

Question Numbers Answered	1st Examiner	2nd Examiner (optional)	3rd Examiner (optional)
TOTAL			
RESULT			

21)

a)

$$\frac{x^1 \times x^5 \times x^4}{x \times x^2}$$

$$= x^8$$

1

b)

$$(x+4)(x+2)$$

1

$$\frac{(x+2)}{(x+4)(x+2)} = \frac{1}{(x+4)}$$

1

c)

$$y = \frac{st + q}{t + p}$$

$$y(t+p) = st + q$$

1

$$yt + yp = st + q$$

1

$$yt - st = q - yp$$

$$t(y - s) = q - yp$$

1

$$t = \frac{q - yp}{y - s}$$

1

4

$$d) \quad \begin{aligned} 2x + 5y &= 19 \text{ ①} \times 3 \\ 3x + 6y &= 30 \text{ ②} \times 2 \end{aligned}$$

$$\begin{aligned} 6x + 15y &= 57 \quad \text{③} \\ 6x + 12y &= 60 \quad \text{④} \end{aligned} \quad -$$

$$3y = -3$$

$$y = -1 \rightarrow \text{in ①}$$

$$2x - 5 = 19$$

$$2x = 19 + 5$$

$$2x = 24$$

$$x = 12$$

e)

$$(i) \quad 12x^2 + x - 6 = 0$$

$$x = \frac{-1 \pm \sqrt{(1)^2 - 4(12)(-6)}}{2(12)}$$

$$x = \frac{-1 \pm \sqrt{1 + 288}}{24}$$

$$x = \frac{-1 \pm \sqrt{289}}{24}$$

$$x = \frac{-1 \pm 17}{24}$$

$$\left(\text{or } (4x+3)(3x-2) \right)$$

$$x = 0.66$$

$$x = -0.75$$

$$(ii) \quad x^2 + 10x + 16 = 0$$

$$(x+8)(x+2) = 0$$

$$x = -8$$

$$x = -2$$

1
1 1 ③

$$(iii) \quad \frac{5x+2}{3} = \frac{x+6}{4}$$

$$4(5x+2) = 3(x+6)$$

$$20x+8 = 3x+18$$

$$20x-3x = 18-8$$

$$17x = 10$$

$$x = \frac{10}{17} = \underline{\underline{0.59}}$$

1
1
1 ③

$$(iv) \quad \ln(x+5) + \ln(x+2) = 2\ln(x+4)$$

$$\ln(x+5)(x+2) = \ln(x+4)^2$$

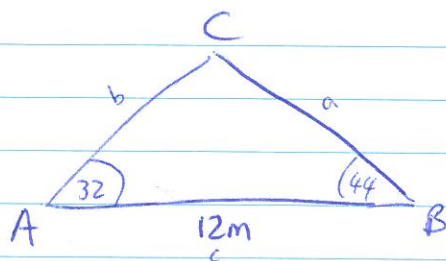
$$x^2 + 7x + 10 = x^2 + 8x + 16$$

$$10-16 = 8x-7x$$

$$-6 = x$$

1
1
1 ③

Q2)
a)
(1)



$$(i) \quad C = 180 - 32 - 44 \\ = 104^\circ$$

$$\frac{BC}{\sin 32} = \frac{AC}{\sin 44} = \frac{12}{\sin 104}$$

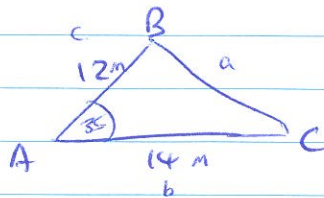
$$(i) \quad AC = \frac{12 \sin 44}{\sin 104}$$

$$AC = 8.59 \text{ m}$$

$$(ii) \quad BC = \frac{12 \sin 32}{\sin 104}$$

$$BC = 6.55 \text{ m}$$

b)



$$(BC)^2 = (14)^2 + (12)^2 - 2(14)(12)\cos 35$$

$$(BC)^2 = 196 + 144 - 336(0.8192)$$

$$(BC)^2 = 340 - 275.25$$

$$(BC)^2 = 64.75$$

$$BC = \sqrt{64.75}$$

$$BC = 8.05m$$

c)

$$(i) \frac{5x+14}{(x+1)(x+4)} = \frac{A}{(x+1)} + \frac{B}{(x+4)}$$

$$5x+14 = A(x+4) + B(x+1)$$

$$x = -1$$

$$9 = 3A$$

$$3 = A$$

$$x = -4$$

$$-6 = -3B$$

$$2 = B$$

P.F.S.

$$\frac{3}{(x+1)} + \frac{2}{(x+4)}$$

$$(ii) \quad \frac{3x+1}{(x+2)(x+3)^2} = \frac{A}{(x+2)} + \frac{B}{(x+3)} + \frac{C}{(x+3)^2}$$

$$3x+1 = A(x+3)^2 + B(x+2)(x+3) + C(x+2)$$

$$x = -2$$

$$-5 = A$$

$$x = -3$$

$$-8 = -C$$

$$8 = C$$

$$x = 0$$

$$1 = 9A + 6B + 2C$$

$$1 = -45 + 6B + 16$$

$$30 = 6B$$

$$5 = B$$

Ans:

$$\frac{-5}{(x+2)} + \frac{5}{(x+3)} + \frac{8}{(x+3)^2}$$

$$d) = 1$$

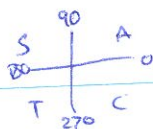
$$e) \quad \ln 3^{x-1} = \ln 5$$

$$(x-1) \ln 3 = \ln 5$$

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

$$x = \frac{\ln 5}{\ln 3} + 1$$

$$x = 2.46 /$$



(i) $x = 38.32^\circ$
 $x = 141.68^\circ$

(ii) $\cos x = 2/3$

$x = 48.19^\circ$
 $x = 311.81^\circ$

(iii) $\tan x = -1.48$

$\tan x = 1.48$

$x = 89.82^\circ$

$x = 90.18^\circ$

$x = 270.18^\circ$

$x = 55.95^\circ$

$x = 124.05^\circ$

$x = 304.05^\circ$

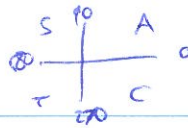
(iv) $\cos x = -\frac{5}{6}$

$\cos x = \frac{5}{6}$

$x = 33.56^\circ$

$x = 146.44^\circ$

$x = 213.56^\circ$



$$b) (x-5)(x-2)$$

$$\therefore (\tan x - 5)(\tan x - 2) = 0$$

$$\tan x = 5$$

$$x = 78.69^\circ$$

$$x = 258.69^\circ$$

$$\tan x = 2$$

$$x = 63.43^\circ$$

$$x = 243.43^\circ$$

$$c) y = re^{-xt} \quad [x]$$

$$\frac{y}{r} = e^{-xt}$$

$$\ln \frac{y}{r} = -xt + \ln e^1$$

$$\frac{\ln \frac{y}{r}}{-t} = x$$

$$\frac{\ln \frac{2}{4}}{-1} = x$$

$$0.69 = x$$

(Q4)

a)

$$(i) \frac{dy}{dx} = 28x^3 + 8x$$

1 1 ②

$$(ii) y = x^2 + 9x + 20$$

1

$$\frac{dy}{dx} = 2x + 9$$

1 1 ③

$$(iii) u = e^{3x} \quad v = \cos 4x$$

$$\frac{du}{dx} = 3e^{3x} \quad \frac{dv}{dx} = -4 \sin 4x$$

1 1

$$\frac{dy}{dx} = \cos 4x (3e^{3x}) + e^{3x} (-4 \sin 4x)$$

1 1 ④

$$(iv) u = e^{2x} \quad v = \sin 5x$$

$$\frac{du}{dx} = 2e^{2x} \quad \frac{dv}{dx} = 5 \cos 5x$$

1 1

$$\frac{dy}{dx} = \frac{\sin 5x (2e^{2x}) - e^{2x} (5 \cos 5x)}{(\sin 5x)^2}$$

1 1

1 ⑤

$$(v) \frac{dy}{dx} = 6(3x^2 + 5x - 2)^5 (6x + 5)$$

1 1 ②

(b) ~~$\frac{dy}{dx}$~~ $y = (3x^2 + 2x + 5)^{1/2}$

$$\frac{dy}{dx} = \frac{1}{2}(3x^2 + 2x + 5)^{-1/2} (6x + 2)$$

c) $z = 5x^3 + 2x^2y^3 + 3y^4$

$$\frac{\partial z}{\partial x} = 15x^2 + 4xy^3$$

$$\frac{\partial z}{\partial y} = 6x^2y^2 + 12y^3$$

$$\frac{\partial^2 z}{\partial x^2} = 30x + 4y^3$$

$$\frac{\partial^2 z}{\partial y^2} = 12x^2y + 36y^2$$

$$\frac{\partial^2 z}{\partial y \partial x} = 12xy^2$$

$$\frac{\partial^2 z}{\partial x \partial y} = 12xy^2$$