# Gr 10 June Exam 2025 /100

1.1 $64 \quad 72 \quad 81$

$\sqrt{64} \quad \sqrt{72} \quad \sqrt{81}$ ✓

$8 \quad \sqrt{72} \quad 9$

$\therefore$ 8 and 9 ✓ ao o/2 (2)

1.2. $x = 3,1\dot{7}$

$100x = 317,\dot{7}$

$10x = 31,\dot{7}$ ×10

✓ $90x = 286$ ✓

$x = \frac{286}{90}$

$= \frac{143}{45}$ ✓ (3)

1.3.1. UD $2x + 5 = 0$

$x = -5/2$ ✓ (1)

2 $R'$ ✓ $2x + 5 < 0$

$2x < -5$

✓ $x < -5/2$ (2)

1.4. $3x - \frac{1}{x} = 5$

$(3x - \frac{1}{x})^2 = (5)^2$

$(3x - \frac{1}{x})(3x - \frac{1}{x}) = 25$

$9x^2 - 3 - 3 + \frac{1}{x^2} = 25$ ✓

$9x^2 + \frac{1}{x^2} = 31$ ✓ (2)

2.1.1. $(x^{\frac{1}{y}} + y^{\frac{1}{x}})^2$

$= (x^{\frac{1}{y}} + y^{\frac{1}{x}})(x^{\frac{1}{y}} + y^{\frac{1}{x}})$ ✓

$= x^{\frac{2}{y}} + 2x^{\frac{1}{y}}y^{\frac{1}{x}} + y^{\frac{2}{x}}$ ✓

• $x^{\frac{1}{y}} \cdot x^{\frac{1}{y}} = x^{\frac{1}{y} + \frac{1}{y}}$ (2)

$= x^{\frac{2}{y}}$

2. $\frac{3^{2n} \cdot 2^n}{18^{n+2} + 18^{n-2}}$

✓pb $= \frac{3^{2n} \cdot 2^n}{(3^2 \cdot 2)^{n+2} + (3^2 \cdot 2)^{n-2}}$

✓simp. $= \frac{3^{2n} \cdot 2^n}{3^{2n+4} \cdot 2^{n+2} + 3^{2n-4} \cdot 2^{n-2}}$

$= \frac{3^{2n} \cdot 2^n}{3^{2n} \cdot 3^4 \cdot 2^n \cdot 2^2 + 3^{2n} \cdot 3^{-4} \cdot 2^n \cdot 2^{-2}}$

$= \frac{3^{2n} \cdot 2^n}{3^{2n} \cdot 2^n (3^4 \cdot 2^2 + 3^{-4} \cdot 2^{-2})}$

✓cf $= \frac{3^{2n} 2^n}{3^{2n} 2^n (81 \cdot 4 + \frac{1}{3^4} \cdot \frac{1}{2^2})}$

$= \frac{1}{324 + \frac{1}{81} \cdot \frac{1}{4}}$

$= \frac{1}{324 + \frac{1}{324}}$

$= \frac{1}{\frac{104\,977}{324}}$

$= 1 \times \frac{324}{104\,977}$

$= \frac{324}{104\,977}$ ✓ (4)

2.2. $(2x-1)^2 - (x-3)^2$

✓ $= ((2x-1)+(x-3))((2x-1)-(x-3))$

$= (2x-1+x-3)(2x-1-x+3)$

$= (3x-4)(x+2)$ ✓ ✓ (3)

OR

$(2x-1)(2x-1) - (x-3)(x-3)$

$= 4x^2 - 4x + 1 - (x^2 - 6x + 9)$

$= 4x^2 - 4x + 1 - x^2 + 6x - 9$

$= 3x^2 + 2x - 8$

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

2.3. $\dfrac{\frac{3y}{x+y}}{\frac{3}{x+y} - \frac{3}{x-y}}$

$\text{den} = \frac{3}{x+y} - \frac{3}{x-y}$

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

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

$= \frac{-6y}{(x+y)(x-y)}$ ✓ ✓

$\therefore \dfrac{\frac{3y}{x+y}}{\frac{-6y}{(x+y)(x-y)}}$

INT ✓

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

$= \frac{x-y}{-2}$ ✓ (4)

• $\frac{3y}{-6y} = \frac{1}{-2}$

2.4. 1. $-4x^2 + 10x + 6$

$= -2(2x^2 - 5x - 3)$ ✓

$= -2(x-3)(2x+1)$ ✓ (2)

2. $x(x-1) - y(y-1)$

$= x^2 - x - y^2 + y$ ✓

$= x^2 - y^2 - x + y$

NOT $(x^2-y^2)(-x+y)$ !!!

$= (x-y)(x+y) - (x-y)$ ✓ ✓

$= (x-y)[(x+y) - 1]$

$= (x-y)[x+y-1]$ ✓ (4)

3. $8x^4 - \frac{1}{2}y^4$

$= 8x^4 - \frac{y^4}{2}$

$= \frac{16x^4 - y^4}{2}$ ✓

$= \frac{(4x^2 - y^2)(4x^2 + y^2)}{2}$ ✓

$= \frac{(2x - y)(2x + y)(4x^2 + y^2)}{2}$ ✓

(3)

OR

$\frac{1}{2}(16x^4 - y^4)$

$= \frac{1}{2}(\ \ldots\ )(\ \ldots\ )$

2.4. 4 $2(a - 2b)x^3 - 54(2b - a)y^3$

$= 2(a - 2b)x^3 + 54(a - 2b)y^3$ ✓

$= 2(a - 2b)(x^3 + 27y^3)$ ✓

$= 2(a - 2b)(x + 3y)(x^2 - 3xy + 9y^2)$ ✓

(3)

3.1. 1. $3x - 7 = 3x + 2$

$0x = 9$

$0 = 9$ ✓

∴ no soln for $x$ (1)

2. $x^2 = 5x$

$x^2 - 5x = 0$ ✓

$x(x - 5) = 0$ ✓

$x = 0$ or $5$ ✓ (3)

3. $(x - 2)^2 - 10 = 0$

$(x - 2)^2 = 10$ ✓

$x - 2 = \pm\sqrt{10}$ ✓

$x - 2 = \sqrt{10}$ or $x - 2 = -\sqrt{10}$

$x = \sqrt{10} + 2$ $\quad$ $x = -\sqrt{10} + 2$

$= 5,16$ ✓ $\quad$ $= -1,16$ ✓

(4)

4 $2.3^{x-4} - 12 = 0$

$2.3^{x-4} = 12$

$3^{x-4} = 6$ ✓

$x - 4 = \frac{\log 6}{\log 3}$ ✓

$x = 5,63$ ✓

(3)

(3)

3.1 5 $14x^{\frac{3}{7}} + 8x^{\frac{6}{7}} = 15$

$8x^{\frac{6}{7}} + 14x^{\frac{3}{7}} - 15 = 0$

$k = x^{\frac{3}{7}}$ $(k)^2 = \left(x^{\frac{3}{7}}\right)^2$

$k^2 = x^{\frac{6}{7}}$

$8k^2 + 14k - 15 = 0$

$(4k - 3)(2k + 5) = 0$ ✓

$k = \frac{3}{4}$ or $-\frac{5}{2}$ ✓

$x^{\frac{3}{7}} = \frac{3}{4}$ $x^{\frac{3}{7}} = -\frac{5}{2}$

$\left(x^{\frac{3}{7}}\right)^{\frac{7}{3}} = \left(\frac{3}{4}\right)^{\frac{7}{3}}$ $\left(x^{\frac{3}{7}}\right)^{\frac{7}{3}} = \left(-\frac{5}{2}\right)^{\frac{7}{3}}$

✓ ✓

$x = 0{,}51$ $x = -8{,}48$

(4)

3.2 1. $-\frac{1}{3} \leq \frac{-1-3x}{2} < 7$

$\times 2$: ✓ $-\frac{2}{3} \leq -1 - 3x < 14$

$+1$: ✓ $\frac{1}{3} \leq -3x < 15$

$\div -3$: ✓ $-\frac{1}{9} \geq x > -5$

(3)

2. $x \in (-5; -\frac{1}{9}]$ ✓ (1)

3.3 $2x + 3y = -10$

$5x - y = 43$

$2x + 3y = -10$

$\times 3$: $15x - 3y = 129$

$17x = 119$

$x = 7$

$5(7) - y = 43$

$-8 = y$

OR

$5x - 43 = y$ ✓

$2x + 3(5x - 43) = -10$ ✓

$2x + 15x - 129 = -10$

$17x = 119$

$x = 7$ ✓

$y = 5(7) - 43$

$= -8$ ✓

(4)

(4)

4.1. $-111 ; -104 ; -97 ; -90$

7 7 7

4.1. 1. $-83$ ✓ (1)

2. $T_n = a + (n-1)d$
$= -111 + (n-1)(7)$
$= -111 + (7n - 7)$
$= -111 + 7n - 7$
$= 7n - 118$ ✓ ✓ (2)

3. $T_n = 3788$
$7n - 118 = 3788$ ✓
$7n = 3906$
$n = 558$ ✓ (2)

4. $\sqrt{2}$ ; $\pi$ do not fit into the sequence

80th term will be:

$T_{78} = 7(78) - 118$ ✓
$= 428$ ✓ (2)

$n \neq 78$ 0/2

4.2. $x^2 - 2x ; 2x^2 + 4x ; 4x^2 - 24$

$2x^2 + 4x - (x^2 - 2x)$
$= 2x^2 + 4x - x^2 + 2x$
$= x^2 + 6x$

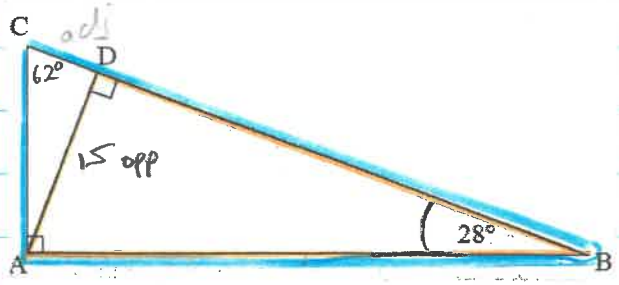
$4x^2 - 24 - (2x^2 + 4x)$
$= 4x^2 - 24 - 2x^2 - 4x$
$= 2x^2 - 4x - 24$

Arithmetic $\therefore$ d is constant :

$x^2 + 6x = 2x^2 - 4x - 24$ ✓
$0 = x^2 - 10x - 24$ ✓
$= (x - 12)(x + 2)$ ✓

$\therefore$ $x = 12$ or $-2$ ✓ both (4)

5.1




5.1 1. $\Delta BAD$ $\sin 28°$

$= \frac{o}{h}$

$= \frac{AD}{AB}$ ✓

$\Delta CAB$ $\sin 28°$

$= \frac{o}{h}$

$= \frac{AC}{BC}$ ✓ (2)

2. $\hat{ACB} = 62°$ ✓

sum ^'s in $\Delta = 180°$ (1)

3. $\Delta CAD$ $62°$

$15 = opp$ $CD = adj$

$\tan 62° = \frac{15}{CD}$ ✓

$CD \tan 62° = 15$

$CD = \frac{15}{\tan 62°}$

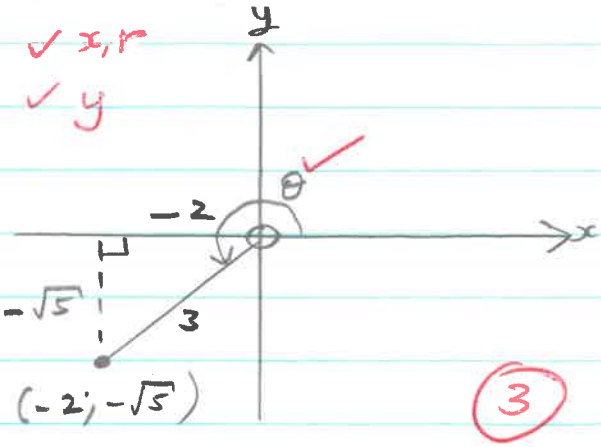
$= 7,98$ cm ✓

(2)

5.2 1. $3\cos\theta + 2 = 0$

$\cos\theta = -\frac{2}{3}$ II III

$180° < \theta < 360°$ III IV




(3)

$\cos\theta = -\frac{2}{3}$ $\frac{x}{r} = \frac{-2}{3}$

$(-2)^2 + y^2 = (3)^2$ Pythag

$y^2 = 5$

$y = \pm\sqrt{5}$

$\therefore y = -\sqrt{5}$

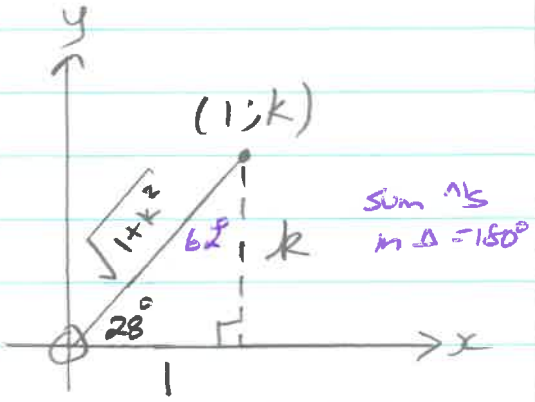
2. $\sin\theta = \frac{y}{r}$

$= \frac{-\sqrt{5}}{3}$ ✓

(1)

5.3 $\tan 28^\circ = k$ $\quad \frac{k}{1} = \frac{y}{x}$

$28^\circ$ I




x, y ✓

r ✓

$(1)^2 + (k)^2 = r^2$ Pythag

$1 + k^2 =$

$\pm\sqrt{1+k^2} = r$

$\sqrt{1+k^2} =$

1. $\sec 28^\circ = \frac{r}{x}$ NOT $\frac{h}{a}$

$= \frac{\sqrt{1+k^2}}{1}$

$= \sqrt{1+k^2}$ ✓ (3)

2. $\sin 62^\circ = \frac{o}{h}$ NOT $\frac{y}{r}$

$= \frac{1}{\sqrt{1+k^2}}$ ✓ (1)

NB

In diagrams

- if $\theta$ is in standard position ie measured from the direction of the +ve x-axis anticlockwise, then use x, y, r

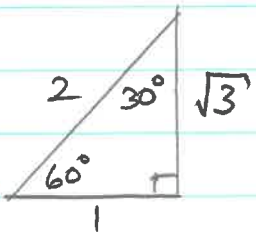
  x, y could be +ve or −ve

  r always +ve

- if $\theta$ is NOT in std posn, then use o, a, h

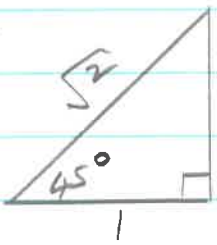
  o, a, h are sides of a Δ always +ve

5.4 1 (a)




✓ ✓ (1)

1 (b)




✓ ✓ (1)

5.4 2(a) $\tan 30° = \frac{o}{a}$

$= \frac{1}{\sqrt{3}}$ ✓ (1)

2(b) $\text{Cosec } 45° = \frac{h}{o}$

$= \frac{\sqrt{2}}{1}$ ✓

$= \sqrt{2}$ (1)

5.5 $\frac{2\tan^2\theta}{\sec\theta + 2}$

$= \frac{2(\tan\theta)^2}{\frac{1}{\cos\theta} + 2}$

$= \frac{2(\tan 55°)^2}{\frac{1}{\cos 55°} + 2}$

$= 1,09$ ✓✓ or 0 (2)

5.6 1. $8\sin\left(\frac{\theta}{3} - 10°\right) - 3 = 0$

Let $A = \frac{\theta}{3} - 10°$

$8\sin A - 3 = 0$

$\sin A = \frac{3}{8}$ ✓

$A = \sin^{-1}(3/8)$

$\frac{\theta}{3} - 10° = 22,02...°$ ✓

$\frac{\theta}{3} = 32,02...°$

$\theta = 96,07°$ ✓ (3)

2. $3\text{Cot}\theta = \sin 57,7°$

$= 0,99...$

$\text{Cot}\theta = 0,33...$ ✓

$\frac{1}{\tan\theta} = 0,33...$

$1 = 0,33... \tan\theta$

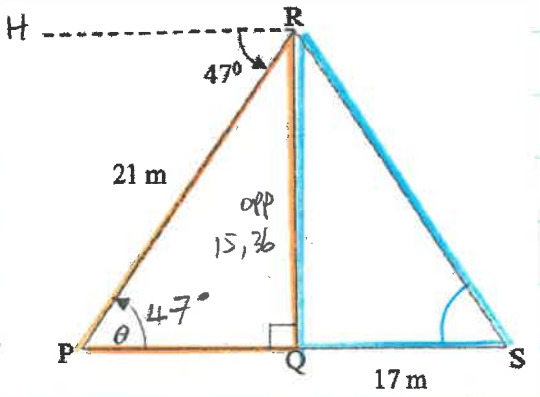
$\frac{1}{0,33...} = \tan\theta$

$3,00... = \tan\theta$ ✓

$\tan^{-1}(3,00...) = \theta$

$71,58° = \theta$ ✓ (3)

6.1.




6.1.1 $\theta = 47°$ ✓S

alt ^'s =, HR ∥ PQ ✓R

(2)

2. $\triangle PQR$

$47°$ RQ = opp 21 = h

$\therefore$ $\sin 47° = \frac{RQ}{21}$ ✓ $\frac{o}{h}$

$21 . \sin 47° = RQ$

$15,36 \text{ m} = RQ$ ✓

(2)

3 $\triangle RQS$

$\hat{S} = ?$ opp = 15,36 adj = 17

$\tan \hat{S} = \frac{15,36}{17}$ ✓ $\frac{o}{a}$

$= 0,90 \ldots$

$\hat{S} = \tan^{-1}(0,90\ldots)$ ✓

$= 42,10°$

(2)

(9)