



(b)



i) Area $= \frac{\pi d^2}{4}$

$= \frac{22}{7} \times \frac{14m \times 14m}{4}$

$= 154 m^2$

∴ Area of the formed circular carpet is $154m^2$ (03)

ii) $(14 \times 14)m^2 - 154m^2$

$196m^2 - 154m^2$

$42m^2$

∴ the area of the remaining part of the carpet is $42m^2$ (03)

Msaki. B