

SLT

Question 1:

1.1.1  $x = 2$  ✓ (1)  
 1.1.2  $x - 2 < 0$  ✓ (1)  
 $x < 2$  ✓

1.2  $\sqrt{64} < \sqrt{71} < \sqrt{81}$  ✓  
 $8 < \sqrt{71} < 9$  ✓  
 $\therefore$  lies between 8 and 9 → ans only 0/2 (2)

1.3  $1000x = 945.45$  ✓  
 $10x = 9.45$  ✓  
 $990x = 936$  ✓  
 $x = \frac{936}{990}$  ✓ (4)  
 $x = 52/55$  ✓

Question 2:

2.1.1  $(2x+3)(2x^2-x-2)$  ✓ (2)  
 $4x^3 - 2x^2 - 4x + 6x^2 - 3x - 6$  ✓  
 $= 4x^3 + 4x^2 - 7x - 6$  ✓

2.1.2  $\frac{(x-3)(x^2+3x+9)}{(3-x)(3+x)} \times \frac{-(x+3)}{x^2+3x+9}$  ✓ (5)  
 $= \frac{-(x-3)}{-(x-3)}$  ✓  
 $= 1$  ✓

2.1.3  $\frac{(3^2)^{x+1} \cdot 5^{x+2}}{(3^2 \cdot 5)^{x+1}}$  ✓ pb  
 $= \frac{3^{2x+2} \cdot 5^{x+2}}{3^{2x+2} \cdot 5^{x+1}}$  ✓  
 $= 5^{x+2-(x+1)}$  ✓  
 $= 5^1$  ✓ (3)  
 $\rightarrow 2+2-2-1$

2.1.4  $\frac{x+y}{\frac{1}{x^2} - \frac{1}{y^2}}$  ✓  
 $= \frac{x+y}{\frac{y^2-x^2}{x^2y^2}}$  ✓  
 $= \frac{x+y}{1} \times \frac{x^2y^2}{(y+x)(y-x)}$  ✓  
 $= \frac{x^2y^2}{y-x}$  ✓  
 $\rightarrow$

2.2  $(2x - \frac{3}{x})^2 = (5)^2$

$4x^2 - 12 + \frac{9}{x^2} = 25$

$4x^2 + \frac{9}{x^2} = 37$

2.3.1  $-3(2x^2 - 3xy - 5y^2)$

$= -3(2x - 5y)(x + y)$

2.3.2  $(\frac{1}{2}x + b^3)(\frac{1}{4}x^2 - \frac{1}{2}b^3x + b^6)$

2.3.3  $x^2 + 5x - 6$

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

2.3.4  $-xy - (by - bx) + b^2$

$= -xy - by + bx + b^2$

$= -y(x+b) + b(x+b)$

$= (x+b)(-y+b)$

(2)

(2)

(2)

(2)

(3)

(2)

### Question 3:

3.1.1  $x(x+3) = 10$   
 $x^2 + 3x - 10 = 0$

$(x+5)(x-2) = 0$   
 $x = -5$  or  $x = 2$

3.1.2  $x^{-\frac{2}{3}} = \frac{5}{3}$   
 $(x^{-\frac{2}{3}})^{-\frac{3}{2}} = (\frac{5}{3})^{-\frac{3}{2}}$   
 $\therefore x = \pm 0,46$

3.1.3  $7^{3x-2} = \frac{8}{5}$   
 $3x-2 = \frac{\log(\frac{8}{5})}{\log(7)}$   
 $x = 0,75$

3.1.4  $3^{2x+1} - 3^{2x} = 16 \cdot 2$   
 $3^{2x}(3^1 - 1) = 16 \cdot 2$   
 $3^{2x} \cdot 2 = 16 \cdot 2$   
 $3^{2x} = 81$   
 $= 3^4$   
 $2x = 4$   
 $x = 2$

WOC

(3)

(3)

(3)

(3)

(2)

3.1.5  $\frac{1-x}{x+1} = \frac{1-5x}{1-x}$  ✓

$(1-x)^2 = (1-5x)(x+1)$  ✓

$1-2x+x^2 = x-5x^2+1-5x$

$6x^2+2x=0$  ✓

$3x^2+x=0$  ✓

$x(3x+1)=0$

$x=0$  or  $x=-\frac{1}{3}$  ✓ both. 4

3.2.  $R = \frac{2\sqrt{x}}{35}$

$R \cdot 35 = 2\sqrt{x}$  or  $R^2 = \left(\frac{2\sqrt{x}}{35}\right)^2$  ✓

isolate  $\left(\frac{35R}{2}\right)^2 = (\sqrt{x})^2$  ✓

$\therefore x = \frac{95^2 R^2}{4}$  ✓

(2)

$\therefore x =$

$\frac{95^2 R^2}{4}$  ✓

(3)

3.2.1  $-2 \leq -2x-1 < 3$

$-1 \leq -2x < 4$  ✓

$\frac{1}{2} \geq x > -2$  ✓

(2)

3.2.2 (a)  $x \in (-2; \frac{1}{2}]$  ✓



(b)

3.4  $2^{3x+3y} = 64$

$3x-y = 2$

$y = 3x-2$  ✓

sub

$2^{3x+3(3x-2)} = 64$  ✓

$2^{12x-6} = 2^6$  ✓

rb

$12x-6 = 6$  ✓

$12x = 12$

$\therefore x = 1$  ✓

$y = 3(1)-2$

$\therefore y = 1$  ✓

or

$3x-2=y$  ✓

$2^{3x+3y} = 2^6$

$3x+3(3x-2) = 6$

$3x+9x-6 = 6$

$12x = 12$

$x = 1$

$y = 3(1)-2$

$y = 1$

(6)

## Question 4:

4.1.1  $T_n = a + (n-1)d$

$= 125 + (n-1)(-5)$

$T_n = -5n + 130$

4.1.2  $T_{150} = -5(150) + 130$

$= -620$

4.1.3  $-220 = -5n + 130$

$n = 70$

(2)

4.2.1

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

$-x + 3 = 2x - 3$

$-3x = -6$

$x = 2$

(2)

4.2.2  $3; 4; 5$

4.2.3  $2x + 2$

4.3.1  $2; 10; 20; 20; 10; 2$

4.3.2  $T_n = 2^n$

(4)

## Question 5:

5.1  $\cos B = \frac{BD}{AB}$  or  $\frac{AB}{BC}$

5.2.1  $2 \sin(88.4^\circ)$

$\cos(144.7^\circ) + 10$

$= 0.22$

5.2.2  $5(\sin[144.7^\circ])^2$

$= 1.67$

5.3.1  $3 \tan \theta = 0.34$

$\tan \theta = 0.11 \dots$

$\theta = 6.5^\circ$

5.3.2 let  $A = 3(\theta - 10^\circ)$

$2 \cos A = 1.71$

$\cos A = 0.855$

$A = 31.24 \dots$

$3(\theta - 10^\circ) = 31.24 \dots$

$\theta = 20.4^\circ$

(3)

5.4.1  $3 \sec 70^\circ$

$= \frac{3}{\cos 70^\circ}$

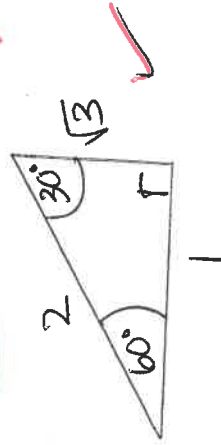
$= 8.77^\circ$

5.4.2

$\cot \theta = \frac{3}{2}$

$\tan \theta = \frac{2}{3}$

$\theta = 33.69^\circ$



5.5.1

← if no diagram 0 marks

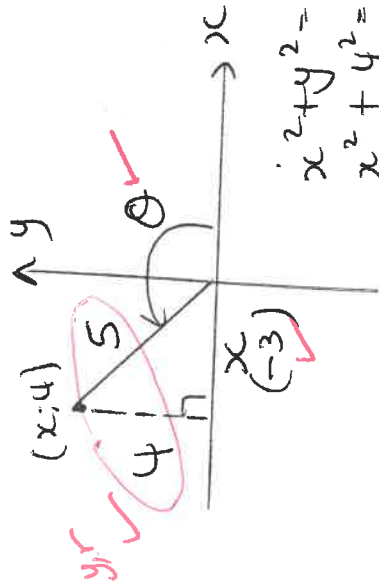
$\frac{p}{a}$

$= \frac{1}{\sqrt{3}}$

follow from (5.5.1)

explanation

6.1.1  $\sin, \cos, \tan, \cot, \sec, \csc$  } Q I/II/III/IV



$x^2 + y^2 = r^2$   
 $x^2 + 4^2 = 5^2$   
 $x^2 = 25 - 16$   
 $x = \pm 3$   
 $\therefore x = -3$

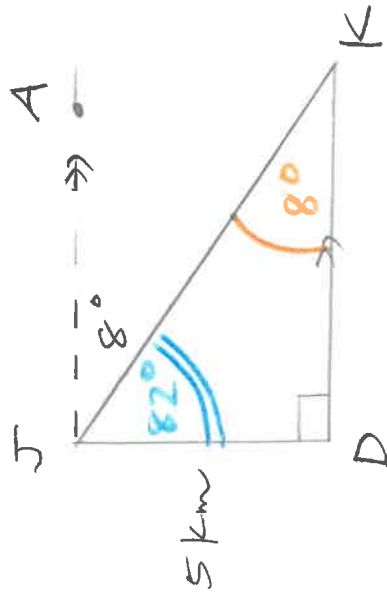
6.1.3  $1 - \left(\frac{x}{r}\right)^2$   
 $= 1 - \left(\frac{-3}{5}\right)^2$

$= 1 - \frac{9}{25}$   
 $= \frac{25}{25} - \frac{9}{25}$   
 $= \frac{16}{25}$

5

(2)

3



6.2.1  $\hat{DKJ} = 8^\circ$  (Alt  $\angle$ s =, JA  $\parallel$  DK)

$$\tan(8) = \frac{JD}{DK}$$

$$\tan(8) = \frac{5}{DK}$$

$$DK = 35.576...$$

$$DK = 36 \text{ km}$$

(3)

$$\tan(82) = \frac{DK}{S}$$

$$DK = S \cdot \tan(82)$$

$$= 35.75...$$

$$\therefore DK = 36 \text{ km}$$

or

6.2.2  $36 \text{ km} - 6 \text{ km}$

$$DS = 30 \text{ km}$$

(1)

Total 100 marks

6