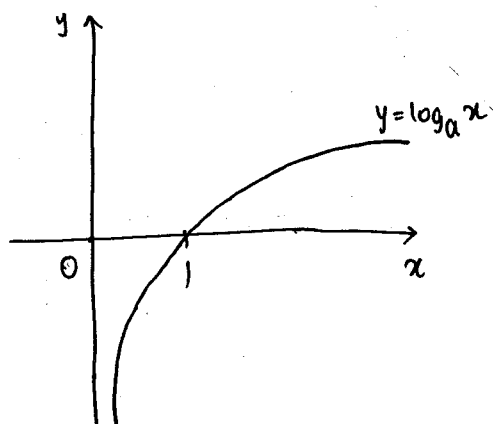


7. Logarithmic and exponential functions

$$y = \log_a x$$



for $y = \log_a (mx + c)$

(a) eq. of asymptote : $mx + c = 0$

(b) x intercept : $mx + c = 1$

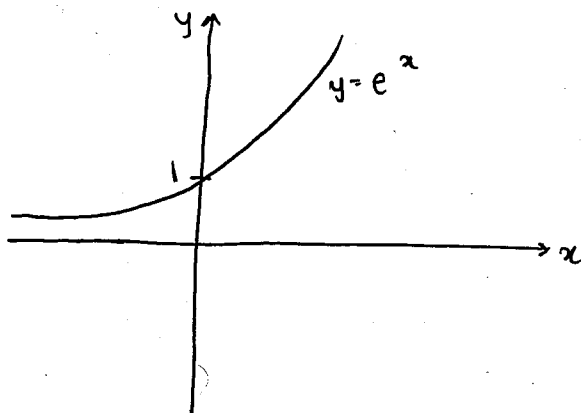
* $\log_a a = 1$

$\log_a 1 = 0$

$$\log_a b = \frac{\log_c b}{\log_c a}$$

$$\log_a b = \frac{1}{\log_b a}$$

$$y = e^x$$



for $y = Ae^{bx} + C$

(a) eq. of asymptote : $y = C$

(b) y intercept : $y = A + C$

Notes

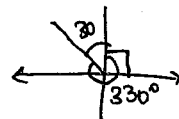
① Bearing — measured clockwise from North direction

② When resolving vectors:

eg. boat, speed in still water 5m/s, steered on bearing 330

$$\vec{v}_B/R = \begin{pmatrix} 5 \cos 120 \\ 5 \sin 120 \end{pmatrix} \quad 120^\circ \text{ is angle from positive x axis}$$

③ If vector is $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$, direction is $\tan^{-1}\left(\frac{y}{x}\right) = \tan^{-1}\left(\frac{4}{3}\right)$



$$\sin(180^\circ - \theta) = \sin \theta$$

$$\cos(180^\circ - \theta) = -\cos \theta$$

$$\sin \theta = \cos(90^\circ - \theta)$$

$$\cos \theta = \sin(90^\circ - \theta)$$