**ANESTAR SCHOOLS**
**MATHEMATICS**
**FORM TWO**
**END-OF-YEAR EXAM - 2022**

# MARKING SCHEME:

## SECTION I:

1. Solve the following simultaneous equation (3mks)

   $2x + 3y = 8$

   $5x - y = 3$

   ***Ans***

   ***1 (2x + 3y = 8)***

   ***3 (5x – y = 3)***

   $$\begin{array}{rl} & 2x + 3y = 8 \\ + & 15x - 3y = 9 \\ \hline & 17x = 17 \end{array}$$

   $x = 1$

   $5x - y = 3$

   $5 - 3 = y$

   $y = 2$

2. The internal and external diameters of a spherical shell are 12cm and 8cm respectively. Calculate the volume of material of the shell. (3mks)

   $V = \frac{4}{3} \times \frac{22}{7} \times 6^3 = 905.143cm^3$

   $V = \frac{4}{3} \times \frac{22}{7} \times 4^3 = 268.190cm^3$

   ***Shell*** $636.953cm^3$

   $= 636.953cm^3$

3. Use reciprocal tables and square root tables to evaluate: (3mks)

   $$\frac{1}{3.953} + \sqrt{2.458}$$

   ***Ans:***

   $0.2529 + 1.568$

   $= \underline{1.821}$

4. Evaluate without using a calculator (3mks)

   $$\frac{-9 + (-7) \times (-8) - (-5)}{-2 + (-6) \div 3 \times 6}$$

5. Solve $\sqrt{\frac{1.843\times0.048}{11.53}}$ using logarithm tables. (3mks)

| ***Number*** | ***Std. fom*** | ***log*** |
|---|---|---|
| ***1.843*** | ***1.843***$\times 10^0$ | ***0.2655*** |
| ***0.048*** | $4.8 \times 10^{-2}$ | $\overline{2}.6812$ |
| | | $\overline{2}.9467$ |
| ***11.53*** | $1.153 \times 10^1$ | *1.0619* |
| | | $\overline{3}.8848$ |

$$\frac{\overline{3}.}{3} + \frac{0.8849}{3}$$
$$1.972 \times 10^{-1}$$
$$= 0.1972$$

6. (a) Find the gradient of the straight line passing through the points P (2,3) and Q (8,-6) (1mk)

***Gradient*** $= \frac{3--6}{2-8}$

$= \frac{9}{-6}$

$= \frac{-3}{2}$

(b) hence find the equation of a line parallel to the straight line and passing through R (1,2) in the form of y=mx+c. (3mks)

***Ans***

***(x, y) (1,2)*** $\frac{-3}{2}$

$\frac{y-2}{x-1} = \frac{-3}{2}$

$y - 2 = \frac{-3}{2}x + \frac{3}{2}$

$y = \frac{-3}{2}x + \frac{7}{2}$

7. The corresponding sides of two similar regular pentagons are 3cm and 7cm respectively. (3mks)

a) Find the ratio of their areas.

***LSF*** $= \frac{3}{7}$

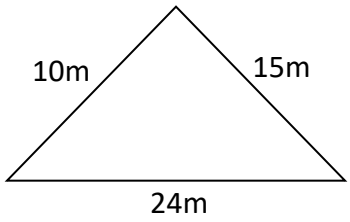
***ASF*** $= \frac{9}{49}$

b) Calculate the area of the larger if the area of the smaller is $36cm^2$.

$$\frac{49}{\cancel{9}_{1}} \times \cancel{36}^{4} = 196$$

$= 196cm^2$

8. A triangular flower garden measure 10m, 15m and 24m. Find the area of the garden. (3mks)




$S = \frac{P}{2} = \frac{49}{2} = 24.5$

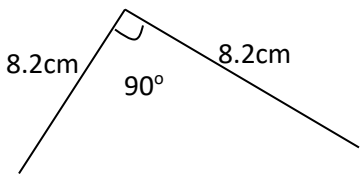
$\sqrt{S\,(5-a)}(5-b)\,(5-b)$

$\sqrt{24.5}\,(24.5-10)\,24.5-15)\,245.24$

$= \sqrt{24.5} \times 14.5 \times 9.5 \times 0.5$

$= 41.08cm^2$

9. Two arms of a pair of divider are spread so that the angle between them is $90^o$. Find the area of the sector formed if the length of an arm is 8.2cm. (3mks)




$A = \frac{0}{360}\ xr^2$

$= \frac{90}{360} \times \frac{22}{7} \times 8.2^2$

$= 52.83cm^2$

10. Without using a calculator, evaluate; (3mks)

$$\frac{2\frac{1}{5} + \frac{2}{3}\ of\ 3\frac{3}{4} - 4\frac{1}{6}}{1\frac{1}{4} - 2\frac{2}{5} \div 1\frac{1}{3} - 3\frac{3}{4}}$$

$$\frac{11}{5} + \frac{2}{3} \times \frac{15}{4} - \frac{25}{6}$$

$$\frac{11}{5} + \frac{5}{2} - \frac{25}{6}$$

$$= \frac{8}{15}$$

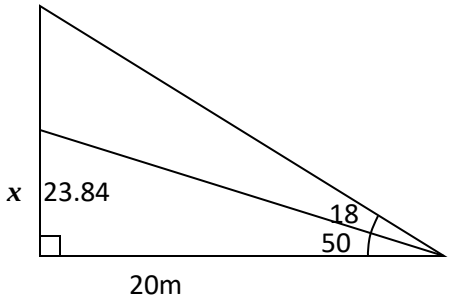
$$\frac{5}{4} - \left(\frac{12}{5} \div \frac{4}{3}\right) - \frac{15}{4}$$

$$\frac{5}{4} - \frac{9}{5} - \frac{15}{4}$$

$$\frac{\cancel{8}^{1}}{\cancel{15}_{2}} \times \frac{\cancel{10}^{2}}{43}$$

$$= \frac{-16}{129}$$

11. An observer stationed 20m away from a tall building finds that the angle of elevation of the top of the building is 68° and angle of its foot is 50°. Calculate the height of the building. (3mks)




$$\boldsymbol{Tan\ 50 = \frac{x}{20}}$$

$$\boldsymbol{x = 23.84}$$

$$\boldsymbol{Tan\ 60 = \frac{h}{20}}$$

$$\boldsymbol{h = 34.64}$$

$$\boldsymbol{h = 10.8}$$

12. Factorize the following; (2mks)

$4x^2 + 7x + 3$

$\boldsymbol{S = 7 \quad P = 12}$

$\boldsymbol{(4x^2 + 4x) + (3x + 3)}$

$\boldsymbol{4x(x + 1) + 3(x + 1)}$

$\boldsymbol{(4x + 3)(x + 1)}$

13. Find the integral values of the inequalities. (3mks)

$-1 \leq 3x - 1 < 5$

$\boldsymbol{3x - 1 < 5}$
$\boldsymbol{3x < 6}$
$\boldsymbol{x < 2}$
$\boldsymbol{-1 \leq 3x - 1}$
$\boldsymbol{0 \leq 3x}$
$\boldsymbol{0 \leq x}$

$\boldsymbol{0 \leq x < 2}$
***0,1 integral values.***

14. Three years ago, Juma was three times as old. as Ali and in two years time, the sum of their ages will be 62. Determine their present ages (3mks)

| | *3 years ago* | *present* | *2 yrs* |
|---|---|---|---|
| ***Juma*** | $x - 3$ | $x$ (42) | $x+2$ |
| ***Sli*** | $y - 3$ | $y$ (16) | $y+2$ |

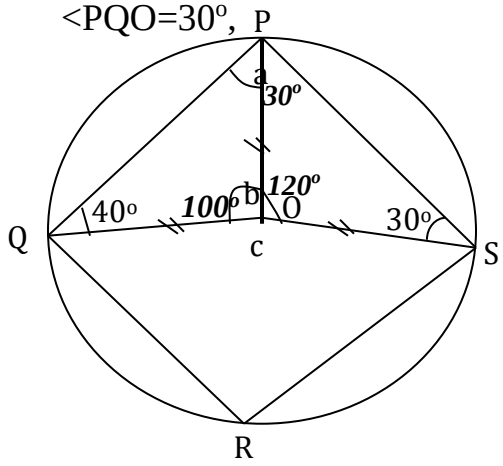
$x - 3 = 3(y - 3)$
$x\ 3 = 3y - 9$
$x - 3y = =6$

$x + 2 + y + 2 = 62$
$x + y = 58$
$-x - 3y = -6$
$4y = 64$

$x + y = 58$
$x = 58 - 16$

***y = 16***

15. The figure below shows a cirlcle with centre O. Find the values of a, b, c and if <PQO=30$^o$,




***a = 70$^o$***

***b= 220$^o$***

***c= 140$^o$***

16. A tourist visited Kenya with 2500 US dollars and changed the US dollars into Kenya shillings at a local bank in Kenya when the exchange rates at the time were as follows:

| | *Buying* | *Selling* |
|---|---|---|
| 1 US dollar | shs.78.45 | shs. 78.55 |
| 1 Sterling Pound | shs.120.25 | shs. 120.45 |

a) How much did he get in Kenya shillings? (2mks)

***2500 X 78.45***
***= 196125 /=***

b) While in Kenya he used shs. 80,000 and after his stay he converted the remaining amount into Sterling pounds. Calculate to 2 decimal places the Sterling pounds that he got (2mks)

***196125***
***80000***
***116125***

**116125**
**120.45**

***= 964.09 Sterling Pounds.***

**SECTION II:**
**Answer any THREE Question.**

**17.** The table below shows the names of 200 persons measured to the nearest kg

| Mass (kg) | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 | 90-99 | 100-109 |
|---|---|---|---|---|---|---|---|
| No. of persons | 9 | 27 | 70 | 50 | 26 | 12 | 6 |

(a) State the modal class (1mk)

***60 - 69***

(b) Calculate the mean mass (5mks)

| *Class* | *x* | *F* | *Fx* | *C.F* |
|---|---|---|---|---|
| *40-49* | *44.5* | *9* | *400.5* | *9* |
| *50-59* | *54.5* | *27* | *1471.5* | *36* |
| *60-69* | *64.5* | *70* | *4515* | *106* |
| *70-79* | *74.5* | *50* | *3725* | *156* |
| *80-89* | *84.5* | *26* | *2197* | *182* |
| *90-99* | *94.5* | *12* | *1134* | *194* |
| *100-109* | *104.5* | *6* | *627* | *200* |
| | | *200* | *14070* | |

$$\bar{x} = \frac{14070}{200}$$

$$= 70.35$$

(b) Calculate the median mass (4mks)

$$59.5 + \frac{\left(\frac{200}{2} - 36\right) \times 10}{70}$$

$$= 68.64$$

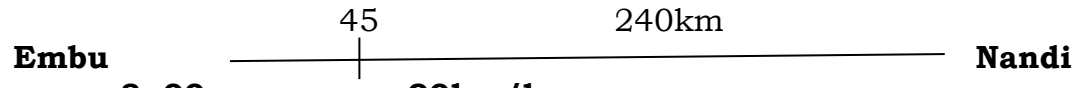
18. Using a ruler and pair of compasses only.

a) Construct a triangle ABC in which AB=9cm, AC=6cm and BAC=37 ½ º. (5mks)

b) Drop a perpendicular from C to meet AB at D. Measure CD and hence find the area of triangle ABC.

19.A motorist left Embu for Nairobi a distance of 240km at 8:00 a.m and travelled at average speed of 90km/hr. Another motorist left Nairobi for Embu at 8:30a.m and travelled at 100km/hr. Find;

a) The time they met. (3mks)




**8: 00 am ⟶ 90km/h**
**T= 30mins**
**S= 90km/h**
**D= 45km**
**D.A = 195km**
**RS = 190km/hr**
**T = $^{39}/_{38}$**

**8.30 am**
**62**
**9.32 am**

b) How far they met from Nairobi. (3mks)

**T= $^{39}/_{38}$hr**
**S = 100km/hr**
**D= 102.63 km**

c) The time of the day each motorist arrived at his destination. (4mks)

| | |
|---|---|
| **Embu ⟶ Nairobi** | **Nairobi~~Embu~~** |
| **D = 240km** | **D = 240km** |
| **S = 90km/hr** | **S = 100km/hr** |
| **T= 2hr 40mins** | **T = 2h 24mins** |
| **8.00** | **8.30** |
| **2.40** | **2.24** |
| **10.40am** | **10.54 am** |

20. **i) 88 km ± 1 and $049^0 \pm 1$**

**(ii) 96km ± and $254^0 \pm 1$**

**(iii) 90 + 31**

**= $121 \pm 2^0$**