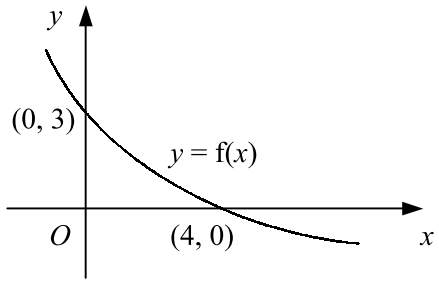
C1 GRAPHS OF FUNCTIONS *Worksheet B*

1 Describe how the graph of $y = \mathrm{f}(x)$ is transformed to give the graph of

a $y = \mathrm{f}(x - 1)$ **b** $y = \mathrm{f}(x) - 3$ **c** $y = 2\mathrm{f}(x)$ **d** $y = \mathrm{f}(4x)$

e $y = -\mathrm{f}(x)$ **f** $y = \frac{1}{5}\mathrm{f}(x)$ **g** $y = \mathrm{f}(-x)$ **h** $y = \mathrm{f}(\frac{2}{3}x)$

2



The diagram shows the curve with equation $y = \mathrm{f}(x)$ which crosses the coordinate axes at the points (0, 3) and (4, 0).

Showing the coordinates of any points of intersection with the axes, sketch on separate diagrams the graphs of

a $y = 3\mathrm{f}(x)$ **b** $y = \mathrm{f}(x + 4)$ **c** $y = -\mathrm{f}(x)$ **d** $y = \mathrm{f}(\frac{1}{2}x)$

3 Find and simplify an equation of the graph obtained when

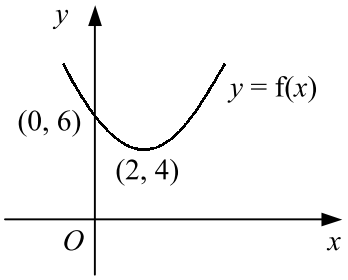
a the graph of $y = 2x + 5$ is translated by 1 unit in the positive y-direction,

b the graph of $y = 1 - 4x$ is stretched by a factor of 3 in the y-direction, about the x-axis,

c the graph of $y = 3x + 1$ is translated by 4 units in the negative x-direction,

d the graph of $y = 4x - 7$ is reflected in the x-axis.

4



The diagram shows the curve with equation $y = \mathrm{f}(x)$ which has a turning point at (2, 4) and crosses the y-axis at the point (0, 6).

Showing the coordinates of the turning point and of any points of intersection with the axes, sketch on separate diagrams the graphs of

a $y = \mathrm{f}(x) - 3$ **b** $y = \mathrm{f}(x + 2)$ **c** $y = \mathrm{f}(2x)$ **d** $y = \frac{1}{2}\mathrm{f}(x)$

5 Describe a single transformation that would map the graph of $y = x^3$ onto the graph of

a $y = 4x^3$ **b** $y = (x - 2)^3$ **c** $y = -x^3$ **d** $y = x^3 + 5$

6 Describe a single transformation that would map the graph of $y = x^2 + 2$ onto the graph of

a $y = 2x^2 + 4$ **b** $y = x^2 - 5$ **c** $y = \frac{1}{9}x^2 + 2$ **d** $y = x^2 + 4x + 6$

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