

1. $10x^4 + 12 \rightarrow \frac{dy}{dx} = 40x^3$

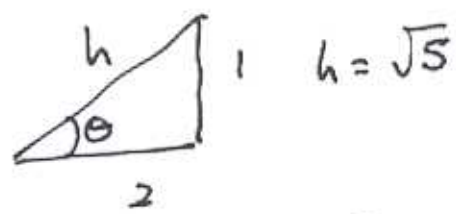
2. 1 2 3 4 5 1 2 3 4 5 1

$t_{48} = 3.$

(ii) Sum of first 48 terms = $9 \times 15 + 6 = 141$

$\swarrow (1+2+3+4+5)$
 $\swarrow (1+2+3)$

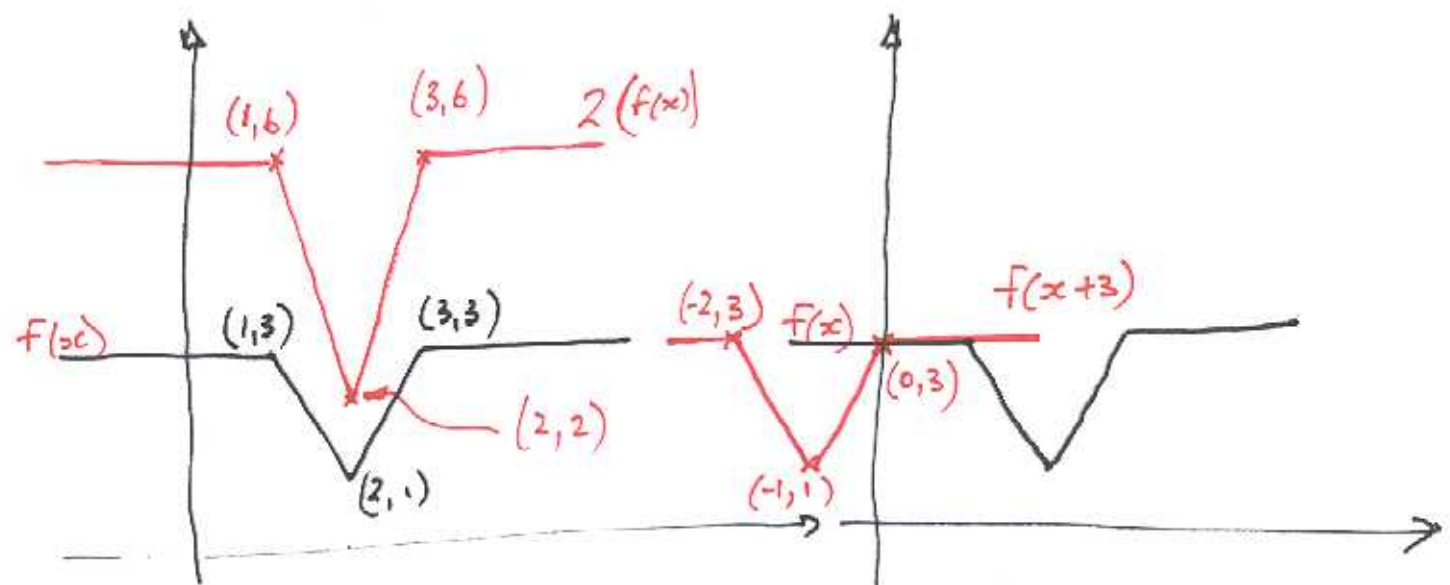
3. $\tan \theta = \frac{1}{2}$ θ is acute



$\cos \theta = \frac{2}{h} = \frac{2}{\sqrt{5}}$

$\therefore \cos^2 \theta = \frac{2^2}{(\sqrt{5})^2} = \frac{4}{5}$

4.



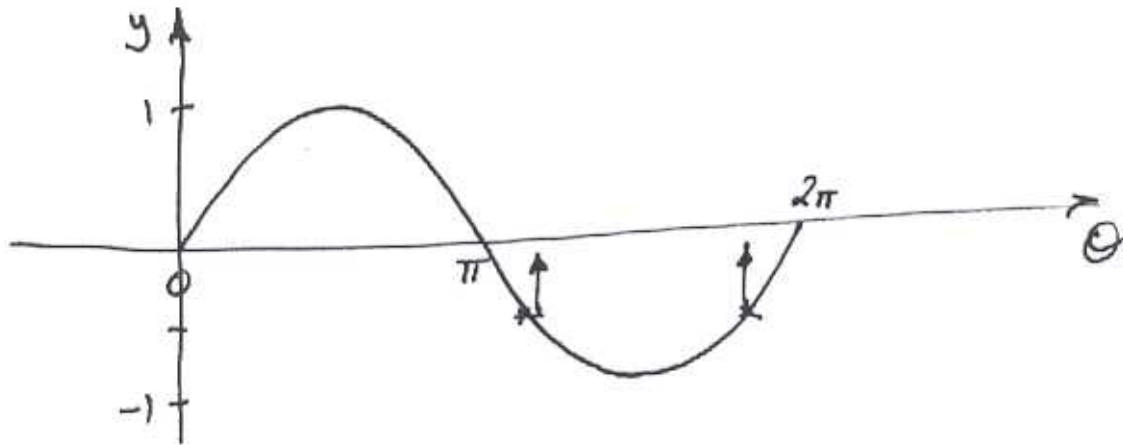
$2f(x) \rightarrow$ stretch (scaling) in y dirⁿ by factor 2

$f(x+3)$ translation $\begin{pmatrix} -3 \\ 0 \end{pmatrix}$ (more left).

$$5. \int (12x^5 + \sqrt[3]{x} + 7) dx = \int (12x^5 + x^{1/3} + 7) dx$$

$$\Rightarrow \frac{12x^6}{6} + \frac{x^{4/3}}{4/3} + 7x + C = \underline{\underline{2x^6 + \frac{3}{4}x^{4/3} + 7x + C}}$$

$$6. y = \sin \theta \quad 0 \leq \theta \leq 2\pi$$



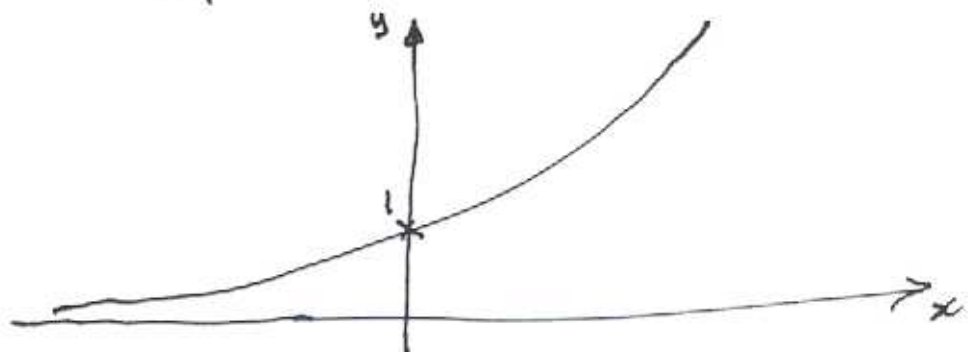
$$2 \sin \theta = -1 \quad \sin \theta = -1/2 \quad \left. \begin{array}{l} \theta = 30^\circ \\ \theta = \frac{\pi}{6} \end{array} \right\}$$

$$\begin{aligned} \therefore \sin \theta = -1/2 \quad \theta &= \pi + \frac{\pi}{6} \quad \text{and} \quad 2\pi - \frac{\pi}{6} \\ &= \underline{\underline{\frac{7\pi}{6} \quad \text{and} \quad \frac{11\pi}{6}}} \end{aligned}$$

$$7(i) \sum_2^5 2^k = 2^2 + 2^3 + 2^4 + 2^5 = 4 + 8 + 16 + 32 = \underline{\underline{60}}$$

$$(ii) 2^u = \frac{1}{64} \quad \frac{1}{64} = 2^{-6} \quad \therefore \underline{\underline{u = -6}}$$

(iii)



8. 2nd term of G.P, $ar = 18$

4th term $ar^3 = 2$

$$\therefore \frac{ar^3}{ar} = r^2 = \frac{2}{18} = \frac{1}{9} \quad \therefore r = \frac{1}{3}$$

$$\therefore a = \frac{18}{\frac{1}{3}} = 54$$

$$\text{Sum } \infty = \frac{a}{1-r} = \frac{54}{2/3} = \underline{\underline{81}}$$

9. $\log_{10} y = 3x + 2$ (given)

(i) find x when $y = 500 \Rightarrow 2.69897 = 3x + 2$

$$3x = 0.69897$$

$$x = \underline{\underline{0.23}} \text{ (2 d.p.)}$$

(ii) find y when $x = -1$

$$\log_{10} y = -3 + 2 = -1. \Rightarrow y = \underline{\underline{10^{-1} = 0.1}}$$

(iii) $\log_{10}(y^4) = 4 \log_{10} y$

$$= 4(3x + 2) = \underline{\underline{(12x + 8)}}$$

(iv) $\log_{10} y = 3x + 2$

$$10^{\log_{10} y} = 10^{3x+2} \Rightarrow y = \underline{\underline{10^{3x+2}}}$$