Gr 10 P II Nov 2014

/100

1.1. 1. $M = 30$ ✓ 1

2. max − min = range

max − 10 = 80

max = 90 ✓ 1

3. $Q_3 - Q_1$: IQR

60 − Q_1 = 44

16 = Q_1 ✓ 1

1.2. $M \rightarrow Q_3$: 25 % ✓ 1

1.3. Weak ✓ − 50 % of the class ie ½ ✓R got less than 30 %. 2

2.1. $30 < x \leq 40$ ✓ 1

2.2. 1. $M = T_{\frac{1}{2}(1+25)}$

$= T_{13}$ ✓ 1

2. $30 < x \leq 40$ ✓ 1

2.3. midpt ✓ f ✓

$\bar{x} = \frac{15.2 + 25.5 + \ldots + 65.1}{21 + \ldots + 1}$ $\frac{935}{25}$

= 37,4 ✓ 3

3. $\frac{2x + 3x - 3 + 1 - x + 5x - 2 + x - 2x}{6} = 30$ ✓

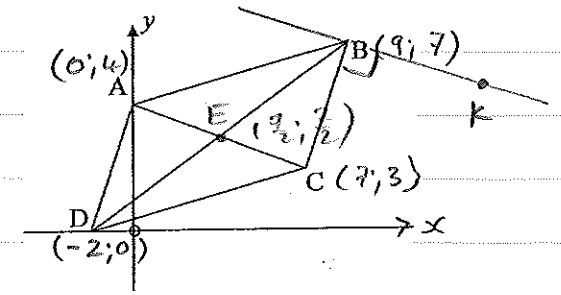
$8x - 4 = 6.30$ ✓

$= 180$

$x = \frac{184}{8}$

$= 23$ ✓ 4

4.



4.1. 1. D(−2;0) B(9;7)

$x = \frac{-2+9}{2}$ $y = \frac{0+7}{2}$

$= \frac{7}{2}$ ✓ ✓ $= \frac{7}{2}$

$\therefore (\frac{7}{2}; \frac{7}{2})$ 2

2. A(0;4) C(7;3)

$x = \frac{0+7}{2}$ $y = \frac{4+3}{2}$

$= \frac{7}{2}$ $= \frac{7}{2}$

$\therefore (\frac{7}{2}; \frac{7}{2})$ ✓

4.2. Midpoints of BD and AC coincide

ie diags bisect ✓

$\therefore$ ABCD is a llgm. 1

4.3. Median ✓ **1**

4.4. $B(9;7)$ $C(7;3)$

$m_{BC} = \frac{3-7}{7-9}$

$= 2$ ✓

$\therefore m_{BK} = -\frac{1}{2}$ 1

$\therefore y = -\frac{1}{2}x + c$ ✓

sub $B(9;7)$

$7 = -\frac{1}{2}(9) + c$ ✓

$\frac{23}{2} = c$

$\therefore \underline{y = -\frac{1}{2}x + \frac{23}{2}}$ ✓ **4**

$-0,5 \qquad 11,5$

4.5. $B(9;7)$ $C(7;3)$ $G(x;-4)$

$m_{BC} = 2$ ✓ (4.4)

$m_{CG} = \frac{-4-3}{x-7}$

$= \frac{-7}{x-7}$ ✓

Coll: $m_{BC} = m_{CG}$

$2 \overset{✓}{=} \frac{-7}{x-7}$

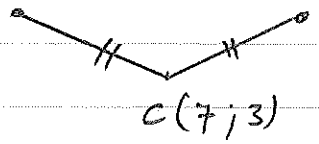
LCD: $(x-7)$ $\therefore x \neq 7$

x/hm

$2(x-7) = -7$

$\underline{x = \frac{7}{2}}$ ✓ **4**

4.6. $B(9;7)$ $F(9;y)$



$C(7;3)$

$BC = \sqrt{(3-7)^2 + (7-9)^2}$

$= \sqrt{20}$ given

$FC = \sqrt{(y-3)^2 + (9-7)^2}$

$= \sqrt{(y-3)^2 + 4}$

But: $BC = FC$

$\sqrt{20} \overset{✓}{=} \sqrt{(y-3)^2 + 4}$

$()^2$ bs ✓

$20 = (y-3)^2 + 4$ ✓

$16 = (y-3)^2$ ✓

✓± $4 = y-3$

$4 = y-3$ or $-4 = y-3$

$7 = y$ $\qquad -1 = y$

but $y < 0$

$\therefore \underline{y = -1}$ ✓ **5**

(-1) if $y = 7$ not rejected

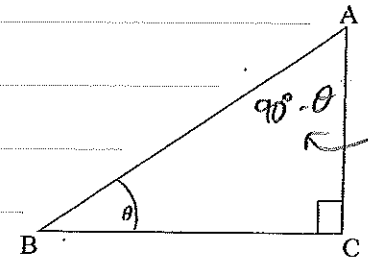
$20 = y^2 - 6y + 9 + 4$

$0 = y^2 - 6y - 7$ ✓

$= (y+1)(y-7)$ ✓

$\therefore y = \underline{-1}$ or ✗ ✓

5.1.



$\angle$'s Δ = 180°

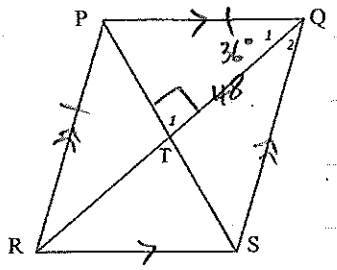
5.1.1 $\sin\theta = \frac{AC}{AB}$ ✓

5.1.2 $\tan\theta = \frac{AC}{BC}$ ✓

5.1.3 $\cos(90° - \theta) = \frac{AC}{AB}$ ✓

3

5.2.



5.2. 1. $\hat{Q}_2 = 36°$ ✓S diags rhomb bisect int $\angle$s 1

1.

2. QT = 48 mm ✓S diags rhomb bisect 1

3. $\hat{T}_1 = 90°$ ✓S diags rhomb $\perp$ 1

4. $\cos 36° = \frac{48}{PQ}$ ✓

$PQ \cdot \cos 36° = 48$

$PQ = \frac{48}{\cos 36°}$

$= 59,33...$ ✓

$\therefore$ perimeter

$= 4 \times 59,33...$ sides rhomb =

$= 237,33$ mm ✓

3

5.3. 1. $-\cos^2(x-y)$

$= -[\cos(x-y)]^2$

$= -[\cos(25° - 5°)]^2$

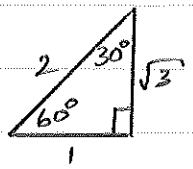
$= -0,88$ ✓ 1

2. $(-\cos(x-y))^2$

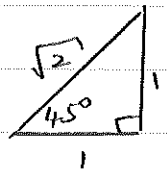
$= (-\cos(25° - 5°))^2$

$= 0,88$ ✓ 1

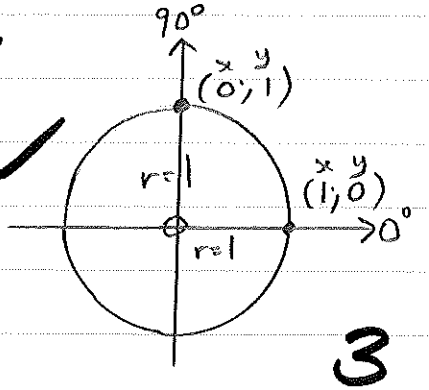
6.1. 30° and 60° ✓



45° ✓



0° and 90° ✓



3

6.2. 1. $\sin 45° = \frac{1}{\sqrt{2}}$ ✓ $\frac{o}{h}$ 1

2. $\tan 90° = \frac{1}{0}$ ← must be shown $\frac{y}{x}$

= undefined ✓ 1

3. $\sin 30° = \frac{1}{2}$ ✓ $\frac{o}{h}$ 1

6.2. 4. $\cos 60° = \frac{1}{2}$ ✓ 1 $\frac{a}{h}$

5. $\cos 0° = \frac{1}{1}$ ← must be shown $\frac{x}{r}$

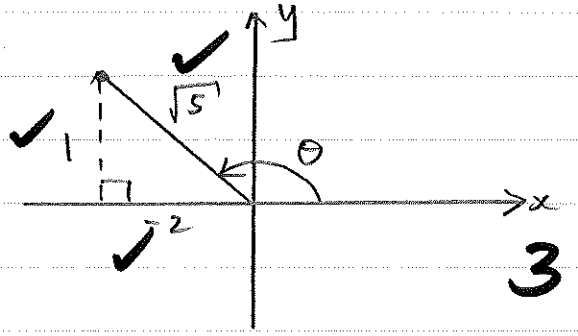
$= 1$ ✓ 1

7.1. 1. $2\tan\theta + 1 = 0$

$\tan\theta = -\frac{1}{2}$ $\frac{y}{x}$

• tan − ∴ Q II IV

• $90° < \theta < 270°$ ∴ Q II III



✓ ✓ ✓ 3

$\frac{y}{5c} = -\frac{1}{2} = \frac{1}{-2}$

$(-2)^2 + (1)^2 = r^2$

$5 = r$

$\sqrt{5} = r$

2. $\cos\theta = \frac{x}{r}$

$= \frac{-2}{\sqrt{5}}$ ✓ 1

7.2. 1. $\frac{\sin x}{2} = \frac{\sin 18°}{3}$

$\sin x = 2 \cdot \frac{\sin 18°}{3}$

$= 0{,}206\ldots$ ✓

$\therefore x = 11{,}89°$ ✓ 2

2. $4^2 + 3^2 - 2.4.3\cos(2x+10°) = 2^2$

Let $A = 2x + 10°$

$4^2 + 3^2 - 2.4.3.\cos A = 2^2$

$-24\cos A = -21$

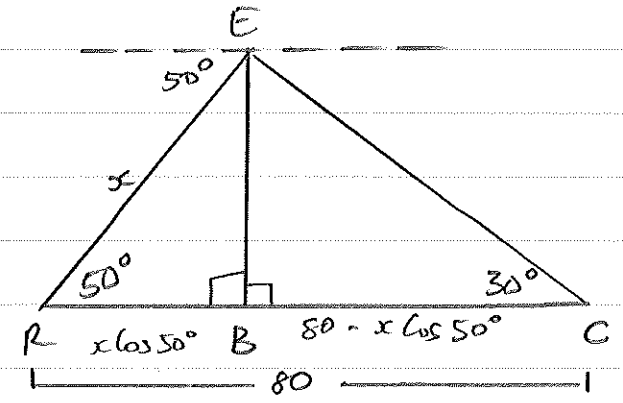
$\cos A = \frac{7}{8}$ ✓

$A = 28{,}9\ldots°$ ✓

$2x + 10° =$

$x = 9{,}48°$ ✓ 3

8.



8.1. $E\hat{R}B = 50°$ ✓ SR alt ∠'s =, ∥ lines 1

8.2. $\cos 50° = \frac{RB}{x}$ ✓

$x\cos 50° = RB$ ✓ 2

8.3. $CB = 80 - x\cos 50°$ ✓ 1

ie $CB = 80 - RB$

8.4. $\frac{BC}{EC} = \cos 30°$ ✓

$BC = EC \cdot \cos 30°$ ✓

$\frac{BC}{\cos 30°} = EC$ ✓

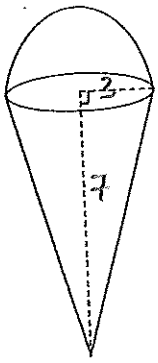
$\frac{80 - x\cos 50°}{\cos 30°} = EC$ → 3

8.5. $CE = \frac{80 - 40\cos 50°}{\cos 30°}$ ✓

$= 62,69$ m ✓ → 2

9. See diagram sheet

10.



10.1 $V = \frac{1}{2} \cdot \frac{4}{3}\pi r^3 + \frac{1}{3}\pi r^2 \cdot h$

$= \frac{1}{2} \cdot \frac{4}{3}\pi(3)^3 + \frac{1}{3}\pi(3)^2 \cdot 7$ ✓ ✓

$= 18\pi + 21\pi$

$= 56,54... + 65,97...$

$= 39\pi$

$= 122,52$ cm^3 ✓ → 3

10.2. $TSA = \frac{1}{2} \cdot 4\pi r^2 + \pi r h_s$

$h_s^2 = 7^2 + 3^2$ Pythag

$h_s = \sqrt{58}$ 7,61...

$\therefore TSA$ ✓ ✓

$= \frac{1}{2} 4\pi(3)^2 + \pi(3)(\sqrt{58})$

$= 18\pi + 71,77...$

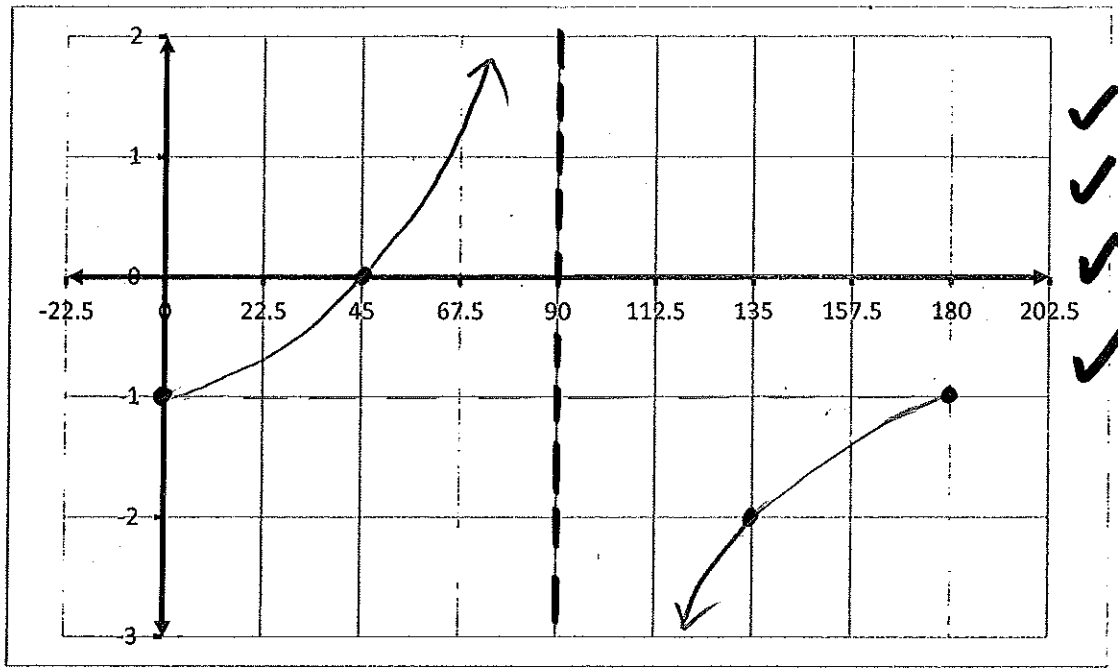
$= 56,54... + 71,77...$

$= 128,33$ cm^2 ✓ → 3

praise units once only in Q 10

MATHS PAPER 2 DIAGRAM SHEET NAME: Solns

9.1

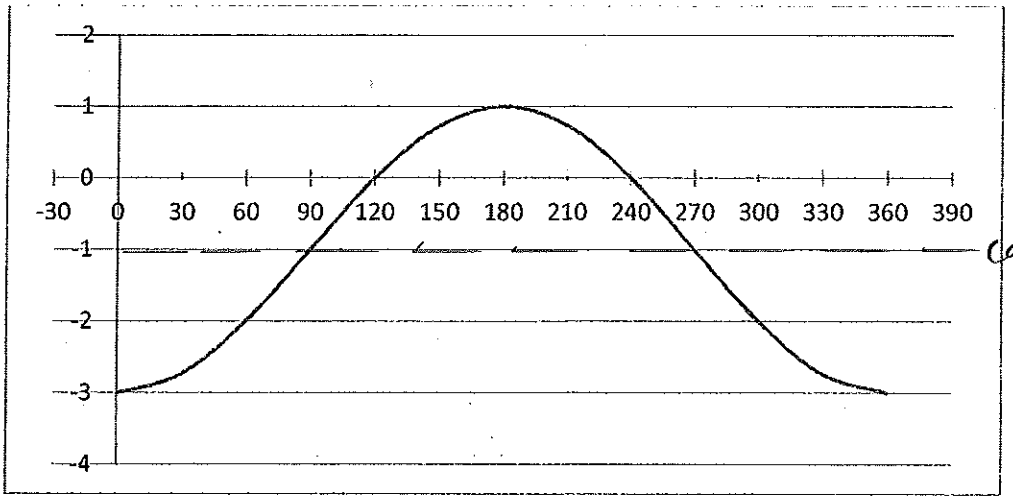


✓ asy
✓ xint
✓ yint
✓ shape

4

(4)

9.2 The following function $g(x) = acosx - b$ is represented below:



9.2.1.1 $a = -2$ ✓ (1) 1

9.2.1.2 $-b = -1 \quad \therefore \quad b = 1$ ✓ (1) 1

9.2.2 g 3↑ $h(x) = a\cos x - b + 3$ ✓ (1) 1

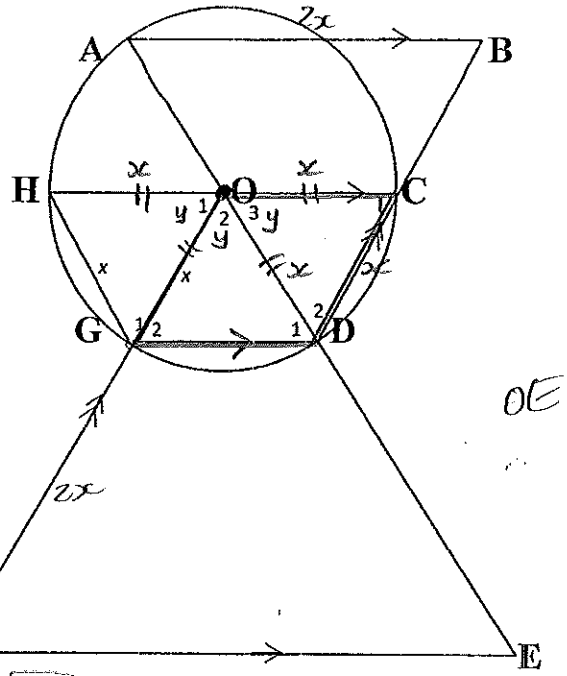
or

$h(x) = -2\cos x - 1 + 3$

$= -2\cos x + 2$

MATHS PAPER 2 DIAGRAM SHEET NAME: _____

QUESTION 11



11.1.1 Δs $G_1 O_1 H$, $D_2 O_3 C$

1. $OH = OC = x$ radii ✓SR
2. $GO = DO$ radii ✓SR
3. $\hat{O}_1 = \hat{O}_3$ given ✓SR

$\therefore \Delta GOH \equiv \Delta DOC$ SAS ✓R (4)

11.1.2 $CD = GH$ $\equiv \Delta$s

$= x$ ✓SR

$\therefore CD = OG$ ✓SR both $= x$

but $CD \parallel OG$ given ✓SR

$\therefore OCDG$ ||gm |pr opp sides || R = ✓R (4)

11.2.1 Δs $O_2 G_2 D_1$, $O_2 F E$

1. $\hat{O}_2 = \hat{O}_2$ common ✓SR
2. $OC \parallel GD$ opp sides ||gm ||
3. $GD \parallel FE$ both || to OC,
4. $\hat{G}_2 = \hat{F}$ corr $\angle$s =, || lines ✓SR (3)

$\therefore \Delta OGD \,///\, \Delta OFE$ AAA ✓R

11.2.2 $\Delta OGD \,///\, \Delta OFE$ (x, $3x$)

$\frac{OD}{OE} = \frac{OG}{OF}$ // Δs

$\therefore \frac{OD}{24} = \frac{x}{3x}$ ✓

$OD = 8$ units ✓ (2)

11.3 $AO = OD$ radii ✓SR

$\therefore AB = 2x$ conv mdpt thm ✓SR