1.   The graph of $y = f(x)$ is drawn on the grid.

working for
part...

a)
b)
c)

y

4

3.75

3

$y=2$ 2

1

−2   −1   −0.4 O 1   2   2.4   3   4 x

$x=0.5$

−1

(a) Write down the coordinates of the turning point of the graph.

①

(....1...., ...4....)

(1)

(b) Write down the roots of f(x) = 2

① Draw line y= 2
② Roots are the x coordinates of where
    the line y=2 intersects y=f(x)

① 2.4, -0.4

(1)

(c) Write down the value of f(0.5)
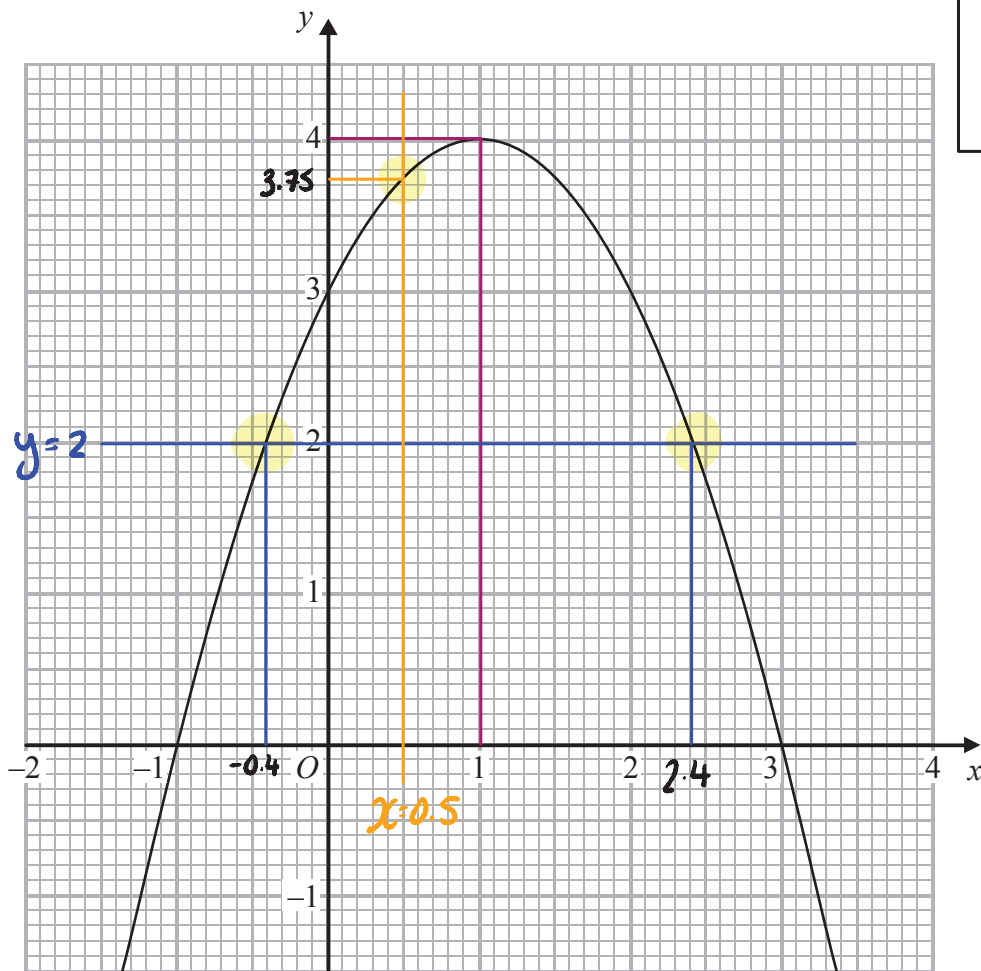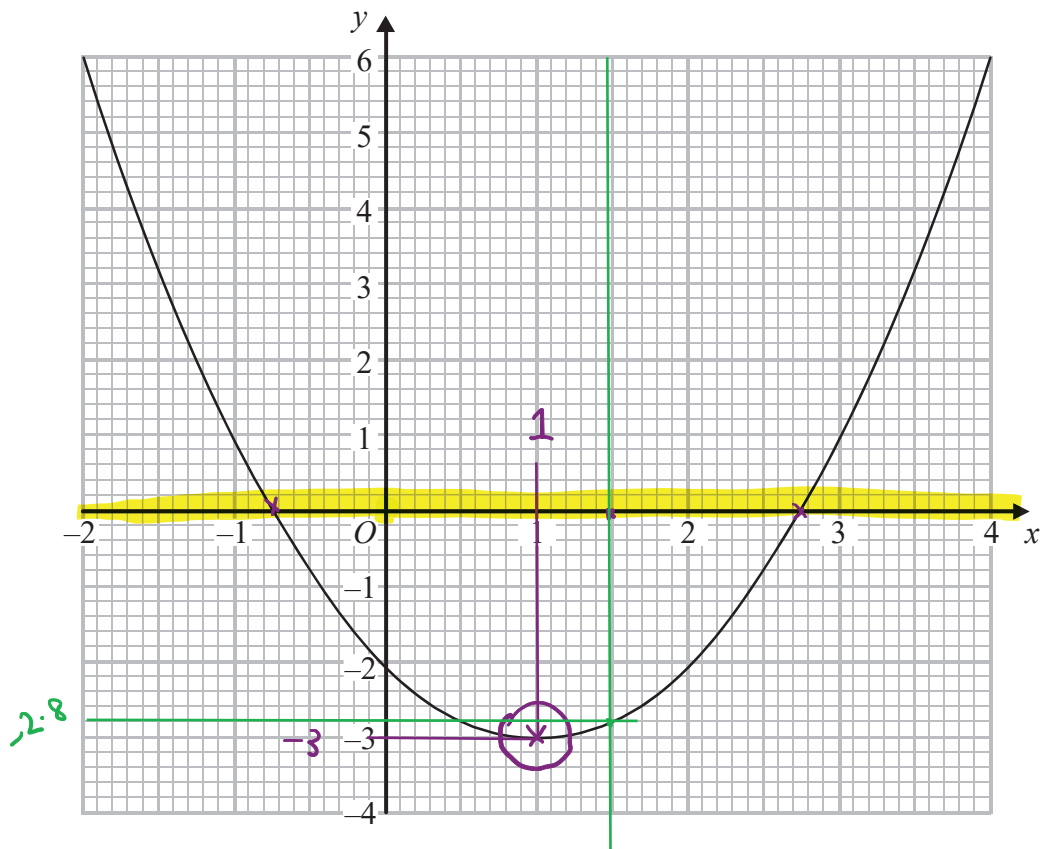
① Draw line x = 0.5

② Write down y coordinate of intersection

3.75

①

(1)

2. The graph of $y = f(x)$ is drawn on the grid.

(a) Write down the coordinates of the turning point of the graph.

(**1** , **−3**)

(1)

(b) Write down estimates for the roots of $f(x) = 0$

Let $y = f(x)$

2·75, −0·75

(1)

(c) Use the graph to find an estimate for $f(1.5)$
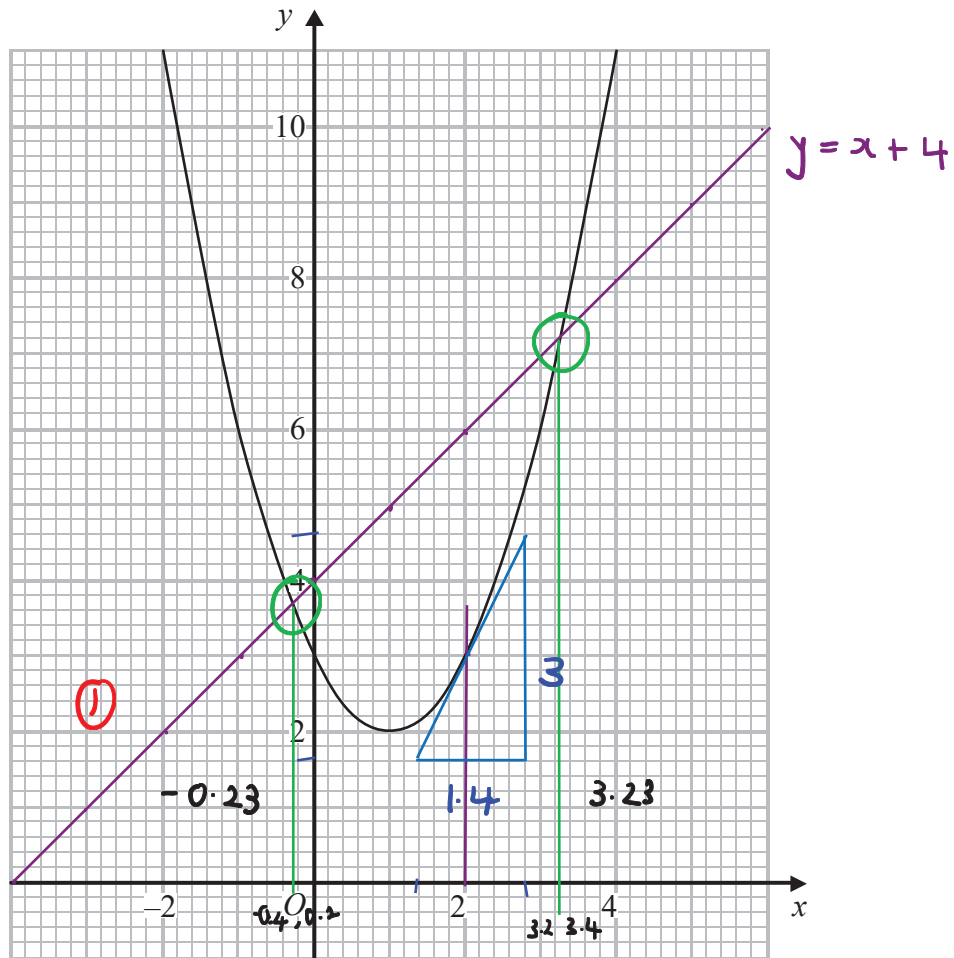
$y = f(1.5)$

−2·8

(1)

(Total for Question   is 3 marks)

3. The diagram shows part of the graph of $y = x^2 - 2x + 3$

(a) By drawing a suitable straight line, use your graph to find estimates for the solutions
   of $x^2 - 3x - 1 = 0$

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

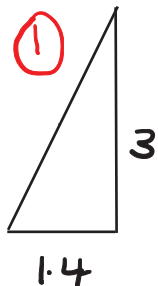$$x^2 - 2x + 3 = x + 4$$

$$y = x + 4$$

①

$$-0.23, \ 3.23$$

(2)

P is the point on the graph of $y = x^2 - 2x + 3$ where $x = 2$

(b) Calculate an estimate for the gradient of the graph at the point *P*.

①

3

1.4

$$\text{Gradient} = \frac{3}{1.4} = 2.14285\ldots$$

①

$$= 2.14 \ (\text{2d.p.})$$

①
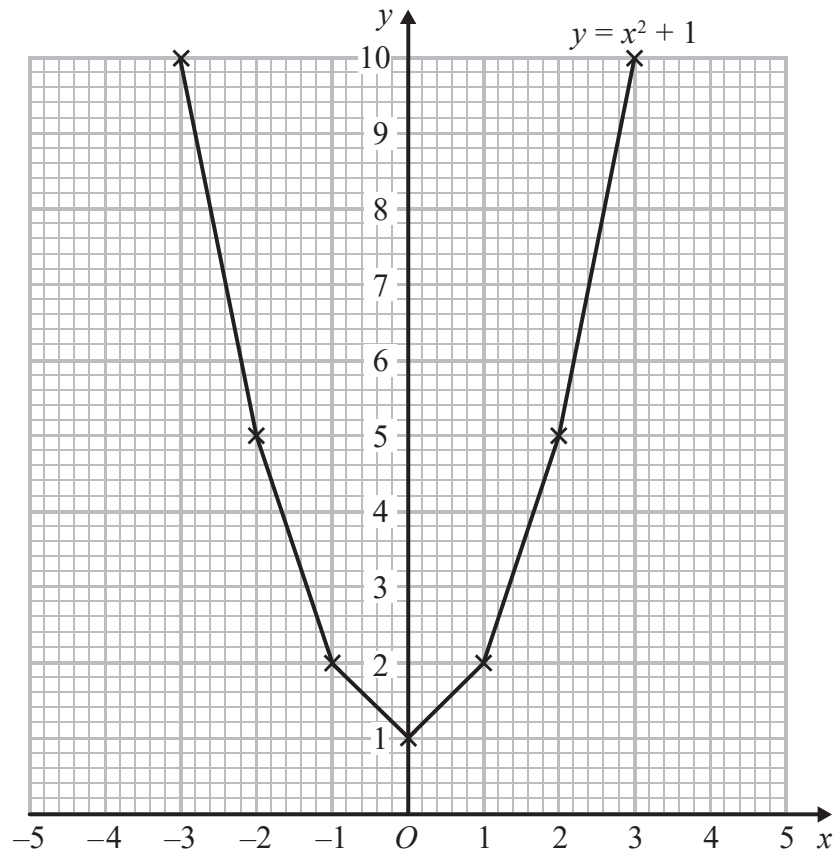
$$2.14 \ (\text{2d.p})$$

(3)

(Total for Question   is 5 marks)

4. Brogan needs to draw the graph of $y = x^2 + 1$

Here is her graph.

Write down one thing that is wrong with Brogan's graph.

Brogan has used a ruler to draw her graph ✓

(Total for Question   is 1 mark)

5. Sketch the graph of

$$y = 2x^2 - 8x - 5$$

showing the coordinates of the turning point and the exact coordinates of any intercepts with the coordinate axes.

Find y-intercept :

$$y = ax^2 + bx + \boxed{c}$$

c is always the y-intercept.

$$y = 2x^2 - 8x \boxed{-5}$$

$$c = -5$$ ①

$$\therefore y\text{-intercept} = -5$$

Find turning point : (complete the square)

$$2x^2 - 8x - 5 = 0$$

$$2\left[x^2 - 4x\right] - 5 = 0$$

$$a(x+d)^2 + e = 0$$

Turning point = $(-d, e)$

$$2\left[(x-2)^2 - 4\right] - 5 = 0$$

$$2(x-2)^2 - 8 - 5 = 0$$

$$2(x-2)^2 - 13 = 0$$

Turning point = $(2, -13)$ ①

Find x-intercepts :

$$2(x-2)^2 - 13 = 0$$
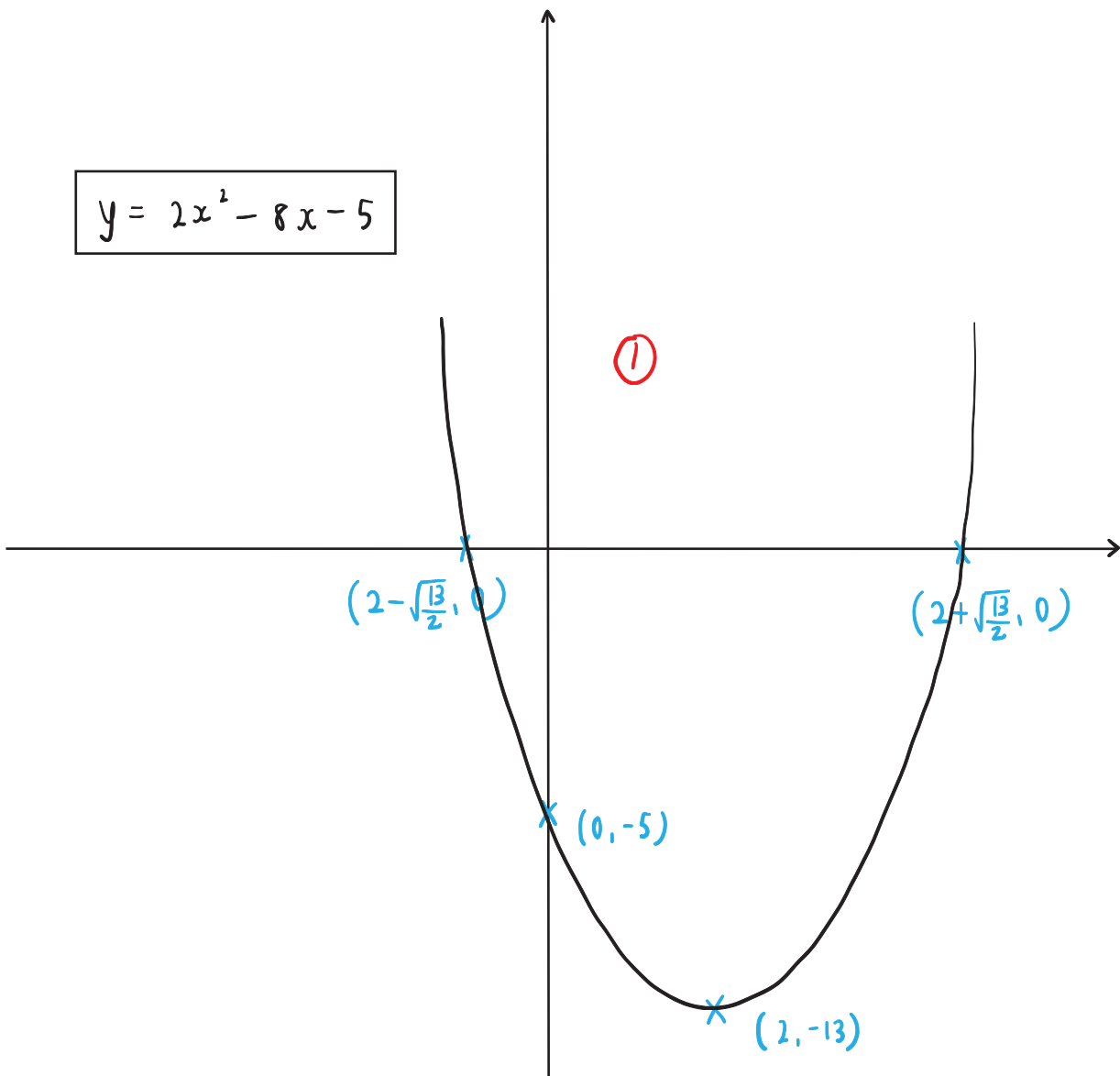
$$2(x-2)^2 = 13$$

$$(x-2)^2 = \frac{13}{2}$$ ①

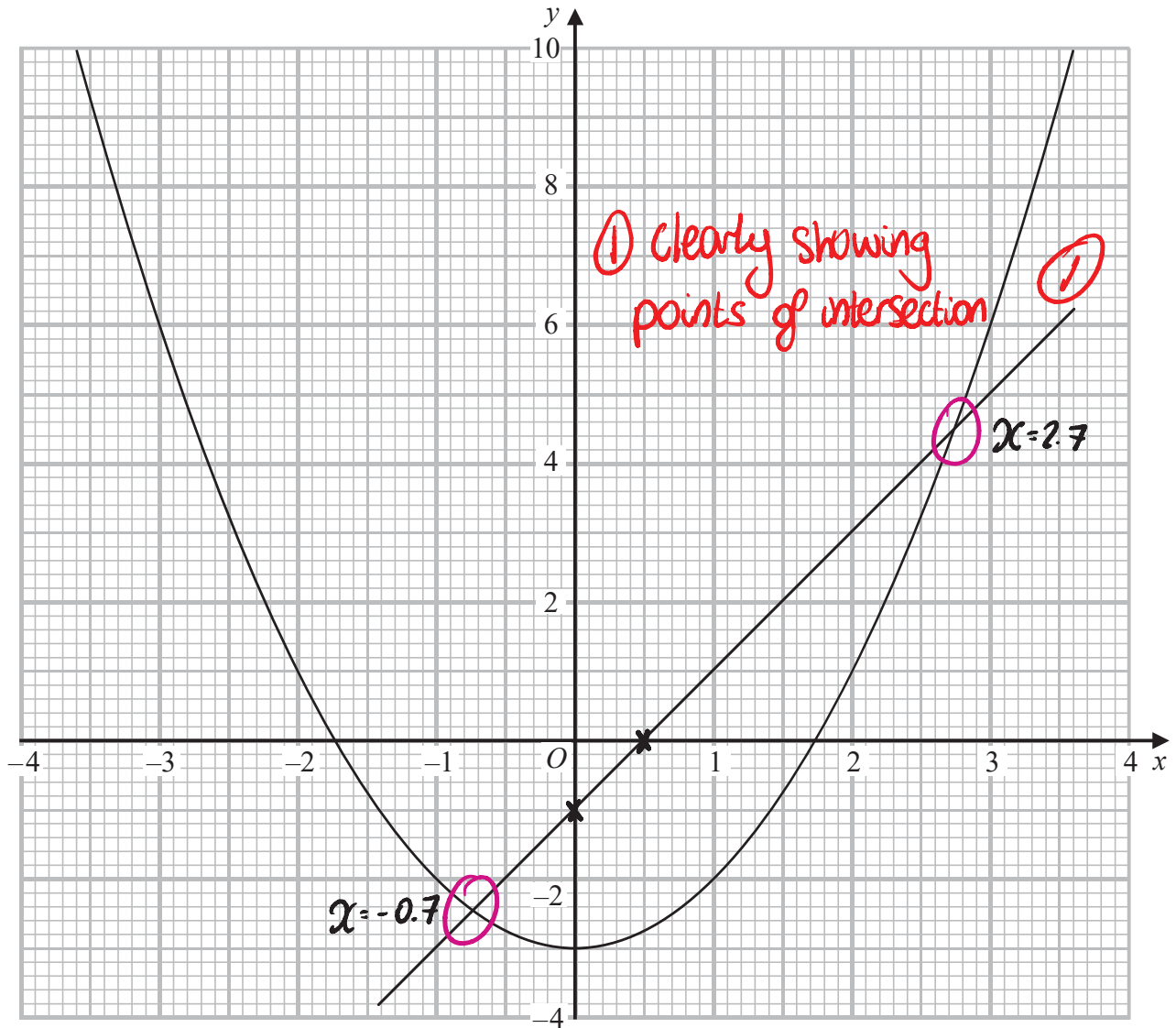$$x - 2 = \pm\sqrt{\frac{13}{2}}$$

$$x = 2 \pm \sqrt{\frac{13}{2}}$$ ①

P.T.O.

(Total for Question   is 5 marks)

$$y = 2x^2 - 8x - 5$$

①

$\left(2-\sqrt{\frac{13}{2}}, 0\right)$

$\left(2+\sqrt{\frac{13}{2}}, 0\right)$

$(0, -5)$

$(2, -13)$

6.   Here is the graph of $y = x^2 - 3$

Use the graph to find estimates for the solutions to the equation $x^2 - 2x - 2 = 0$
You must show how you get your solutions.

7. The diagram shows four graphs.

$y = \dfrac{1}{x}$

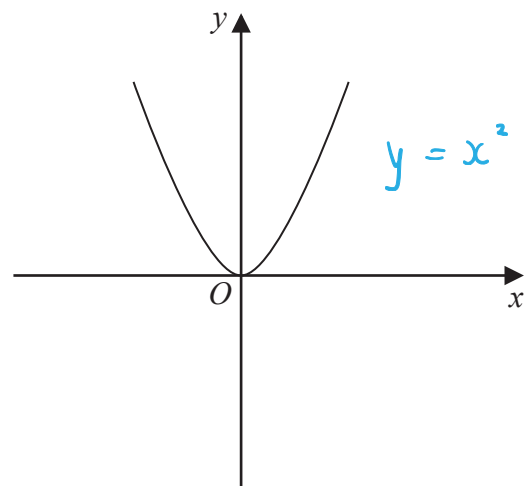Graph **A**

$y = -x^3$

Graph **B**

$y = x^3$

Graph **C**

$y = x^2$
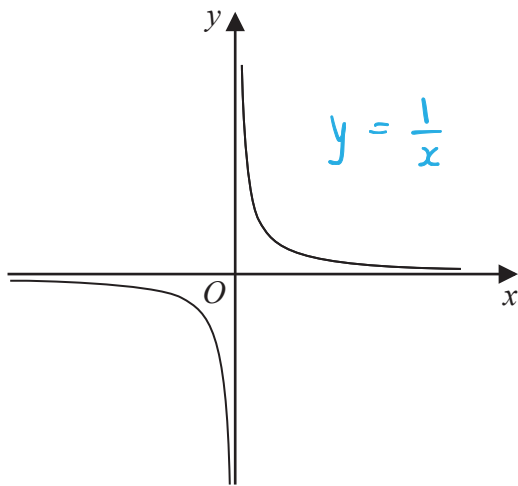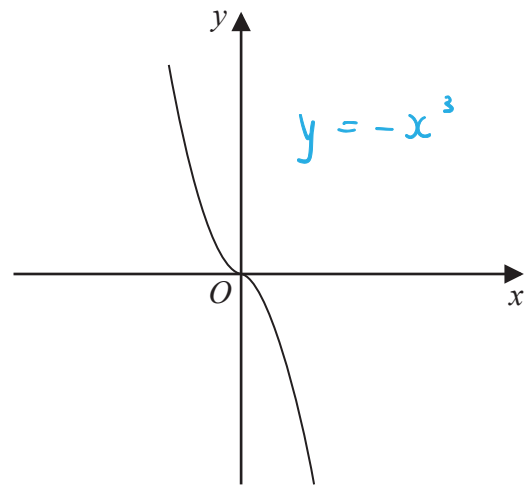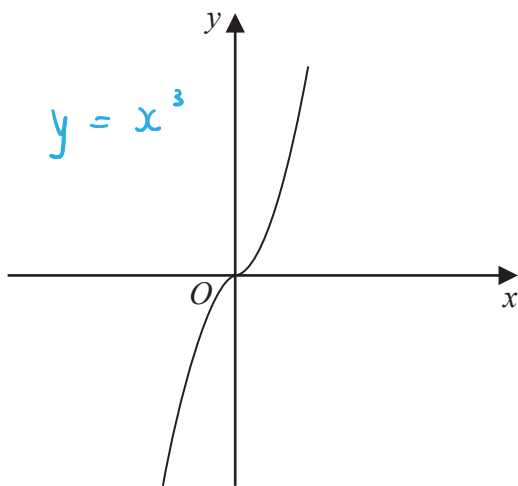
Graph **D**

Each of the equations in the table is the equation of one of the graphs.

Complete the table.

Equation	Letter of graph
$y = -x^3$	B
$y = x^3$	C
$y = x^2$	D
$y = \dfrac{1}{x}$	A

(Total for Question   is 2 marks)