

Question 2

$$D^{ii}) \quad x^2 + 13x + 22 = 0$$

$$\begin{array}{r} 22 \\ 1 \overline{) 22} \\ \underline{22} \\ 0 \end{array} \quad \leftarrow \textcircled{11}$$

$$(x+11)(x+2) \quad x^2 + 2x + 11x + 22 \checkmark$$

$$x + 11 = 0$$

$$x + 2 = 0$$

$$\boxed{x = -11} \quad \boxed{x = -2} \quad \leftarrow \text{Answers}$$

$$D^{iii}) \quad x^2 - 100 = 0$$

$$(x+10)(x-10)$$

$$\sqrt{100} = 10$$

- 50 + and -

$$\boxed{x = \pm 10} \quad \leftarrow \text{Answer}$$

$$D^{iv}) \quad 2x^2 + 7x + 5 = 0$$

$$2 \times 5 = 10$$

$$\begin{array}{r} 10 \\ 1 \overline{) 10} \\ \underline{10} \\ 0 \end{array} \quad \leftarrow \text{Add } \textcircled{7}$$

$$(2x+2)(2x+5) \quad \text{Reduce}$$

$$\downarrow \div 2$$

$$(x+1)(2x+5) \quad 2x^2 + 5x + 2x + 5 \checkmark$$

$$x + 1 = 0$$

$$2x + 5 = 0$$

$$\boxed{x = -1} \quad \boxed{x = -2.5} \quad \leftarrow \text{Answers}$$

$$x = -\frac{5}{2}$$

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Barry Phillips

2014/14

06/11/20

Question 3 b) continued...

$$\frac{(2000)(0.79)}{0.25} = b$$

$$b = 6,320$$

Answers =

$$\text{Distance } A-C = 6,320 \text{ m}$$

$$\text{Angle } C = 14.4^\circ$$

$$\text{Angle } B = 127.6^\circ$$

Question 1

$$v) y = e^{2x} \tan 3x$$

$$\uparrow \quad \uparrow$$

$$u \quad v$$

$$\frac{du}{dx} \quad u = 2e^{2x}$$

$$\frac{dv}{dx} \quad v = 3 \sec^2 3x$$

$$\frac{dy}{dx} = (\tan 3x)(2e^{2x}) + (\cancel{\tan 3x}) (e^{2x})(3 \sec^2 3x)$$

$$vi) y = \frac{\sin 5x}{x^3 + 3x + 4} - u$$

$$-v$$

$$\frac{du}{dx} = 3x^2 + 3$$

$$du = 5 \cos 5x$$

$$\frac{dy}{dx} = \frac{(x^3 + 3x + 4)(5 \cos 5x) - (\sin 5x)(3x^2 + 3)}{(x^3 + 3x + 4)^2}$$

$$vii) y = \sqrt{3x^3 + 2x + 5} = (3x^3 + 2x + 5)^{1/2}$$

$$\frac{dy}{dx} = \frac{1}{2} (3x^3 + 2x + 5)^{-1/2} (9x^2 + 2)$$

$$= (4.5x^2 + 1)(3x^3 + 2x + 5)^{-1/2}$$

$$B) y = \sin x \quad 1) \cos x \quad 2) \sin x \quad 3) \cos x$$

$$\frac{dy}{dx}$$

$$\frac{d^2y}{dx^2}$$

$$\frac{d^3y}{dx^3}$$

$$\uparrow$$

$$\text{Answer}$$

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Barry Phillips

2014949

6/11/2020

Question 1

i) $8x^3 - 2x^2 - x + 1$

$$\frac{dy}{dx} = 24x^2 - 4x - 1$$

ii) $y = -3(x-5)^2$
 $y = 3x^2 - 30x + 75$

$$(x-5)(x-5)$$
$$x^2 - 5x - 5x + 25$$
$$x^2 - 10x + 25$$

$$\frac{dy}{dx} = 6x - 30$$

iii) $y = \frac{7}{x^3} + 4e^{3x}$

Barry Phurup

2014949

6/11/2020

Question 2

$$c) \quad 9x^2 - 4x - 5 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(9)(-5)}}{2(9)}$$

$$x = \frac{4 \pm \sqrt{16 + 180}}{18}$$

$$x = \frac{4 \pm 14}{18}$$

$$x = \frac{4 + 14}{18}$$

$$x = \frac{4 - 14}{18}$$

$$x = 1.00$$

← 2 Decimal Place

$$x = -0.55$$

← 2 Decimal Place

Question 2

$$d) \quad x^2 + 11x + 30 = 0$$

$$(x + 5)(x + 6)$$

30

$$\begin{array}{r} 1 \quad 30 \\ 2 \quad 15 \\ 3 \quad 10 \end{array}$$

(5 + 6)

$$x + 5 = 0$$

$$x = -5$$

← Answer

$$x + 6 = 0$$

$$x = -6$$

Question 2

$$a) \text{ii)} \quad 3^{x+5} = 2^x \times 6$$

$$\log_3 3^{x+5} = \log_3 2^x \times 6$$

$$(x+5) \log 3 = \log 2^x + \log 6$$

$$(x+5) \log 3 = x \log 2 + \log 6$$

$$(x+5) 0.477 = 0.301x + 0.778$$

$$0.477x + 2.385 = 0.301x + 0.778$$

$$0.176x + 2.385 = 0.778$$

$$0.176x = -1.607$$

$$x = \boxed{-9.13}$$

$$\div 0.176$$

$$64 - 16 + 2$$

$$b) \quad y = x^2 + 2x + 2$$

①

$$y = 2x^2 + 11x + 10$$

②

$$2x^2 + 11x + 10 = x^2 + 2x + 2$$

$$x^2 + 9x + 8 = 0$$

Move over

$$(x+8)(x+1)$$

Multiply Make 8 (8x1)
Add Move 8

$$x+8=0$$

$$x = -8$$

$$y = 50$$

?

$$x+1=0$$

$$x = -1$$

$$y = \textcircled{1}$$

$$-8^2 + 2(-8) + 2 =$$

$$+64 + 16 + 2 = 50$$

$$-1^2 - 2 + 2 = \textcircled{1}$$

Question 3

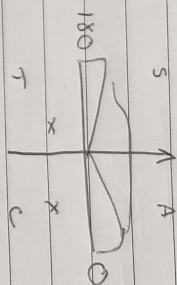
1) $\sin x = 0.75$

$x = \sin^{-1} 0.75$

$x = 48.59^\circ$

$x = 131.41^\circ$

Answers

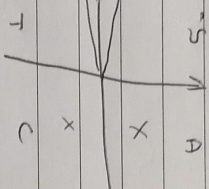


ii) $-\cos x = 2$

$x = \frac{2}{-1}$ (ignore minus)

$x = \cos^{-1} 0.4$

$x = 66.42^\circ \leftarrow \text{Not Answer}$



$$= 180 - 66.42 = 113.58^\circ$$

$$= 180 + 66.42 = 246.42^\circ$$

Answers

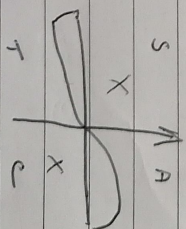
iii) $8 \tan x = 1$

$x = \tan^{-1} \frac{1}{8} = 0.125$

$x = 7.125^\circ$

$x = 187.125^\circ$

Answers



iv) $\tan^2 x - 14 \tan x + 24 = 0$

$x^2 - 14x + 24 = 0$

Both

$(x - 12)(x - 2)$

$x^2 - 22x + 24$

$$\begin{array}{r|l} 24 & \\ -1 & -24 \\ \hline -3 & -12 \\ -4 & -8 \\ -6 & \end{array}$$

Continued

(P8)

Question 3 iv) contin...

$$(x-12)(x-2)$$

$$\begin{aligned} x-12 &= 0 \\ x-2 &= 0 \end{aligned} \quad \begin{aligned} x &= +12 \\ x &= +2 \end{aligned}$$

$$\tan x = +12$$

$$\tan x = +2$$

$$\tan^{-1} 12 =$$

$$85.24$$

$$180 + 85.24 =$$

$$265.24$$

ANSWER

(1)

$$\tan^{-1} 2 =$$

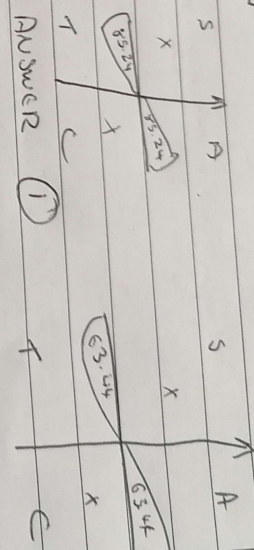
$$63.44$$

$$180 + 63.44 =$$

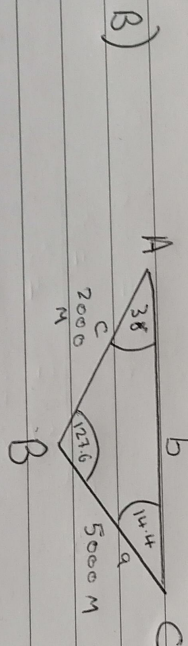
$$243.44$$

ANSWER

(2)



Question 3



SINE RULE

$$\frac{5000}{\sin C} = \frac{2000}{\sin C}$$

$$= (0.62)(2000) = (\sin C)(5000)$$

$$= (1240) = 0.248$$

$$\frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{2000}{\sin B} = \frac{2000}{0.25}$$

Angle $\sin^{-1}$

$$14.36$$

$$\frac{b}{0.79} = \frac{2000}{0.25}$$

$$(2000)(0.79) = b(0.25)$$

Question 1

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

Question 2

$$a) \quad \frac{2x+3}{6} = \frac{x}{3} + \frac{5x-1}{6} \quad \times 6$$

$$2x+3 = 2x + 5x-1$$

$$2x+3 = 7x-1 \quad -2x \quad 8+1$$

$$4 = 5x$$

$$5x = 4$$

$$x = \frac{4}{5} = \textcircled{0.8}$$

$$ii) \quad 2 \ln(x+6) = \ln(x+3) + \ln(x+7)$$

$$\cancel{\log}(x+6)^2 = \cancel{\log}(x+3)(x+7)$$

$$(x+6)(x+6) = (x+3)(x+7)$$

$$x^2 + 6x + 6x + 36 = x^2 + 7x + 3x + 21$$

$$\cancel{x^2} + 12x + 36 = \cancel{x^2} + 10x + 21 \quad -x^2$$

$$2x + 36 = 21 \quad -10x$$

$$2x = -15 \quad -36$$

$$x = -\frac{15}{2} \quad \div 2$$

$$\boxed{= -7.5}$$

ANSWER