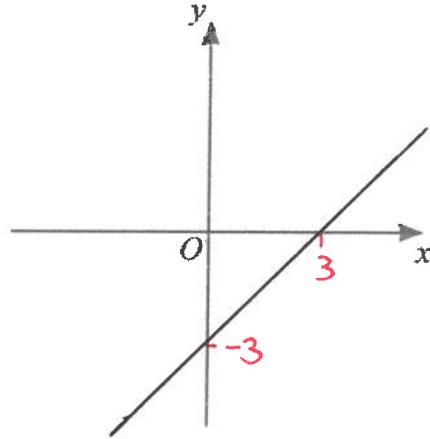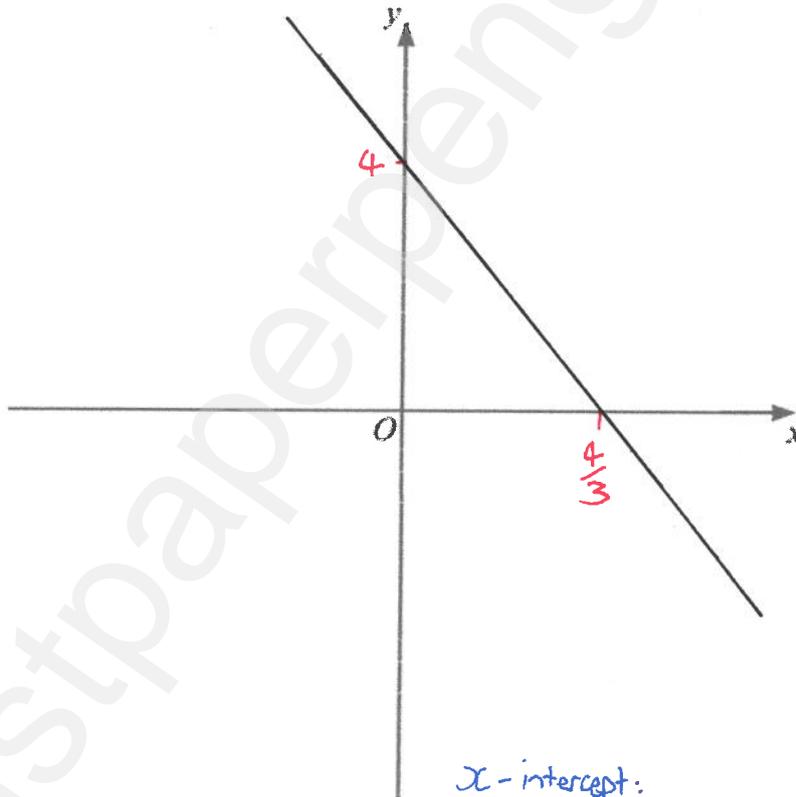**10** Sketch the graph of each function.

(a) $y = x - 3$

[1]

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

x - intercept:
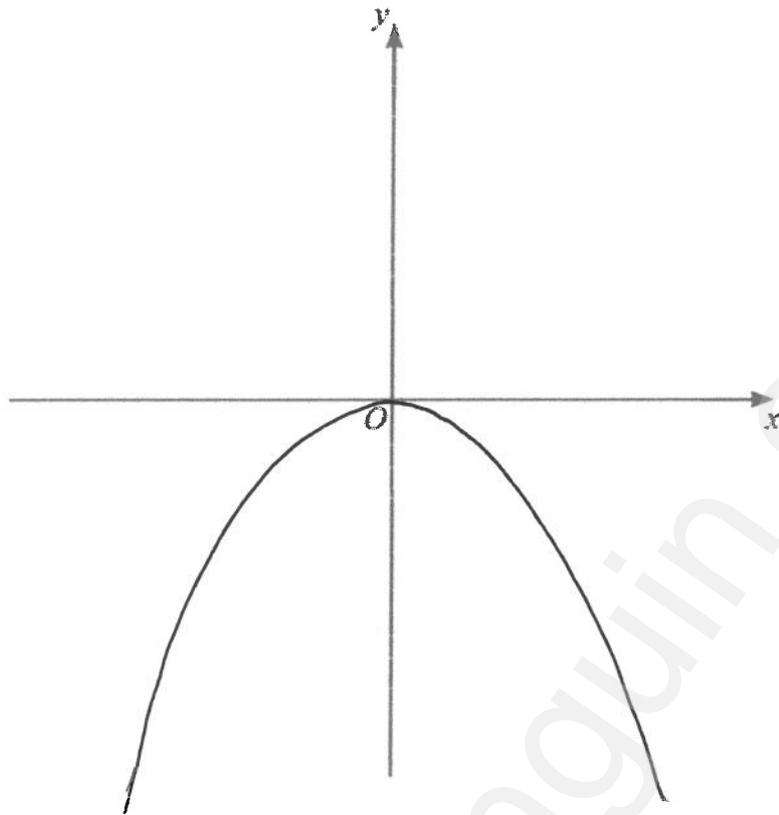
$$0 = 4 - 3x$$
$$+3x \qquad +3x$$
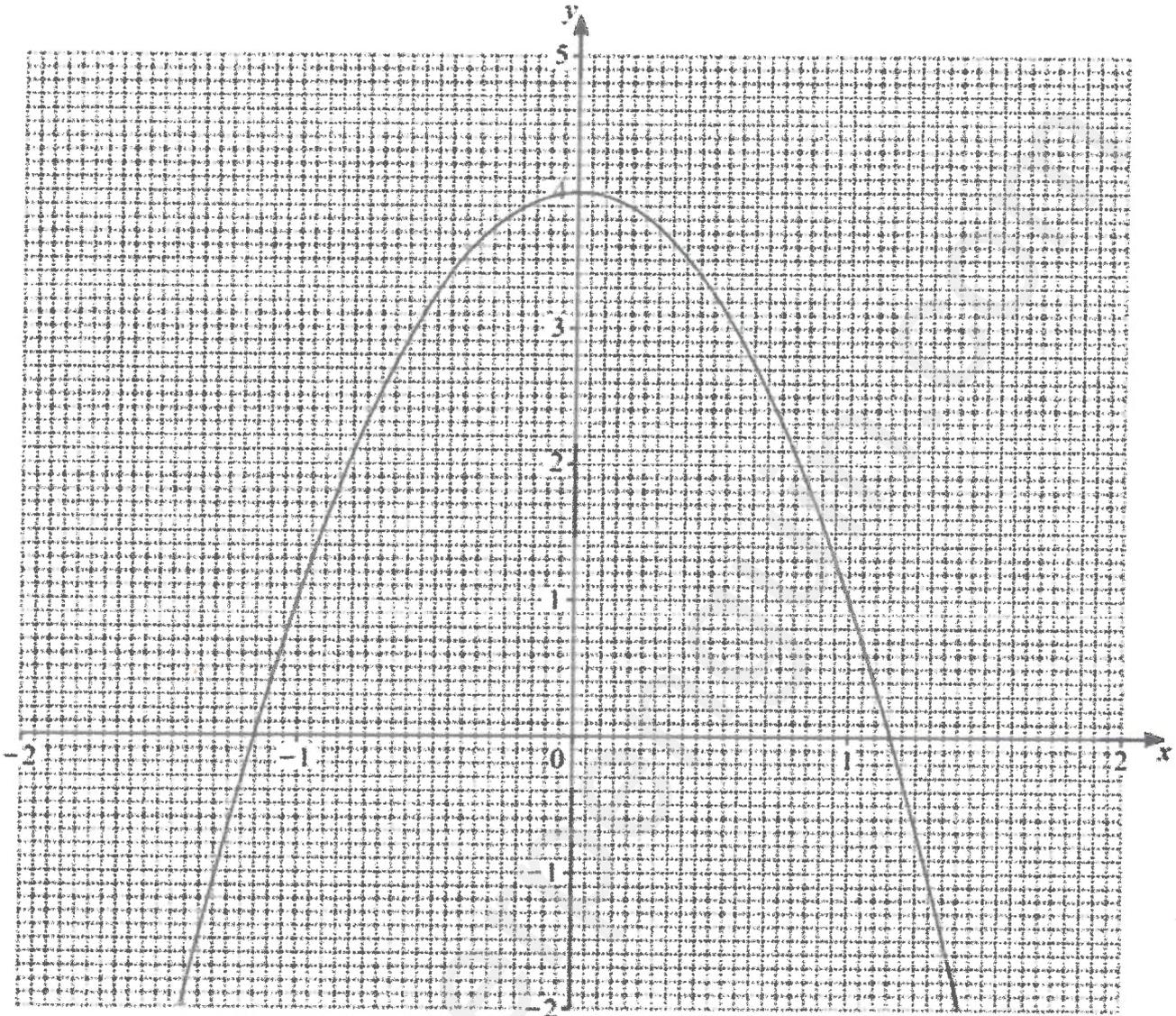
$$3x = 4$$
$$\div 3 \qquad \div 3$$

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

[2]

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

[2]

6

(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. $(0,4)$:

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

$$\underline{4 = a}$$

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

Sub. $(1,1)$:

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

$$1 = 4 + b$$
$$\;\;-4 \qquad -4$$

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

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

$a =$ .... 4 ....

$b =$ .... -3 .... **[2]**

www.pastpaperpenguin.com

10 **(a)**
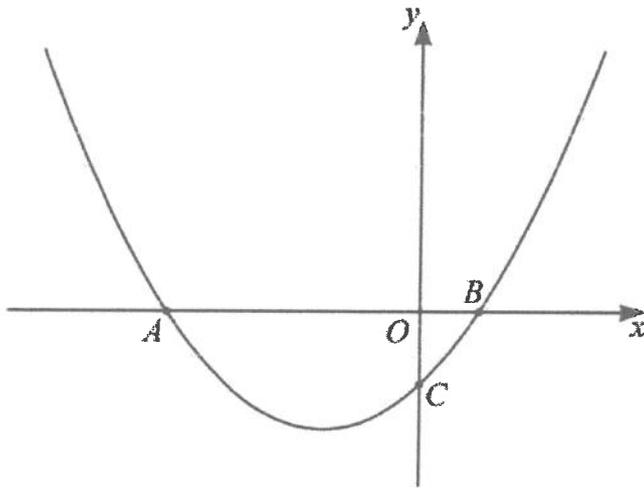
NOT TO SCALE

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

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

$\underline{C:}$ sub. $x = 0$:

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

$\underline{y = -4}$

$\underline{A \& B:}$ factorise and set $= 0$:

$(x + 4)(x - 1) = 0$
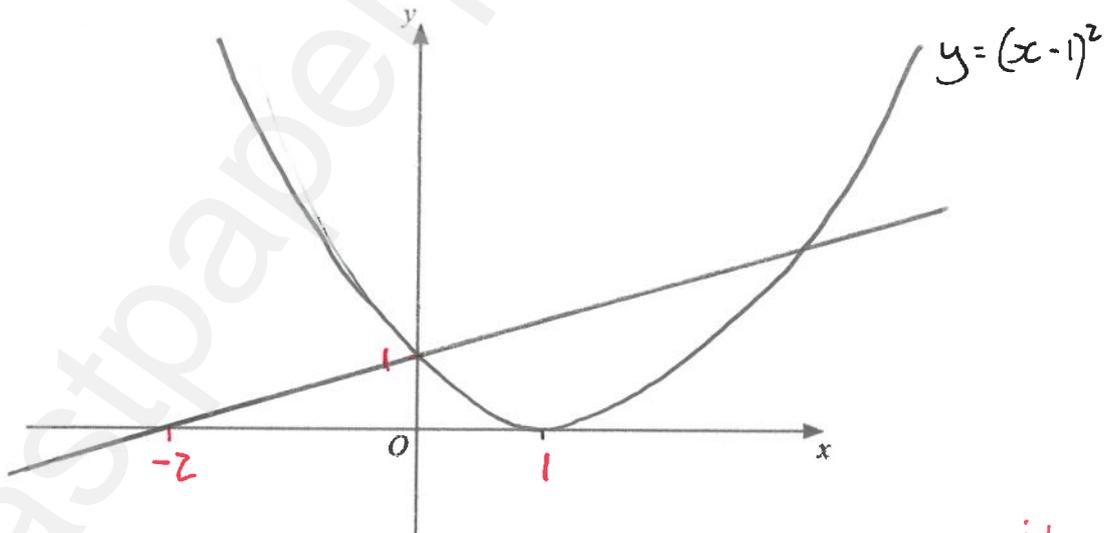
$x + 4 = 0$ or $x - 1 = 0$
$\quad -4 \quad -4 \qquad\quad +1 \quad +1$

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

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

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

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

(c) **(i)**

$y = (x - 1)^2$

On the diagram,

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

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

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

$x - 1 = 0$

$\underline{x = 1}$

repeated root,

so just touches axis, doesn't cross.

y-int: $y = (x - 1)(x - 1)$

$= x^2 - 2x + 1$

$(0, 1)$

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

$-1 = \frac{1}{2}x$

$x = -2$

www.pastpaperpenguin.com

NOT TO SCALE
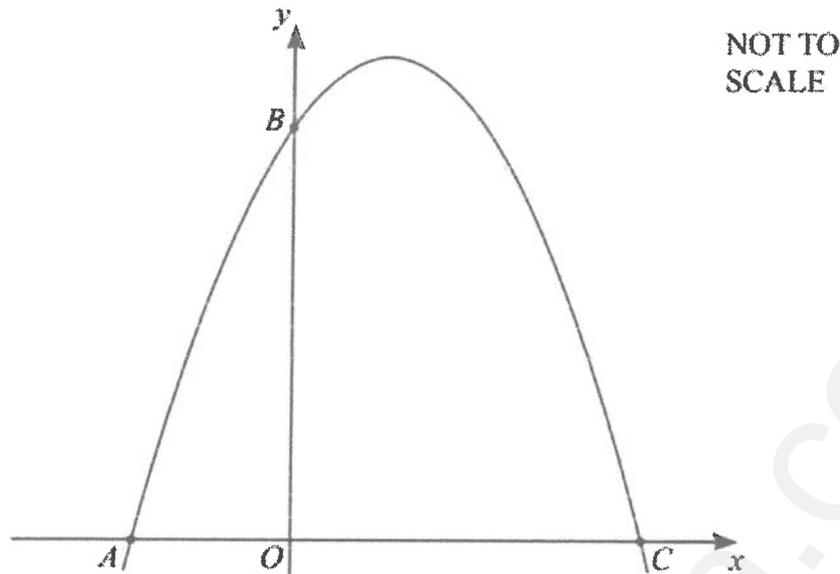
The diagram shows a sketch of $y = 18 + 5x - 2x^2$.

(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:

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

$\times -1 \quad \times -1 \quad \times -1 \quad \times -1$

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

$ac: -36$

two numbers: $4, -9$

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

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

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

$2x - 9 = 0 \qquad x + 2 = 0$

$+9 \ +9 \qquad -2 \ -2$

$2x = 9 \qquad \underline{x = -2}$

$\div 2 \ \div 2$

$\underline{x = \frac{9}{2}}$

$A (\ -2\ , \ 0\ )$

$B (\ 0\ , \ 18\ )$

$C (\ \frac{9}{2}\ , \ 0\ )$ [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]

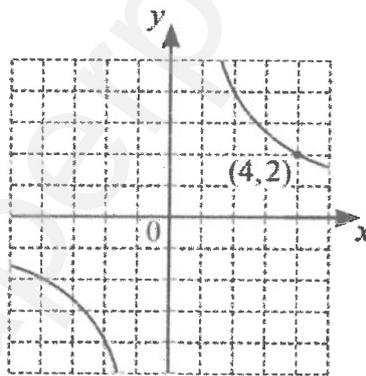www.pastpaperpenguin.com
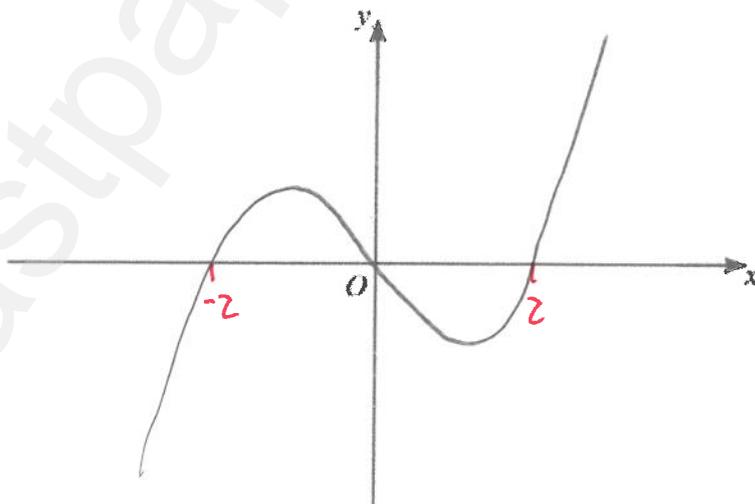
8 On the diagram, sketch the graph of $y = \frac{1}{x}$.

[2]

14

(4,2)
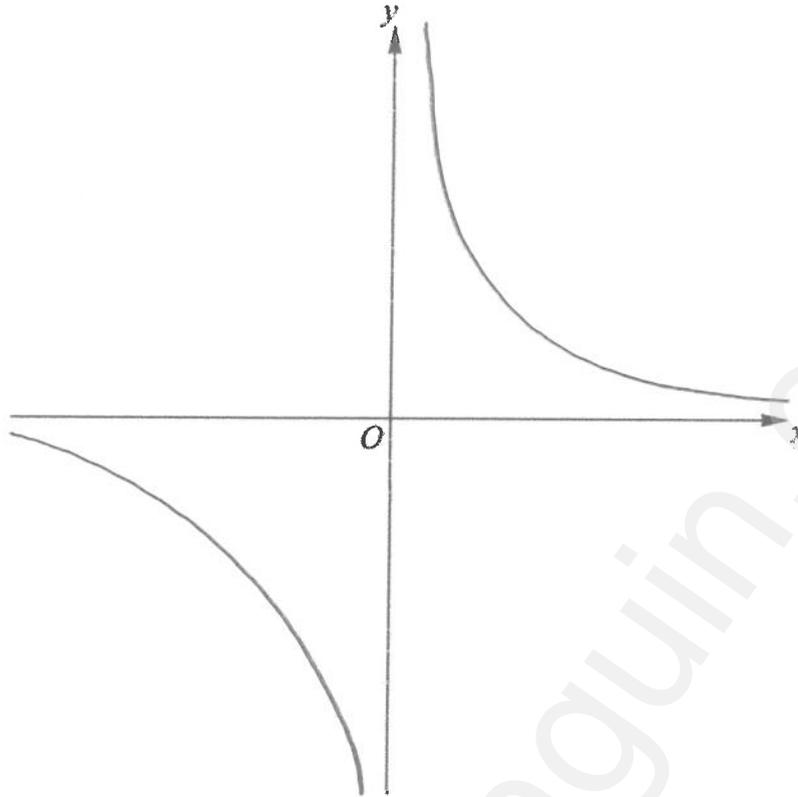
reciprocal graph, so:

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

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): $2 = \frac{a}{4}$ (×4, ×4)

$8 = a$

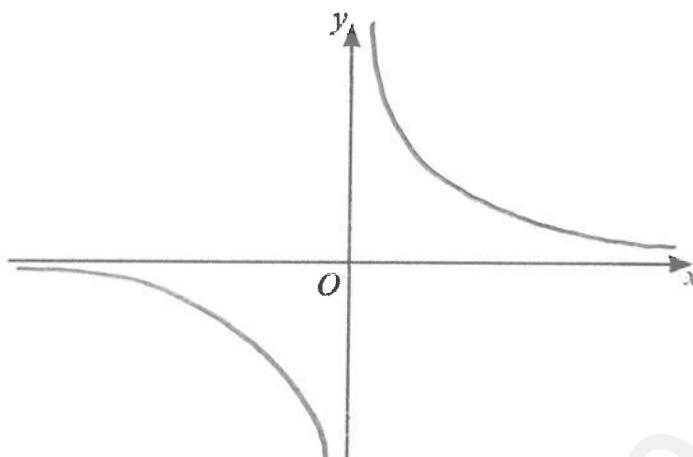$y = \frac{8}{x}$

$y = \frac{8}{x}$ [2]

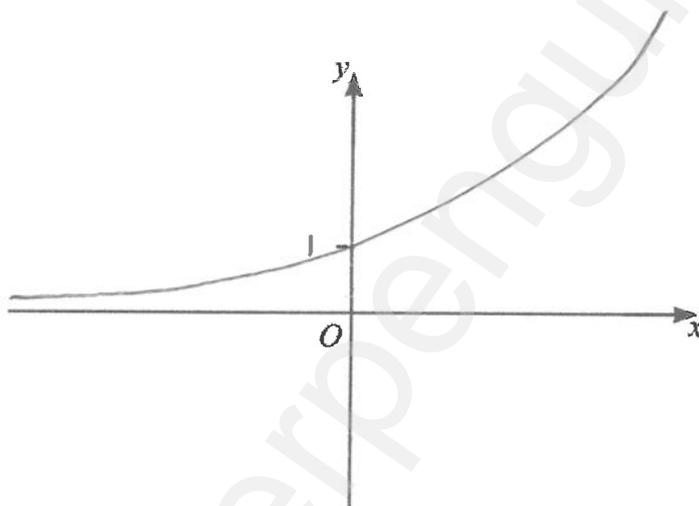www.pastpaperpenguin.com

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

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

[2]

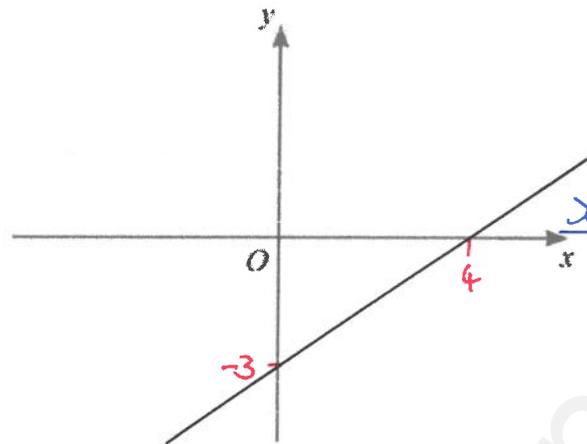(b) $y = 4^x$

[2]

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

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

y-int: $x = 0$:

$3(0) - 4y = 12$

$-4y = 12$

$\div -4 \qquad \div -4$

$\underline{y = -3}$

x-int: $y = 0$:

$3x - 4(0) = 12$

$3x = 12$

$\div 3 \qquad \div 3$

$\underline{x = 4}$

[2]

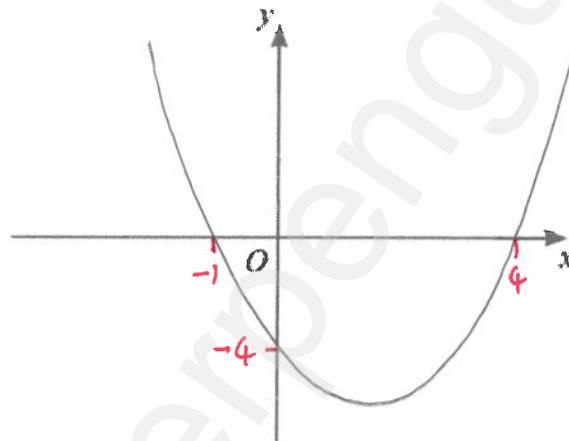**(ii)** $y = x^2 - 3x - 4$

roots:

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

$(x - 4)(x + 1) = 0$
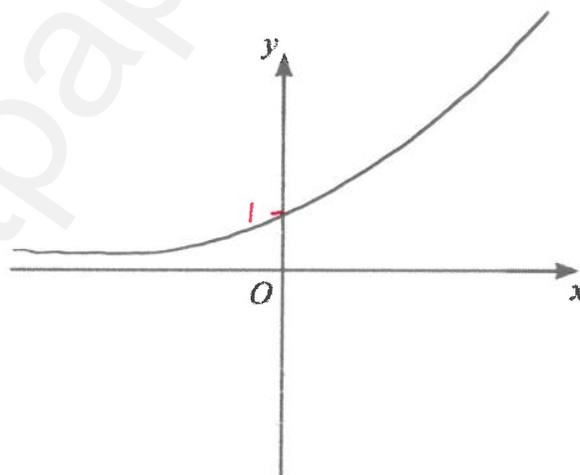
$\underline{x = 4} , \underline{x = -1}$

y-int:

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

$\underline{y = -4}$

[4]

(iii) $y = 6^x$

[2]

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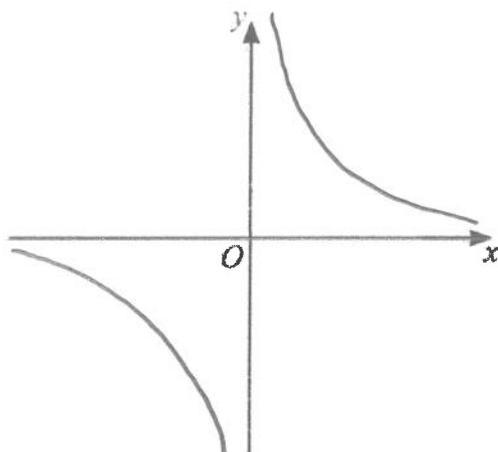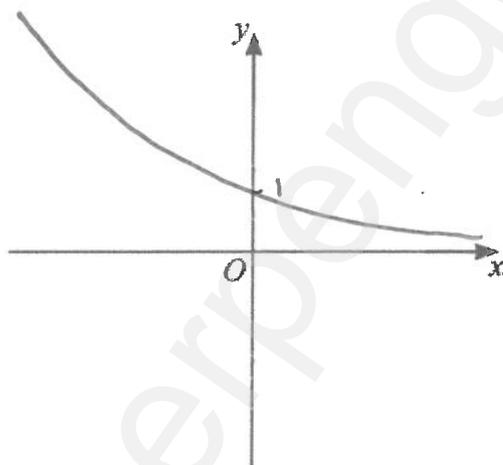
24 On the axes, sketch the graph of each of these functions.

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

[2]

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

[2]