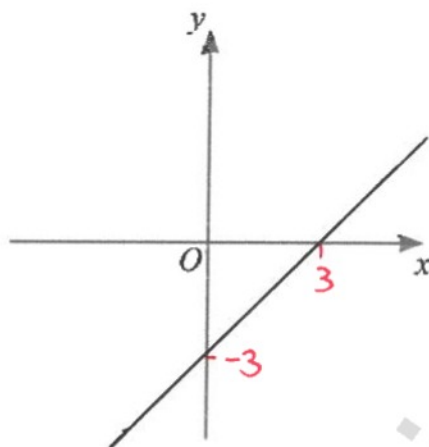


A Sketching Graphs of Functions

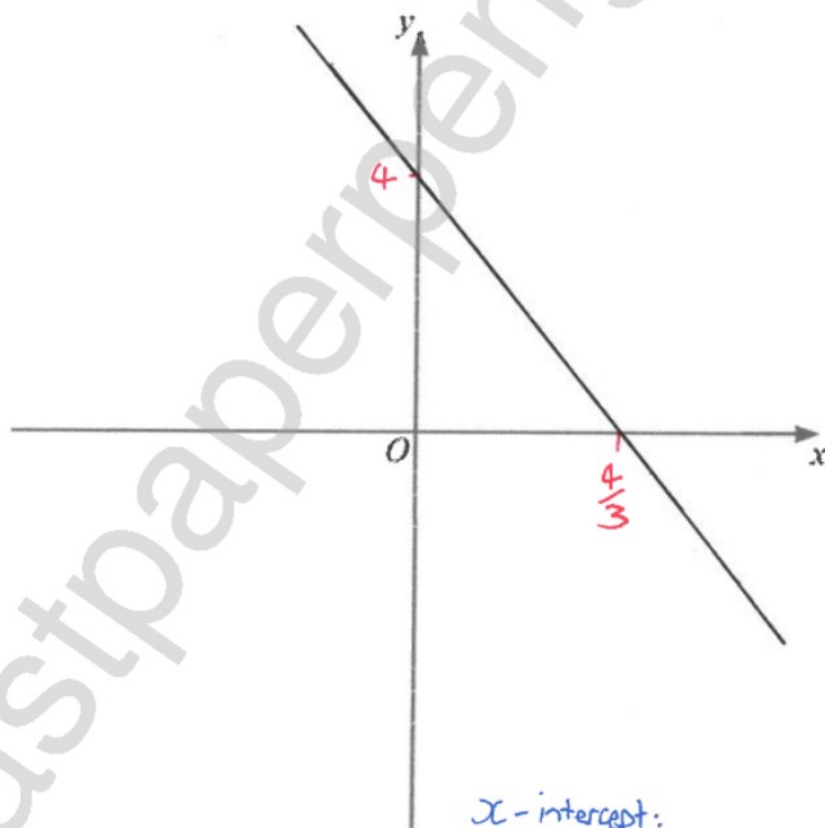
10 Sketch the graph of each function.

(a) $y = x - 3$



[1]

8 (a) On the axes, sketch the graph of $y = 4 - 3x$.



x -intercept:

$$0 = 4 - 3x$$

$$+3x \quad +3x$$

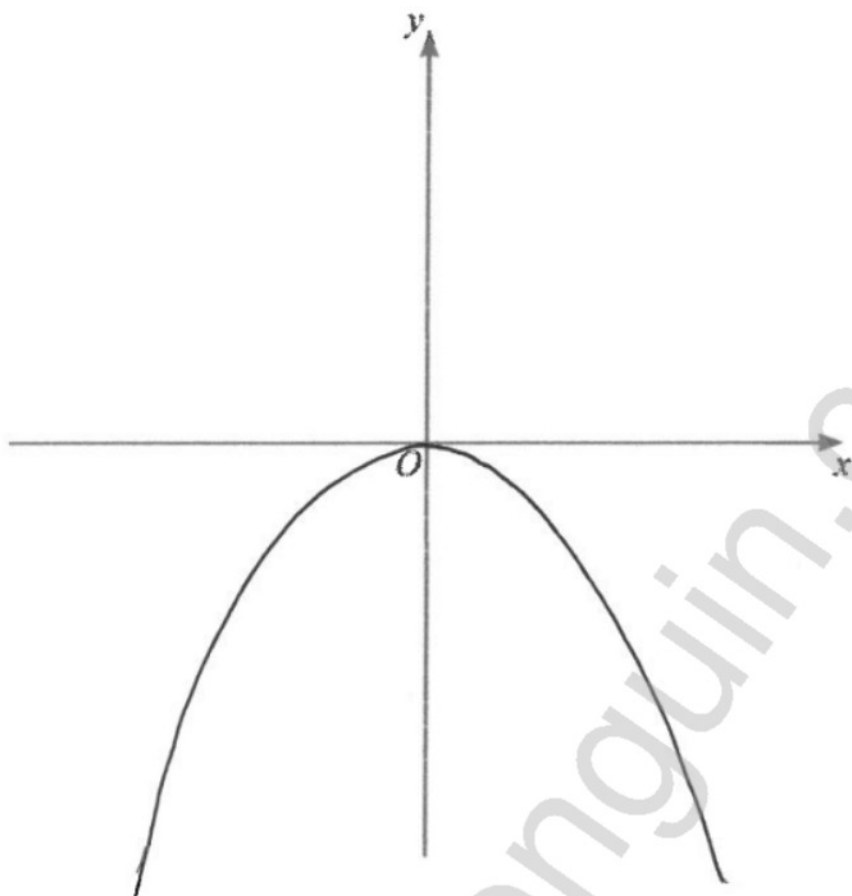
$$3x = 4$$

$$\div 3 \quad \div 3$$

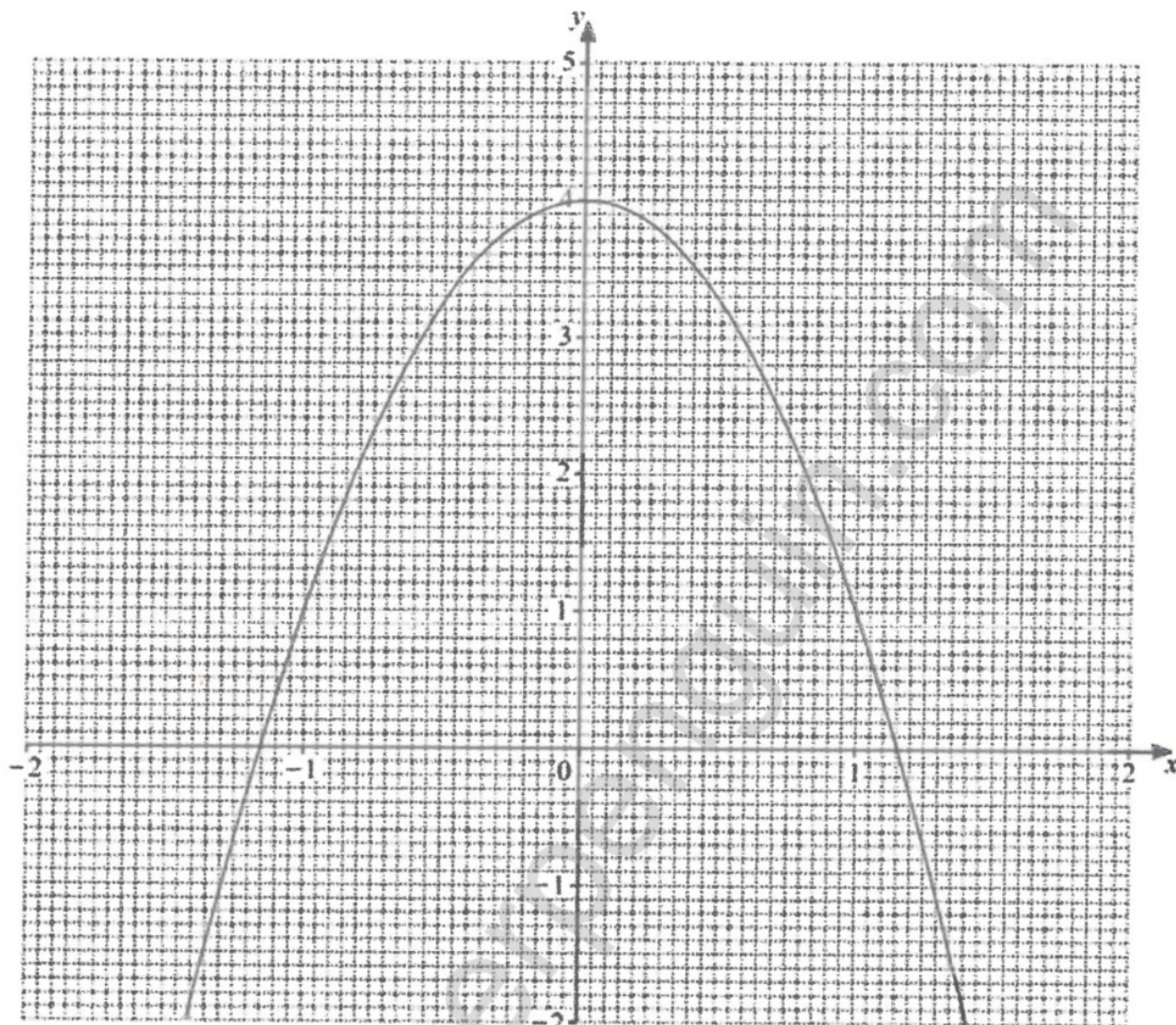
$$x = \frac{4}{3}$$

[2]

(b) On the axes, sketch the graph of $y = -x^2$.



[2]



(a) The grid shows the graph of $y = a + bx^2$.

The graph passes through the points with coordinates (0, 4) and (1, 1).

(i) Find the value of a and the value of b .

Sub. (0, 4):

$$4 = a + b(0)^2$$

$$4 = a$$

$$\rightarrow y = 4 + bx^2$$

Sub. (1, 1):

$$1 = 4 + b(1)^2$$

$$1 = 4 + b$$

$$\begin{array}{r} -4 \\ -4 \end{array}$$

$$\underline{-3 = b}$$

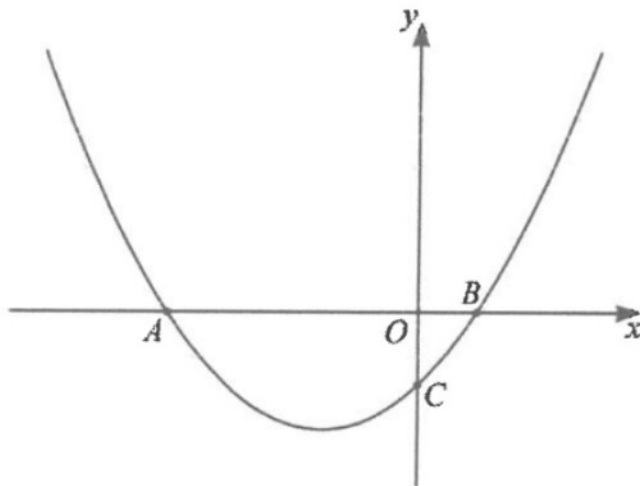
$$y = 4 - 3x^2$$

$$a = \dots\dots\dots 4$$

$$b = \dots\dots\dots -3$$

[2]

10 (a)



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The diagram shows a sketch of the curve $y = x^2 + 3x - 4$.

(i) Find the coordinates of the points A, B and C.

C: sub. $x=0$:

$$y = 0^2 + 3(0) - 4$$

$$\underline{y = -4}$$

A + B: factorise and set = 0:

$$(x + 4)(x - 1) = 0$$

$$\underset{-4}{x+4} = 0 \text{ or } \underset{-4}{x-1} = 0$$

$$\underline{x = -4}$$

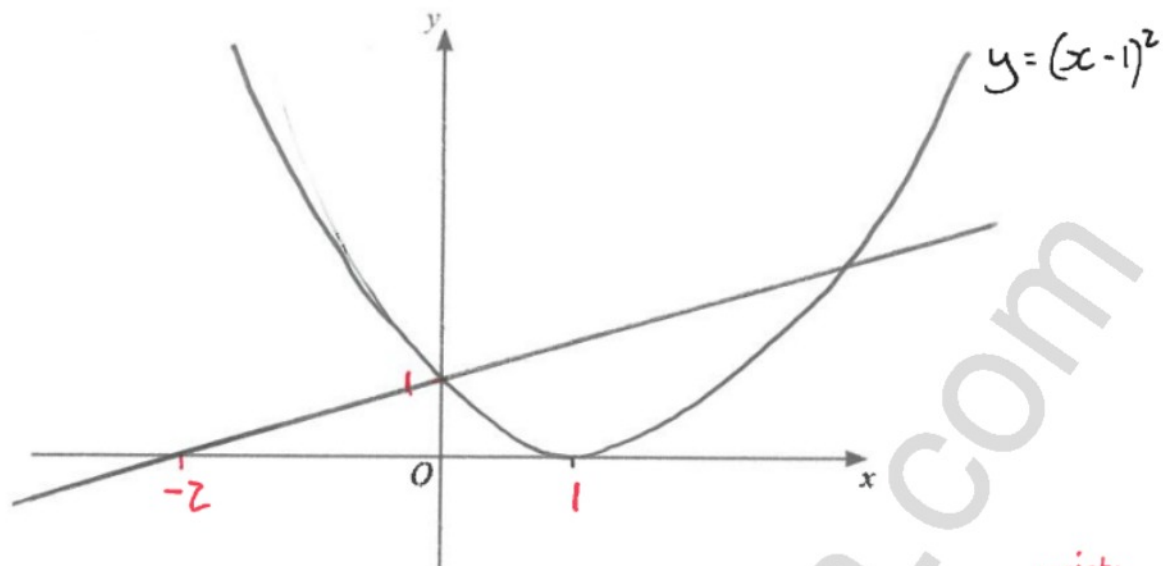
$$\underline{x = 1}$$

$$A(\underline{-4}, \underline{0})$$

$$B(\underline{1}, \underline{0})$$

$$C(\underline{0}, \underline{-4}) \quad [4]$$

(c) (i)



On the diagram,

(a) sketch the graph of $y = (x-1)^2$,

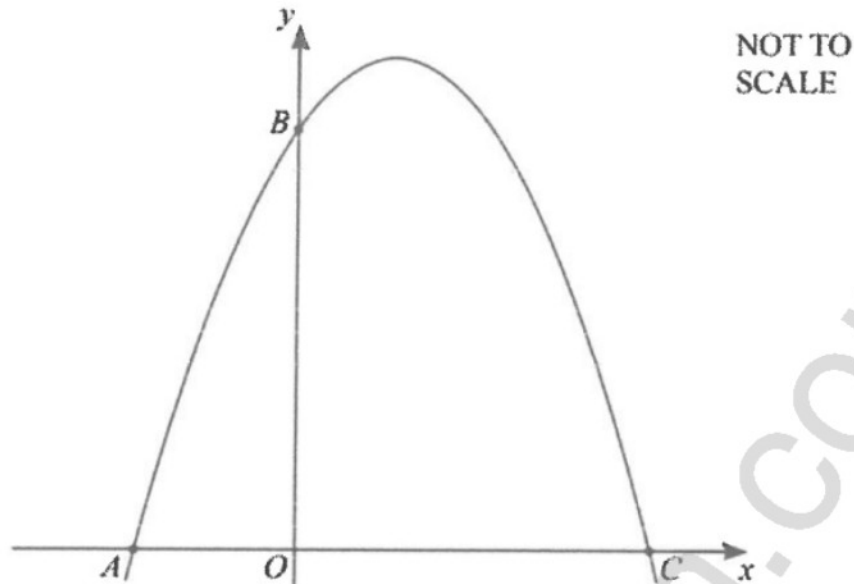
(b) sketch the graph of $y = \frac{1}{2}x + 1$.

x -int: $0 = \frac{1}{2}x + 1$
 $-1 = \frac{1}{2}x$
 $x = -2$

roots: $(x-1)(x-1) = 0$
 $x-1 = 0$
 $x = 1$

repeated root,
So just touches
axis, doesn't cross.

y -int: $y = (x-1)(x-1)$
 $= x^2 - 2x + 1$
[2] $\uparrow$
[2] $(0, 1)$



The diagram shows a sketch of $y = 18 + 5x - 2x^2$.

(a) Find the coordinates of the points A, B and C.

B: set $x=0$:

$$y = 18 + 5(0) - 2(0)^2$$

$$\underline{y = 18}$$

A & C: set $y=0$ and solve:

$$18 + 5x - 2x^2 = 0$$

$$\begin{array}{cccc} x-1 & x-1 & x-1 & x-1 \end{array}$$

$$2x^2 - 5x - 18 = 0$$

ac: -36

two numbers: 4, -9

$$\rightarrow 2x^2 + 4x - 9x - 18 = 0$$

$$2x(x+2) - 9(x+2) = 0$$

$$(2x-9)(x+2) = 0$$

$$\begin{array}{ll} 2x-9=0 & x+2=0 \\ +9 & -2 \\ 2x=9 & \underline{x=-2} \\ \div 2 & \\ \underline{x=9/2} & \end{array}$$

$$A(\underline{-2}, \underline{0})$$

$$B(\underline{0}, \underline{18})$$

$$C(\underline{9/2}, \underline{0}) \quad [4]$$

(b) Sketch the curve $y = x^3 - 4x$.

roots:

positive cubic:

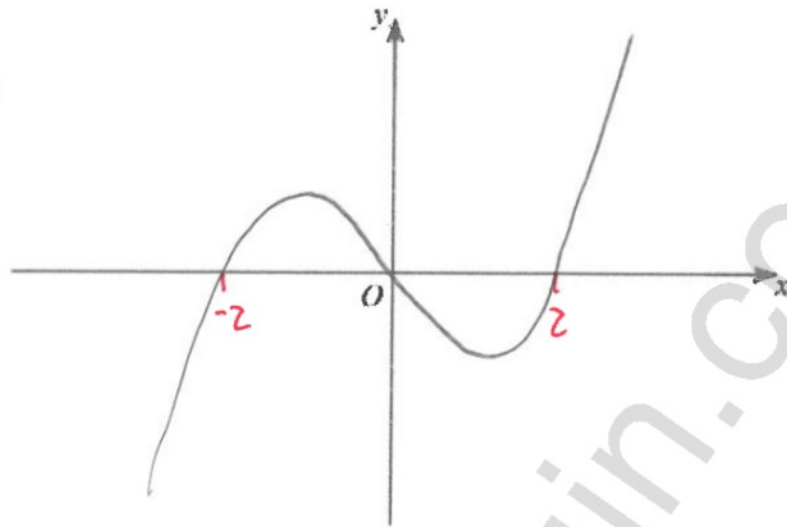


$$x^3 - 4x = 0$$

$$x(x^2 - 4) = 0$$

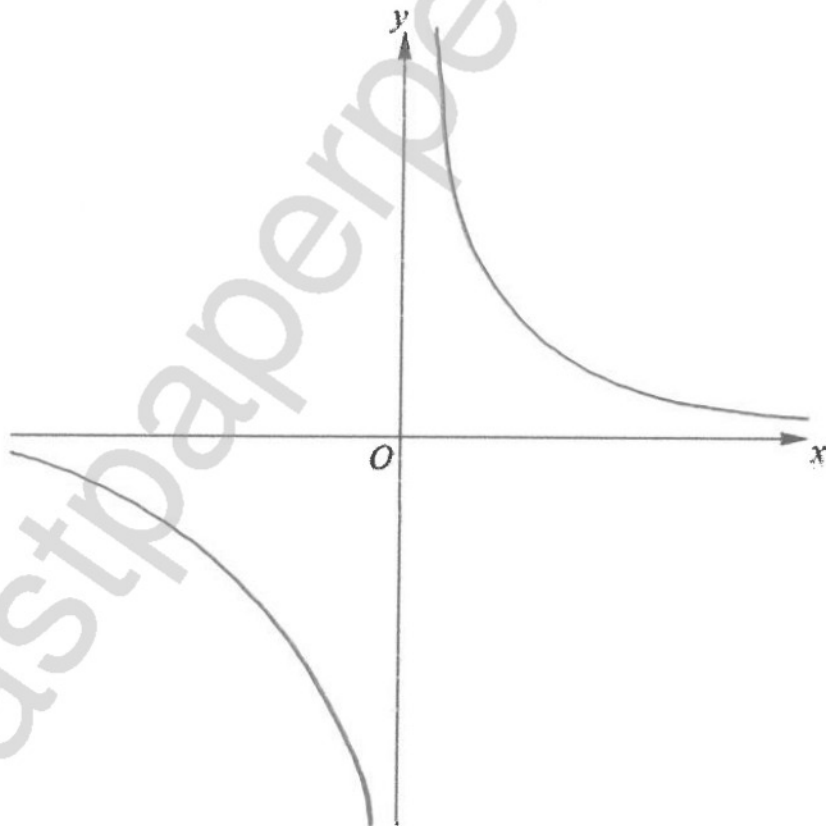
$$x(x+2)(x-2) = 0$$

$$x=0, x=-2, x=2$$

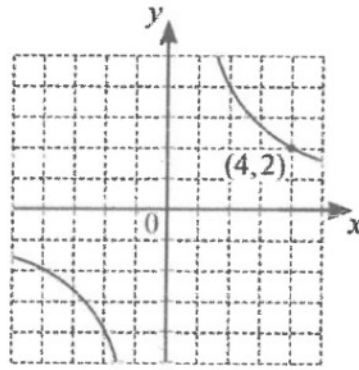


[3]

8 On the diagram, sketch the graph of $y = \frac{1}{x}$.



[2]



reciprocal graph, so:

$$y = \frac{a}{x}$$

In the diagram, the graph passes through the point (4, 2).

Write down the equation of the graph.

$$y = \frac{a}{x}$$

sub. (4, 2): $2 = \frac{a}{4}$

$\times 4$ $\times 4$

$8 = a$

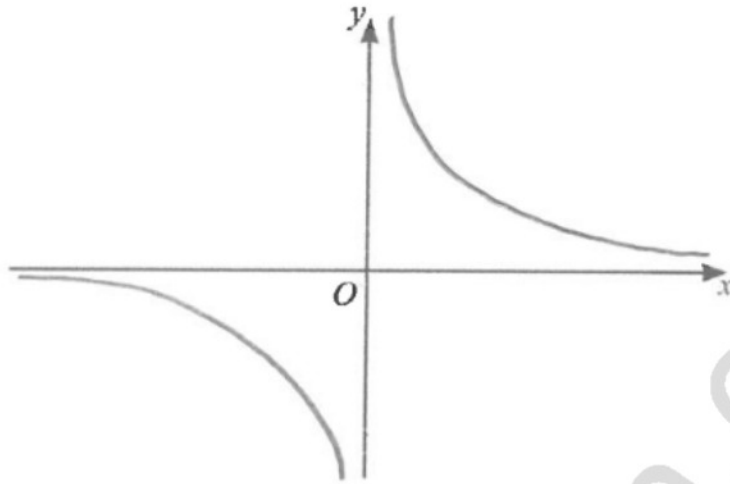
$$y = \frac{8}{x}$$

$$y = \frac{8}{x}$$

[2]

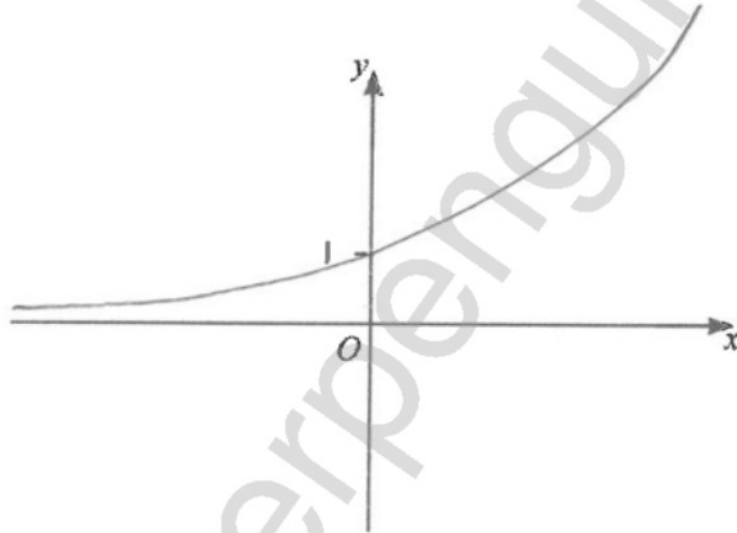
21 On the axes, sketch the graph of each of these functions.

(a) $y = \frac{1}{x}$



[2]

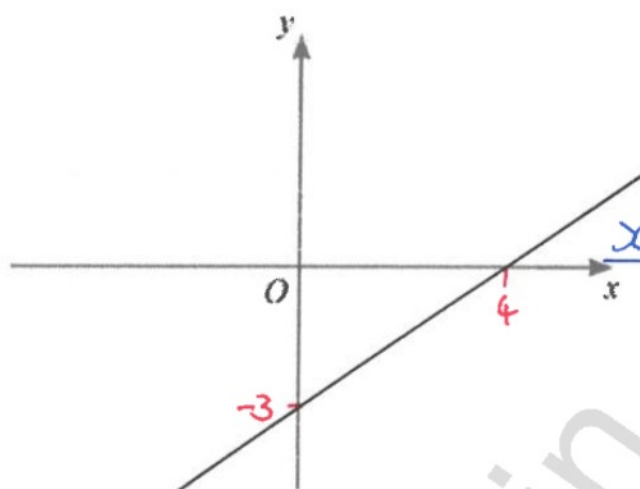
(b) $y = 4^x$



[2]

- 9 (a) Sketch the following graphs.
On each sketch, indicate any intercepts with the axes.

(i) $3x - 4y = 12$



y-int: $x=0$:

$$3(0) - 4y = 12$$

$$-4y = 12$$

$$\div -4 \quad \div -4$$

$$\underline{y = -3}$$

x-int: $y=0$:

$$3x - 4(0) = 12$$

$$3x = 12$$

$$\div 3 \quad \div 3$$

$$\underline{x = 4}$$

[2]

(ii) $y = x^2 - 3x - 4$

roots:

$$x^2 - 3x - 4 = 0$$

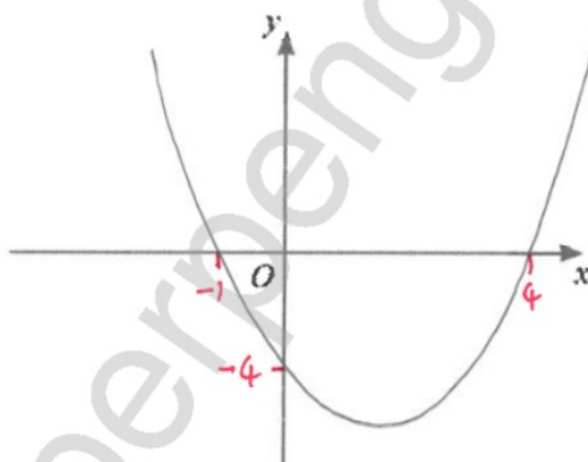
$$(x - 4)(x + 1) = 0$$

$$\underline{x = 4}, \underline{x = -1}$$

y-int:

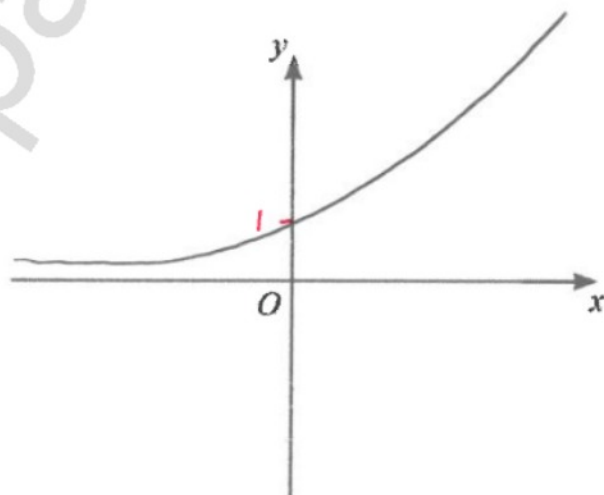
$$y = 0^2 - 3(0) - 4$$

$$\underline{y = -4}$$



[4]

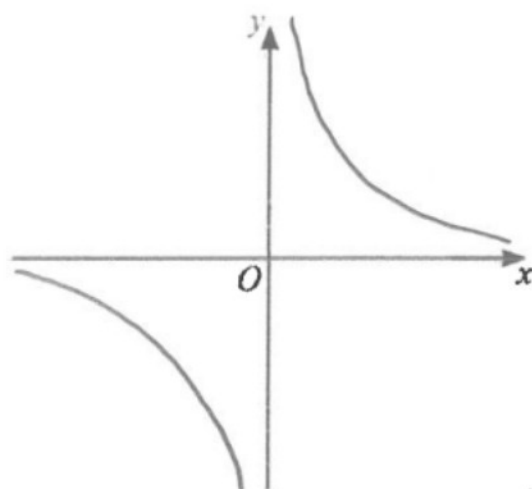
(iii) $y = 6^x$



[2]

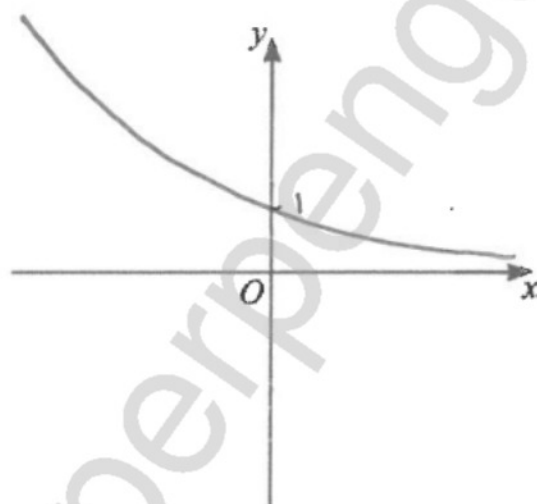
24 On the axes, sketch the graph of each of these functions.

(a) $y = \frac{2}{x}$



[2]

(b) $y = 2^{-x}$



[2]