CHRISTIAN SOCIAL SERVICES COMMISSION

CSSC – SOUTHERN ZONE, FORM TWO JOINT EXAMINATION 2024

MARKING GUIDE

041 BASIC MATHEMATICS

1. (a) The solution is the GCF of 100 and 140 which is 20

$\therefore$ They did so 20 times

(b) Given $a = 0.\dot{2}\dot{5}$ and $b = 0.\dot{5}$

Then, $100a = 25.\dot{2}\dot{5}$

Therefore, $100a - a = 25.\dot{2}\dot{5} - 0.\dot{2}\dot{5}$

$$99a = 25$$

$$a = \frac{25}{99}$$

And $10b = 5.\dot{5}$

$$10b - b = 5.\dot{5} - 0.\dot{5}$$

$$9b = 5$$

$$b = \frac{5}{9}$$

Therefore, $\frac{a}{b} = \frac{25}{99} \div \frac{5}{9}$

$$= \frac{25}{99} \times \frac{9}{5} = \frac{5}{11}$$

$$\therefore \frac{a}{b} = \frac{5}{11}$$

(c) Let $x =$ Total balls in the bag.

Then,

$x = \frac{1}{4}x + \frac{1}{8}x + \frac{1}{2}x + 26$

Multplying by 8 the equation above

$8x = 2x + x + 4x + 208$

$$8x = 7x + 208$$

$$x = 208$$

$\therefore$ There 208 balls in the bag

2 (a) $6.8125 \approx 7, \quad 0.0695 \approx 0.07$ and $1.9812 \approx 2$

$$\frac{7}{0.07 \times 2} = \frac{7}{1.4} = \frac{70}{14} = 5$$

$$\therefore \frac{6.8125}{0.0695 \times 1.9812} \approx 5$$

(b) (i) $0.156\ km = 0.156 \times 1000\ m = 156\ m$

And $0.0312\ km = 0.0312 \times 1000\ m = 31.2\ m$

Area $= (156 \times 31.2)\ m^2 = 4867.2\ \ m^2$

(ii) Perimeter $= 2(0.156 + 0.0312)km$

$$= 2 \times 0.1872$$

$$= 0.3744\ km$$

(iii) A side has trees $\frac{156}{4} + 1 = 39 + 1 = 40$

For both sides, there $40 \times 2 = 80$ trees.

2 (c) The distance in km for two day is $2 \times 24\ km$

$$= 48\ km$$

The distance in metres is $48 \times 1000\ m$

$$= 48000\ m$$

3 (a) The total interior angles of a pentagon is $540°$

The sum of three unknown angle are

$540° - (58° + 83°)$

$= 540° - 141°$

$= 339°$

3. (a) Total ratio $6 + 5 + 4 = 15$

The smallest angle is $\frac{4}{15} \times 399 = 106.4°$

(b) Area of a trapezium is $\frac{1}{2}h(a + b)$

$$2700 = \frac{1}{2} \times 12(a + 300)$$

$$2700 = 6(a + 300)$$

$$a + 300 = 450$$

$$a = 450 - 300 = 150$$

$\therefore$ The length is 150 cm

4. (a) (i) From $b^2 = 4ac$

$$(a + 3)^2 = 4 \times 4 \times 9$$

$$a + 3 = \pm\sqrt{(4 \times 4 \times 9)} = \pm(4 \times 3) = \pm 12$$

$$a + 3 = \pm 12$$

$$\therefore a = -15 \text{ or } 9$$

(ii) Given the expression

$$(9792)^2 - 9292 \times 9792$$

$$= 9792(9792 - 9292)$$

$$= 9792 \times 500$$

$$\therefore (9792)^2 - 9292 \times 9792 = 4896000$$

(b) A candidate is required to show that

$$ax^2 + bx + c = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

5. (a) Let L, and $W = Length$ and $Width$ of the rectangle .

Then,

Perimeter $2(L + W) = 800$

$$\therefore L + W = 400 \ldots\ldots\ldots.(i)$$

Also, $W : L = 3 : 5$

$$\frac{W}{L} = \frac{3}{5}$$

5 (a) $W = \frac{3L}{5} \ldots\ldots\ldots\ldots\ldots (ii)$

From $L + \frac{3L}{5} = 400$

$$5L + 3L = 2000$$

$$L = 250$$

From, $W = \frac{3L}{5}$

$$W = \frac{3 \times 250}{5} = 3 \times 50 = 150$$

$\therefore$ The dimensions are:

$Length = 250\ cm$ and $Width = 150\ cm$

(b) $\%\ Loss = \frac{Loss\ Made}{Costs} \times 100\%$

$$\%Loss = \frac{Costs - Sales}{Costs} \times 100\%$$

$$30\% = \frac{Costs - 35000}{Costs} \times 100\%$$

$\therefore$ Costs $= 50000$

$$\%\text{Profit} = \frac{\text{Profit Made}}{\text{Costs}} \times 100\%$$

$$\%\text{Profit} = \frac{\text{Sales} - \text{Costs}}{\text{Costs}} \times 100\%$$

$$= \frac{64000 - 50000}{50000} \times 100\%$$

$$= \frac{14000}{50000} \times 100\%$$

$$= 28\%$$

$\therefore$ The percentage profit $= 28\%$

6. (a) The points $(1,-2)$ *and* $(4,1)$ satisfy the equation, $ax + by = 12$,

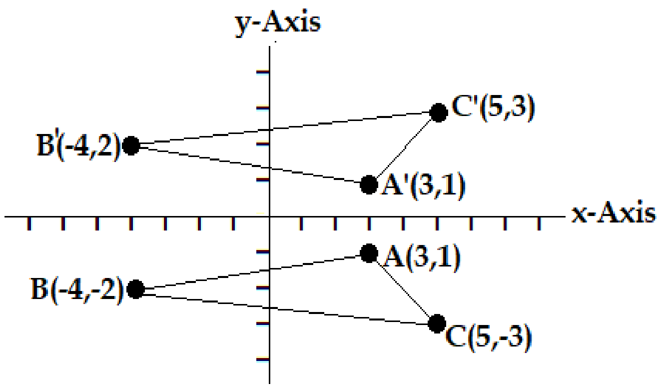
$$\text{Therefore, } a(1) + b(-2) = 12$$

$$a - 2b = 12 \ldots\ldots\ldots\ldots(i)$$

$$4a + b = 12 \ldots\ldots\ldots\ldots(ii)$$

$$\therefore (a, b) = (4, -4)$$

(b)



7. (a) (i) $(3)^{x+2} \div (5)^{2y-6} = 2025$

$$(3)^{x+2} \times (5)^{6-2y} = 2025 = (3^4)(5^2)$$

$$3^{x+2} = 3^4$$

$$x + 2 = 4$$

$$x = 2$$

$$5^{6-2y} = 5^2$$

$$6 - 2y = 2$$

$$2y = 6 - 2 = 4$$

$$y = 2$$

$$\therefore (x, y) = (2,2)$$

(ii) $\frac{2+\sqrt{3}}{\sqrt{2}-\sqrt{3}} \times \frac{\sqrt{2}+\sqrt{3}}{\sqrt{2}+\sqrt{3}} = \frac{(2+\sqrt{3})(\sqrt{2}+\sqrt{3})}{(\sqrt{2}-\sqrt{3})(\sqrt{2}+\sqrt{3})}$

$$= \frac{2\sqrt{2} + 2\sqrt{3} + \sqrt{6} + 3}{2 - 3}$$

$$= -(2\sqrt{2} + 2\sqrt{3} + \sqrt{6} + 3)$$

7 (b) $2\log x = \log(2x - 3) + \log 4$

$$2\log x = \log 4(2x - 3)$$

$$\log x^2 = \log 4(2x - 3)$$

$$x^2 = 4(2x - 3)$$

$$x^2 = 8x - 12$$

$$x^2 - 8x + 12 = 0$$

$$\therefore x = 2 \text{ or } 6$$

8 (a) $\Delta PST \approx \Delta PQR$

Therefore,

$$\frac{PT}{PR} = \frac{TS}{QR}$$

$$PT = \frac{240}{16}$$

$$\therefore PT = 15 \text{ cm}$$

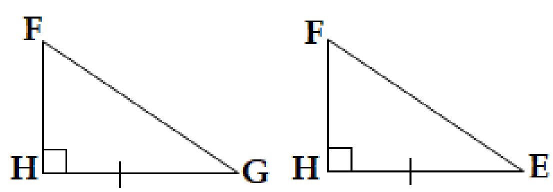
$$\text{And } \frac{PS}{PQ} = \frac{TS}{QR}$$

$$\frac{12}{12 + s} = \frac{10}{16}$$

$$120 + 10s = 192$$

$$\therefore QS = 7.2$$

(b)



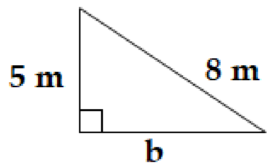
HG = HE (Given)

$F\hat{H}G = F\hat{H}E = 90°$

FH is common side

$\therefore$ $\Delta EFH \equiv \Delta FHG$ (By SSS Theorem)

9. (a)



By Pythagoras theorem

$b^2 = 8^2 - 5^2$

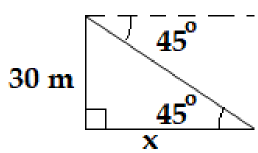
$$b^2 = 64 - 25$$

$$b^2 = 39$$

$$b = 6.245$$

$\therefore$ The solution is 6.245 m

(b) (i)



$\text{Tan } 45° = \frac{30}{x}$

$x \tan 45° = 30$ but $\tan 45° = 1$

Then $x = 30$

$\therefore$ The distance is 30 m.

(ii) By Pythagoras theorem

Using figure in part (i) above

$C^2 = 30^2 + 30^2$

$$= 900 + 900$$

$$= 1800$$

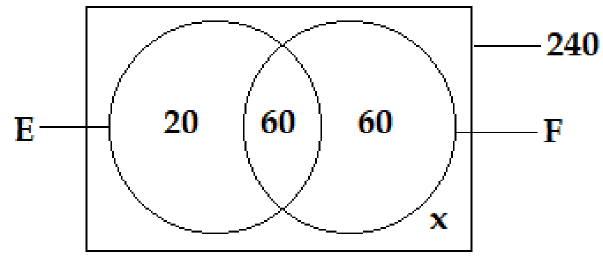
Then, $\quad C = \sqrt{1800}$

$$= 42.43$$

$\therefore$ The distance is 42.43 m

10 (a) Using the Venn Diagrams

Let E = English and F = French



$20 + 60 + 60 + x = 240$

$$x = 100$$

$\therefore$ There are 100 tourists speak neither English nor Frech

(b) (i) If $72° = 10\ m^2$

$$\text{then, } 360° = \frac{360}{72} \times 10m^2$$

$$= 50\ m^2$$

Therefore, total area is $50\ m^2$

(ii) If $72° = 10\ m^2$

$$\text{then, } 126° = \frac{126}{72} \times 10m^2$$

$$= 17.5\ m^2$$

$\therefore$ The area occupied by onion is $17.5\ m^2$