

Q6)

i) $\int x^5 + 3x^2 + 4x - 5 \, dx$

$= \frac{x^6}{6} + \frac{3x^3}{3} + \frac{4x^2}{2} - 5x + C$

ii) $\int x^5 (x^2 + x + 7) \, dx$

$\int x^7 + 2x^6 + 7x^5 \, dx$

~~$\int x^7 + 2x^6 + 7x^5 \, dx$~~

~~$\int x^7 + 2x^6 + 7x^5 \, dx$~~

$= \frac{x^8}{8} + \frac{2x^7}{7} + \frac{7x^6}{6} + C$

iii) $\int 7 \cos 2x \, dx$

$= -\frac{7}{2} \sin 2x + C$

iv) $\int_0^2 (x+3)(x+2) \, dx$

$\int_0^2 x^2 + 5x + 6 \, dx$

$= \left[\frac{x^3}{3} + \frac{5x^2}{2} + 6x \right]_0^2$

$= \left[\frac{8}{3} + 10 + 12 \right]$

$= \left[2.66 + 10 + 12 \right] = 24.66$

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Q1)

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i) $y = 6x^3 + 2x^2 + 7x - 10$

$$\frac{dy}{dx} = 18x^2 + 4x + 7$$

ii) $y = (x+7)(x-2)$

$$\therefore x^2 - 2x + 7x - 14$$

$$\frac{dy}{dx} = x^2 + 5x - 14$$

$$\frac{dy}{dx} = 2x + 5$$

iii) $y = \frac{1}{x^9} - \sin 3x$

$$y = x^{-9} - \sin 3x$$

$$\frac{dy}{dx} = -9x^{-10} + 3\cos 3x$$

iv) $y = e^{7x} \sin 5x$

$$\frac{dy}{dx} = (\sin 5x)(7e^{7x}) + (e^{7x})(5\cos 5x)$$

v) $y = \frac{x^2}{\cos x}$

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

vi) $y = \sqrt{8x^4 + x + 7}$
 $y = (8x^4 + x + 7)^{0.5}$

$$\frac{dy}{dx} = 0.5(8x^4 + x + 7)^{-0.5}(32x^3 + 1)$$

Q4) Transpose P

$$U = \frac{r(p^3 - T)}{Z}$$

$$UZ = r(p^3 - T)$$

$$\frac{UZ}{r} = p^3 - T$$

$$\frac{UZ}{r} + T = p^3$$

$$\sqrt{\frac{UZ}{r} + T} = p$$

Q5) i) $2^{x+3} = 4^x$

$$\log 2^{x+3} = \log 4^x$$

$$(x+3)\log 2 = x\log 4$$

$$(x+3)0.30 = 0.60x$$

$$0.30x + 0.90 = 0.60x$$

$$0.90 = 0.30x$$

$$3 = x$$

ii) $\log(x+4) + \log(x+1) = \log(x+9) + \log(x+2)$

$$\cancel{\log(x+4)(x+1)} = \cancel{\log(x+9)(x+2)}$$

$$\cancel{x^2} + 5x + 4 = \cancel{x^2} + 11x + 18$$

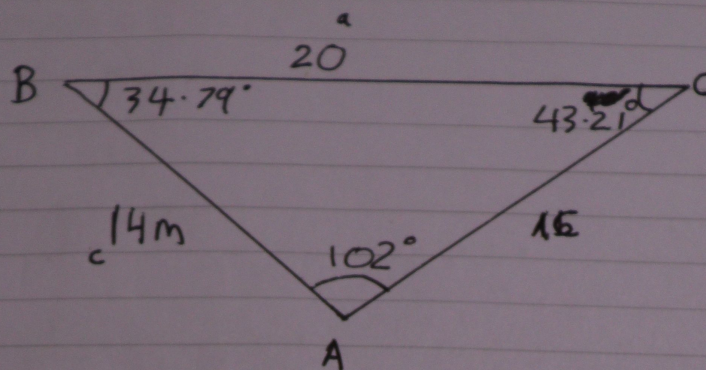
$$-6x = -14$$

$$x = \frac{-14}{-6}$$

$$x = -2.33$$

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Q3)



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i) Angle C

$$\frac{20}{\sin(102)} = \frac{20 \cdot 45}{\sin C}$$

$$\sin C = \frac{20 \cdot 45 \cdot \sin(102)}{20}$$

$$\sin C = 1.00$$

$$\sin^{-1}(1) = 90^\circ$$

~~$$180 - 102 - 90 = 192$$~~

i) Angle C

$$\frac{20}{\sin(102)} = \frac{14}{\sin C}$$

$$\sin C = \frac{14 \sin(102)}{20}$$

$$\sin C = 0.6847$$

$$C = 43.21^\circ$$

$$ii) \hat{B} = 180^\circ - 102^\circ - 43.21^\circ$$

$$B = 34.79^\circ$$

$$iii) \frac{AC}{\sin 34.79} = \frac{20}{\sin(102)}$$

$$AC = \frac{20 \sin(34.79)}{\sin(102)}$$

$$AC = 11.67m$$

Q2)

$$i) \sin x = 0.87$$

$$\sin^{-1}(0.87)$$

$$x = 60.46^\circ$$

$$180 - 60.46$$

$$x = 119.54^\circ$$

$$ii) 4 \tan x = -9$$

$$\tan x = \frac{-9}{4}$$

$$\therefore x = 66.04^\circ$$

$$180 - 66.04$$

$$x = 113.96^\circ$$

$$360 - 66.04$$

$$x = 293.96^\circ$$

$$iii) 7 \cos x = 2$$

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

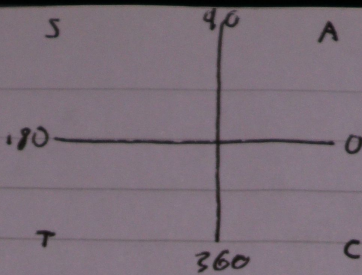
$$\therefore x = 73.40^\circ$$

$$\therefore 180 - 73.40$$

$$x = 106.6^\circ$$

$$\therefore 360 - 73.40$$

$$= 286.6^\circ$$



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