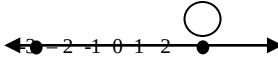


MATHEMATICS PAPER 1
FORM 3
MAY SERIES
2017

MARKING SCHEME

1. Numerator
- $$\sqrt{\frac{1}{4}} \text{ of } \frac{7}{2} + \frac{3}{2} \left(\frac{15-4}{6} \right)$$
- $$\frac{1}{2} \times \frac{7}{2} + \frac{3}{2} \times \frac{11}{6} \quad \text{M1}$$
- $$\frac{7}{4} + \frac{33}{12}$$
- $$\frac{21+33}{12} = \frac{54}{12}$$
- Denominator
- $$\frac{3}{4} \text{ of } \frac{5}{2} \div \frac{1}{4}$$
- $$\frac{15}{8} \times \frac{4}{1} = \frac{15}{2}$$
- $$\frac{54}{12} \div \frac{15}{2}$$
- $$\frac{54^{13^3}}{12^6_2} \times \frac{2^1}{15_5} = \frac{3}{5} \quad \text{A1}$$
- 2.
- | | 36 | 40 | 48 |
|---|----|----|----|
| 2 | 18 | 20 | 24 |
| 2 | 9 | 10 | 12 |
| 2 | 9 | 5 | 6 |
| 2 | 9 | 5 | 3 |
| 3 | 3 | 5 | 1 |
| 3 | 1 | 5 | 1 |
| 3 | 1 | 1 | 1 |
- rem = $2^4 \times 3^2 \times 5$ minutes = 720 M1
- Fastest = $\frac{720}{36} = 20$ laps M1
- Slowest = $\frac{720}{40} = 18$ laps
- $\chi = 20 - 18 = 2$ laps A1
3. (a) Swiss francs
- $$\frac{72}{1.25} = 57.6 \quad \text{B1}$$
- (b) Ksh.
- $$57.6 \times 48.2 = 2776.32$$
- $$= \text{sh. } 2776 \quad \text{A1}$$
4. $7x - 4 \leq 9x + 2 \dots (i)$
 $9x + 2 < 3x + 14 \dots (ii)$
Solving (i)
 $7x - 4 \leq 9x + 2$
 $-2x \leq 6$
 $x \geq -3$ M1
Solving equation (ii)
 $9x + 2 < 3x + 14$
 $6x < 12$
 $x < 2$ M1
Combining (i) and (ii)
 $-3 \leq x < 2$
- 
- Integral values are -3, -2, -1, 0, 1 A1
- 5.
- | | |
|---|--|
| $8t + 6s = 4160$
$4t + 12s = 4000$

$4t + 3s = 2080$
$\underline{t + 3s = 1000}^-$
$3t = 1080$
$\underline{t = 360}$
$s = 213\frac{1}{3}$
Trouser = Sh. 360
Shirt = Sh. 213.33 | M1 ✓ Simultaneous equations formed

M1 ✓ Attempt to eliminate

A1 For both |
|---|--|
7.
Inter. $\angle = x$
Exter. $\angle = y$
 $x + y = 180^\circ$
 $\underline{x - y = 108^\circ}$
 $2x = 288$ B1
 $x = 144^\circ$
 $\therefore \text{ext. } \angle 36^\circ$ M1
No. of sides = $\frac{360}{36} = 10$ sides A1
- 8.

$\frac{4-b=-3}{3-a}$	2	M1	$\frac{10x-14}{6}$	M1
$\frac{b+1=2}{a-2}$	3	M1	$\frac{5x-7}{3}$	A1
3a + 2b = 17 -2a + 3b = -7 6a + 4b = 34 -6a + ab = -21 a = 5, b = 1		M1 A1	15. VSF $\frac{4752}{1408} = 3.375$ LSF = $\sqrt[3]{3.375} = 1.5$	
9. Present 4 yrs ago Daughter $\Rightarrow x$ x - 4 Mother $\Rightarrow 2.5x$ 2.5x - 4 $\frac{x-4}{2.5x-4} = \frac{1}{3}$ 3x - 12 = 2.5x - 4 0.5x = 8 x = 16 Mother = 2.5 x 16 = 40 years		M1 A1 A1	ASF = (1.5) ² Area of larger cylinder = 352 x 2.25 = 792cm ²	M1 A1
10. $4.46 \times 10^{-2} \times \left(\frac{1}{4.327}\right)^2$ 2.337 x 10 ⁻¹ + (0.2311) ² (2.311 x 10 ⁻¹) ² 2.337 x 10 ⁻¹ + 5.341 x 10 ⁻² 0.2337 + 0.05341 = 0.28711 ≈ 0.2871		M1 M1 A1	16. 5000 x 72.23 = 361,150 361,150 - 214500 = 146,650 = $\frac{146,650 \times 1}{135.97}$ = £1078.55	M1 M1 A1
11. Log $\frac{t+5}{t-3} = \frac{2}{3}$ $\frac{t+5}{t-3} = 8^{2/3} = 4$ t - 3 t + 5 = 4t - 12 t = $\frac{17}{3} = 5\frac{2}{3}$		M1 M1 A1	17. (a) Gross tax = 5512 + 1162 = 6674 Rate 1 st 9680 10% 968 2 nd 9120 15% 1368 3 rd 9120 20% 1824 4 th 9120 25% 2280 5 th 780 30% 234 <u>37820</u> 6674 - 6440 = 234 17.1	M1 M1 M1 M1 M1
12. $\frac{5}{8} \times 72 = 45kg$		M1 M1	(b) $x = \frac{234 \times 100}{30}$ = 780 Basic salary = 37320 - 15220 Ksh.22,600 Net pay Total deductions = 320 + 200 + 7500 + 5512 = 13,532 Net pay Gross Deductions = 37,820 13,532 = 24,288	M1 A1 M1 M1 M1 A1
13. Volume of cylinder = volume of sphere $\Pi \times 7^2 \times 5 = \frac{4}{3} \Pi r^3$ $r^3 = 245 \times \frac{3}{4}$ V = 5.685 S.A. = 4\Pi r ² = 4 x 3.142 x (5.685) ² M1 = 406.2cm ²		M1 M1 A1 A1	18. (a) 250 x 14 x 2 x 2 = 14000 Net profit = 14000 - 6000 = KSh. 8000 (b) 8000 x 25 = 200,000 = 190,000 (c) Saving: $\frac{40}{100} \times 190,000$ = 76000 Remaining profit = $\frac{36}{100} \times 190,000$ = 68,400 James' share $\frac{45,600}{3} + \frac{2}{9} \times 68,400$ = 30,400 (d) $\frac{475,000 \times 3 \times 100}{95}$ = 1,500,000	M1 A1 B1 M1 A1 M1M1 A1
14. $\frac{3(x-5)-x-1}{6}$ $\frac{12x-15-x-1}{6}$		M1	19. a) < PAQ = <PAM + <QAM < PAM = sinθ1 = Sin -1 (0.4286) = 25.380	A1

$$\angle QAM = \angle PAM = 25.38$$

$$\rightarrow \angle LAP = 25.38 \times 2 = 50.76$$

b) $\angle PBQ = \angle PBM + \angle QBM$
 $\angle PBM = \sin^{-1} 1 =$
 $\sin^{-1} (0.5357) = 32.390$
 $\angle PBM = \angle QBM = 32.390$
 $\angle PBQ = 32.390 \times 2 = 64.78$

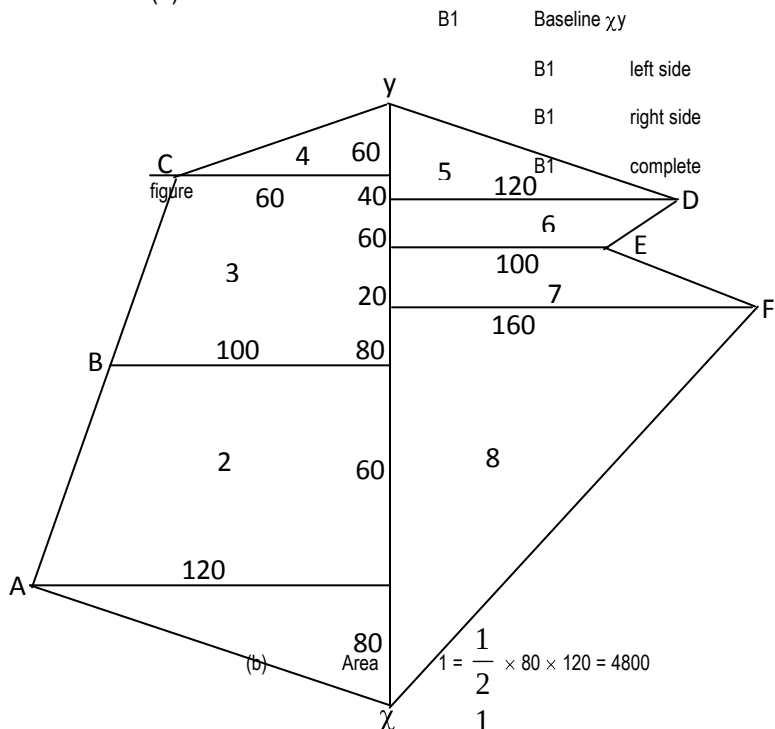
c)i) area of segment = area of a section - area of D

Taking (i)
 $=$
 $= 48.84 - 42.69 = 6.15 \text{ cm}^2$

Taking (ii)
 $=$
 $= 39.89 - 31.92 = 7.97 \text{ cm}^2$
 $= (6.15 + 7.97) \text{ cm}^2 = 14.12 \text{ cm}^2$

21.

(a)



(b) Area
 $1 = \frac{1}{2} \times 80 \times 120 = 4800$

$2 = \frac{1}{2} \times 60(120 + 100) = 6600$

M1 for the first four areas.

$3 = \frac{1}{2} \times 200 \times (160) = 16000$

$4 = \frac{1}{2} \times 60 \times 60 = 1800$

$5 = \frac{1}{2} \times 100 \times 120 = 6000$

$6 = \frac{1}{2} \times 60(220) = 6600$

M1 for the next

four areas.

$7 = \frac{1}{2} \times 20(260) = 2600$

M1 for addition

$8 = \frac{1}{2} \times 220 \times 160 =$

$\frac{17600}{62,000}$

for addition

$\frac{62000}{10000} = \underline{6.2ha}$

A1 for Total area

(c) $50,000 \times 6.2$

B1

$= \underline{496,000}$

23.

$\frac{1}{7} + \frac{1}{5} = \frac{12}{35}$	✓
Rate of emptying per minute	
$\frac{3}{13}$	✓
Amount left per minute	
$\frac{12}{35} - \frac{3}{13} = \frac{156}{455} - \frac{105}{455} = \frac{51}{455}$	✓
Amount in the bath after $2\frac{1}{2}$	
$\frac{51}{455} \times \frac{5}{2} = \frac{255}{910}$	
Time taken to fill $\frac{910}{255} = 3.57$ minutes	✓
Total cost = $(4 \times 90) + 3(120) + 5(60)$	
$360 + 360 + 300$	
$= \text{shs. } 1020$	
Cost of one kg = $\frac{1020}{4+3+5} = \frac{1020}{12}$	
Shs. 85.00 per kg	
$5 \times 85 = 425$	
$= \frac{108}{100} \times 425$	
$= \text{shs. } 459.00$	