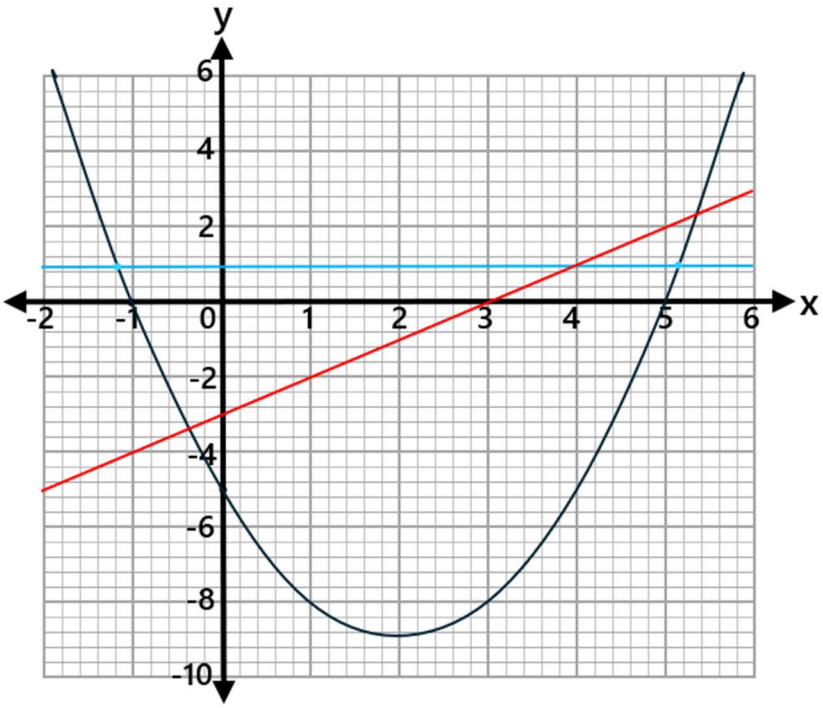
HARDER SIMULTANEOUS EQUATIONS GRAPHICALLY

1) The graph of

$$y = x^2 - 4x - 5$$

is shown on the coordinate grid below from $-2 \leq x \leq 6$.



a. Use the graph to estimate the solutions of

$$x^2 - 4x - 5 = 1$$

Give your answers to one decimal place.

$$\boldsymbol{x = -1.2 \ (1 \ dp)}$$

$$\boldsymbol{x = 5.2 \ (1 \ dp)}$$

b. By drawing a suitable straight line on the grid, find estimates for the solutions of

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

Show your working clearly. Give your answers correct to one decimal place.

Rearrange to make the left-hand side the same equation

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

$$x^2 - 4x - 2 = x$$

$$x^2 - 4x - 5 = x - 3$$

Plot $y = x - 3$ on the graph

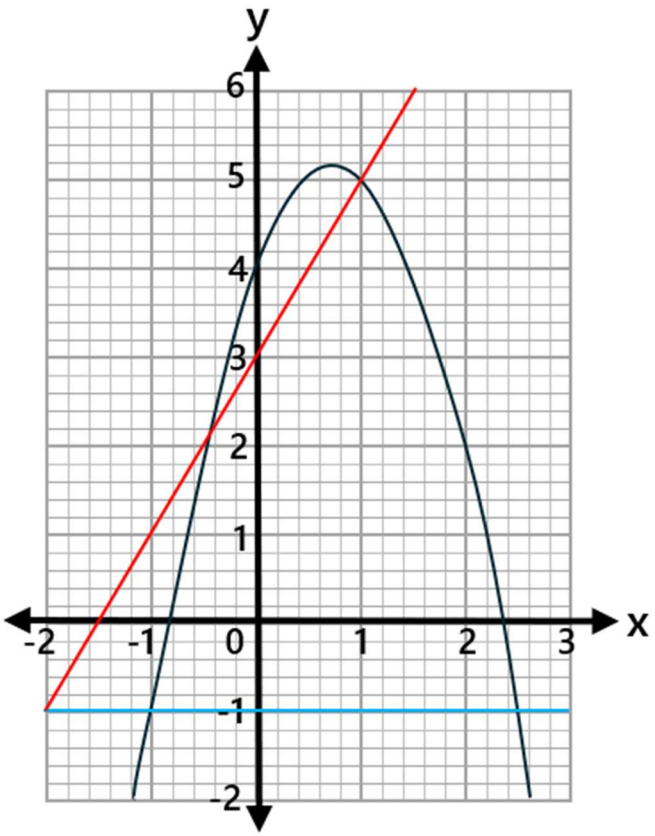
$$\boldsymbol{x = -0.4 \ (1 \ dp)}$$

$$\boldsymbol{x = 5.4 \ (1 \ dp)}$$

2) The graph of

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

is shown on the coordinate grid below from $-2 \leq x \leq 3$.



a. Use the graph to estimate the solutions of

$$-2x^2 + 3x + 4 = -1$$

Give your answers to one decimal place.

$$\boldsymbol{x = -1.0 \ (1 \ dp)}$$

$$\boldsymbol{x = 2.5 \ (1 \ dp)}$$

b. By drawing a suitable straight line on the grid, find estimates for the solutions of

$$-2x^2 + x + 1 = 0$$

Show your working clearly. Give your answers correct to one decimal place.

Rearrange to make the left-hand side the same equation

$$-2x^2 + x + 1 = 0$$

$$-2x^2 + 3x + 1 = 2x$$

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

Plot $y = 2x + 3$ on the graph

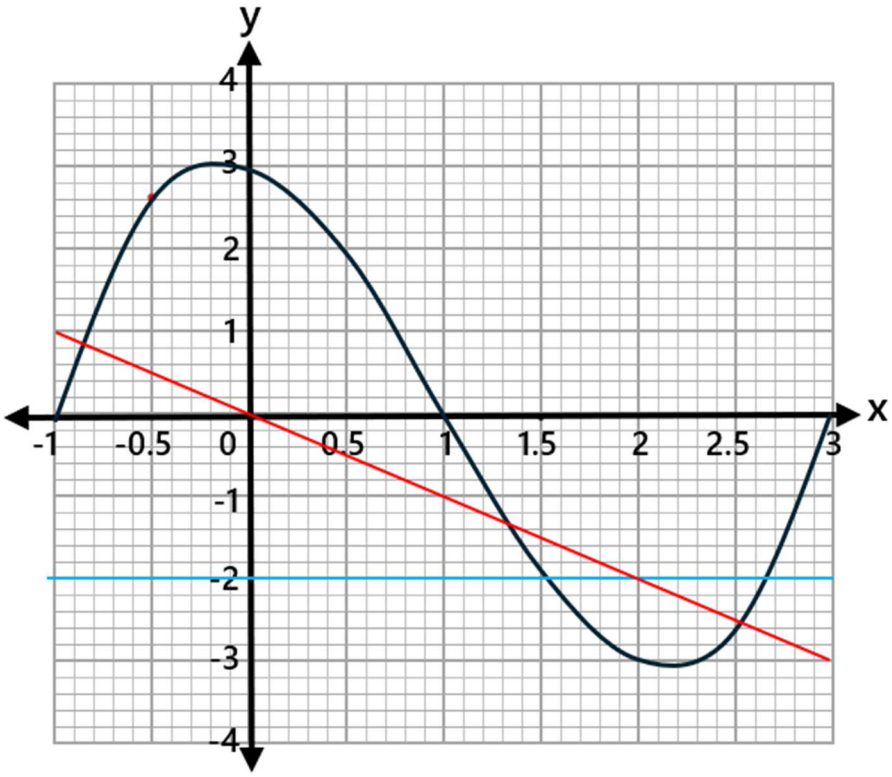
$$\boldsymbol{x = -0.5 \ (1 \ dp)}$$

$$\boldsymbol{x = 1.0 \ (1 \ dp)}$$

3) The graph of

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

is shown on the coordinate grid below from $-1 \leq x \leq 3$.



a. Use the graph to estimate the solutions of

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

Give your answers to one decimal place.

$$\boldsymbol{x = 1.5 \ (1 \ dp)}$$

$$\boldsymbol{x = 2.7 \ (1 \ dp)}$$

b. By drawing a suitable straight line on the grid, find estimates for the solutions of

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

Show your working clearly. Give your answers correct to one decimal place.

Rearrange to make the left-hand side the same equation

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

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

Plot $y = -x$ on the graph

$$\boldsymbol{x = -0.9 \ (1 \ dp)}$$

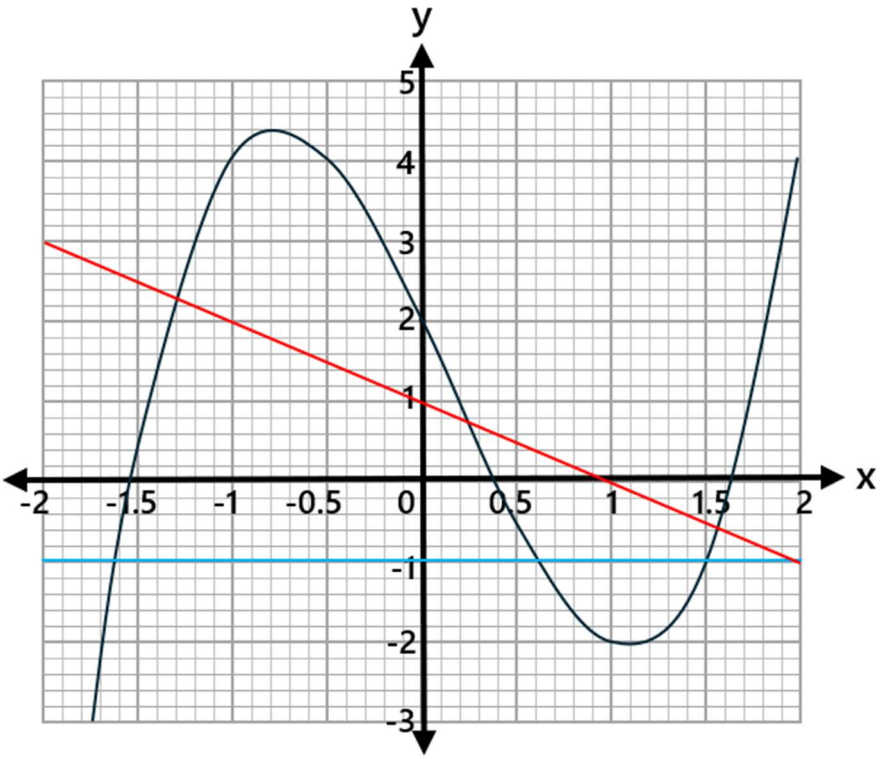
$$\boldsymbol{x = 1.3 \ (1 \ dp)}$$

$$\boldsymbol{x = 2.5 \ (1 \ dp)}$$

4) The of the graph of

$$y = 2x^3 - x^2 - 5x + 2$$

is shown on the coordinate grid below from $-2 \leq x \leq 2$.



a. Use the graph to estimate the solutions of

$$2x^3 - x^2 - 5x + 2 = -1$$

Give your answers to one decimal place.

$$\boldsymbol{x = -1.6\ (1\ dp)}$$

$$\boldsymbol{x = 0.6\ (1\ dp)}$$

$$\boldsymbol{x = 1.5\ (1\ dp)}$$

b. By drawing a suitable straight line on the grid, find estimates for the solutions of

$$2x^3 - x^2 - 4x + 1 = 0$$

Show your working clearly. Give your answers correct to one decimal place.

Rearrange to make the left-hand side the same equation

$$2x^3 - x^2 - 4x + 1 = 0$$

$$2x^3 - x^2 - 5x + 1 = -x$$

$$2x^3 - x^2 - 5x + 2 = -x + 1$$

Plot $y = -x + 1$ on the graph

$$\boldsymbol{x = -1.3\ (1\ dp)}$$

$$\boldsymbol{x = 0.2\ (1\ dp)}$$

$$\boldsymbol{x = 1.6\ (1\ dp)}$$