

Q1)

a) $\int 7x^4 + 2x + 8 \, dx$

$$= \frac{7x^5}{5} + \frac{2x^2}{2} + 8x + C$$

b) $\int \frac{1}{x^3} \, dx$

$$= \int x^{-3} \, dx$$

$$= \frac{x^{-2}}{-2} + C$$

c) $\int \sec^2 x \, dx$

$$= \tan x + C$$

d) $\int (x+4)^2 \, dx$

$$= \int (x+4)(x+4) \, dx$$

$$= \int x^2 + 8x + 16 \, dx$$

$$= \frac{x^3}{3} + \frac{8x^2}{2} + 16x + C$$

e) $\int_0^4 x^3 + 5x + 2 \, dx$

$$\left[\frac{x^4}{4} + \frac{5x^2}{2} + 2x \right]_0^4$$

$$= \left[\frac{(4)^4}{4} + \frac{5(4)^2}{2} + 2(4) \right] - [0]$$

$$= [64 + 40 + 8] - [0]$$

$$= 112$$

$$f) \int_1^2 (x+2)(x+3) dx$$

$$\int_1^2 x^2 + 5x + 6 dx$$

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

$$= \left[\frac{(2)^3}{3} + \frac{5(2)^2}{2} + 6(2) \right] - \left[\frac{(1)^3}{3} + \frac{5(1)^2}{2} + 6(1) \right]$$

$$= [2 \cdot 6.7 + 10 + 12] - [0.33 + 2.5 + 6]$$

$$= [24.67] - [8.83]$$

$$= 15.84$$

Q2) a) $\tan 28 = \frac{yz}{10}$

$$5.32m = yz$$

b) $(BC)^2 = (5)^2 + (3)^2 - 2(5)(3)\cos 112$

$$(BC)^2 = 25 + 9 + 11.24$$

$$BC = \sqrt{45.24}$$

$$BC = 6.73$$

Q3) a) $y = 7x^2 + 2x + 1$

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

b) $y = (x+7)(x+2)$

$$y = x^2 + 9x + 14$$

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

c) $y = 2x^2 - 9x + 6$

$$\frac{dy}{dx} = 4x - 9$$

d) $y = \tan 3x$

$$\frac{dy}{dx} = 3 \sec^2 3x$$

e) $y = \frac{1}{x^9}$

$$y = x^{-9}$$

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

f) $y = \overset{\uparrow u}{x^2} \overset{\downarrow v}{\cos x}$

$$\frac{du}{dx} = 2x, \quad \frac{dv}{dx} = -\sin x$$

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

$$g) \quad y = \frac{e^{3x}}{\sin x} \leftarrow u \quad \frac{du}{dx} = 3e^{3x} \quad \frac{dv}{dx} = \cos x$$

$$\therefore \quad \frac{dy}{dx} = \frac{(\sin x)(3e^{3x}) - (e^{3x})(\cos x)}{(\sin x)^2}$$

$$h) \quad y = (5x^3 - 1)^4$$

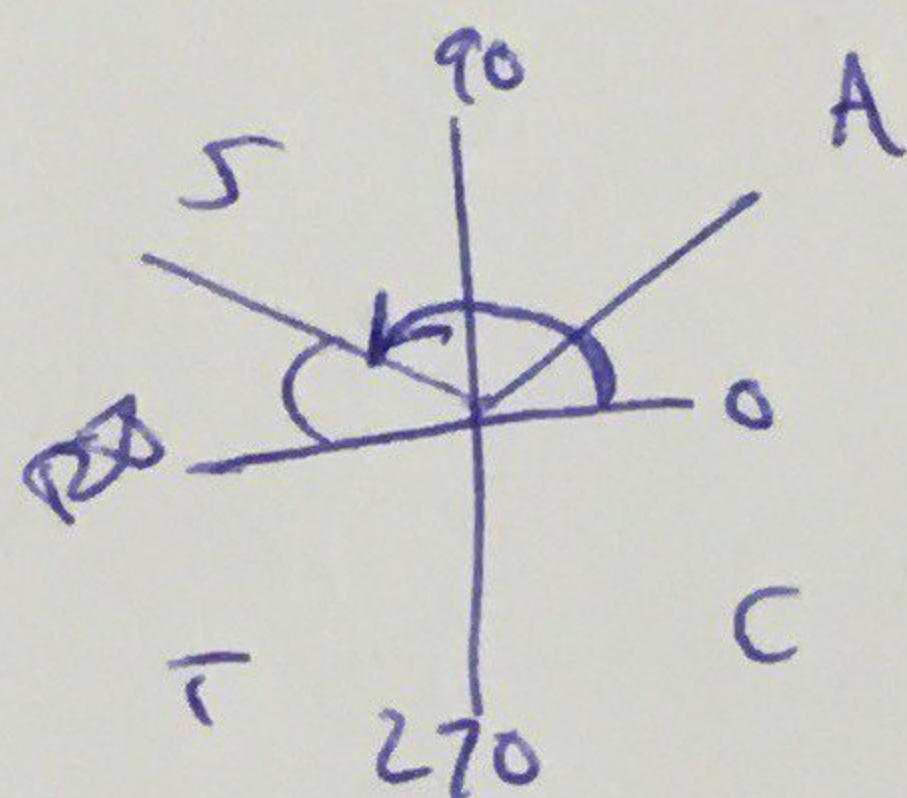
$$\frac{dy}{dx} = 4(5x^3 - 1)^3(15x^2)$$

Q4)

$$a) \quad \sin x = 0.26$$

$$x = \sin^{-1}(0.26)$$

$$x = 15.07^\circ$$



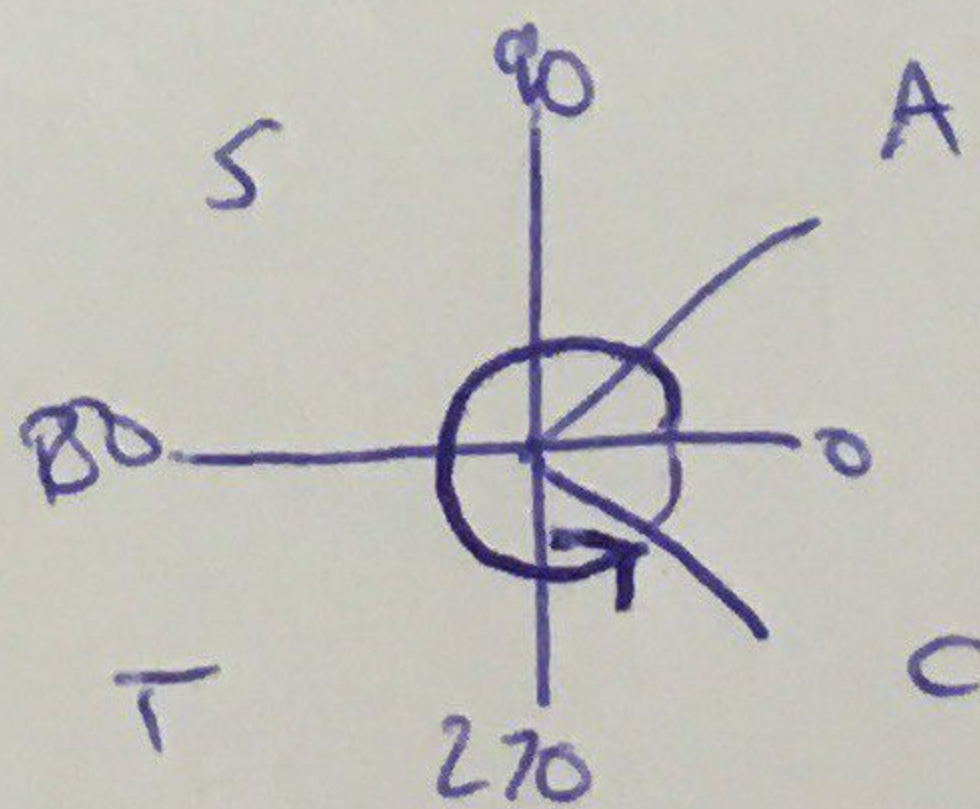
$$x = 180^\circ - 15.07^\circ$$

$$x = 164.93^\circ$$

$$b) \quad \cos x = 0.32$$

$$x = \cos^{-1}(0.32)$$

$$x = 71.34^\circ$$



$$x = 360^\circ - 71.34^\circ$$

$$x = 288.66^\circ$$