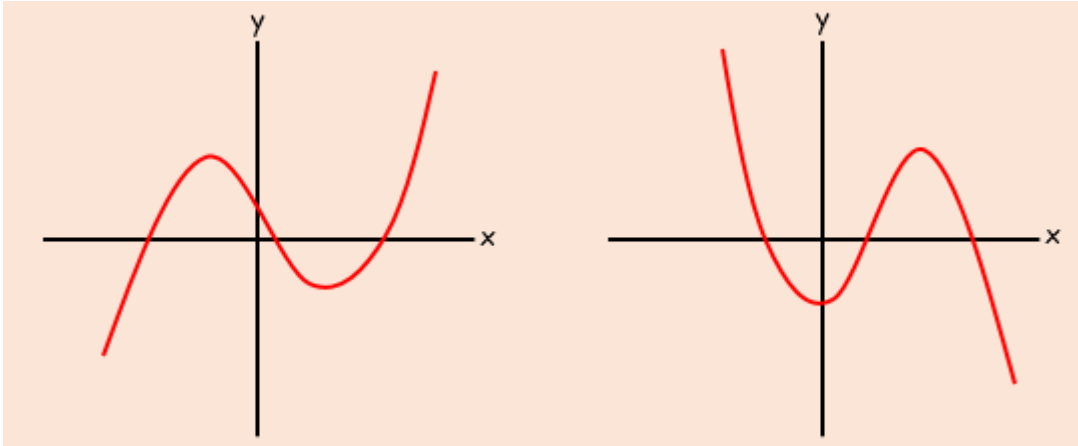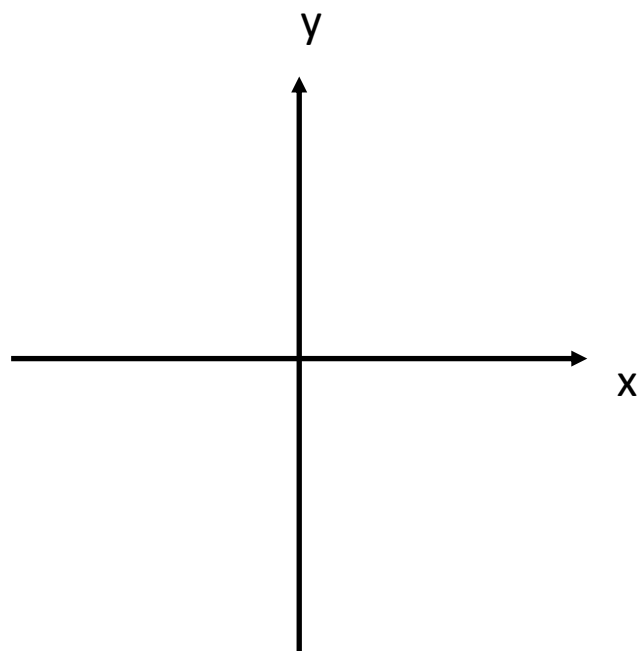# 4A Sketching Cubic Graphs

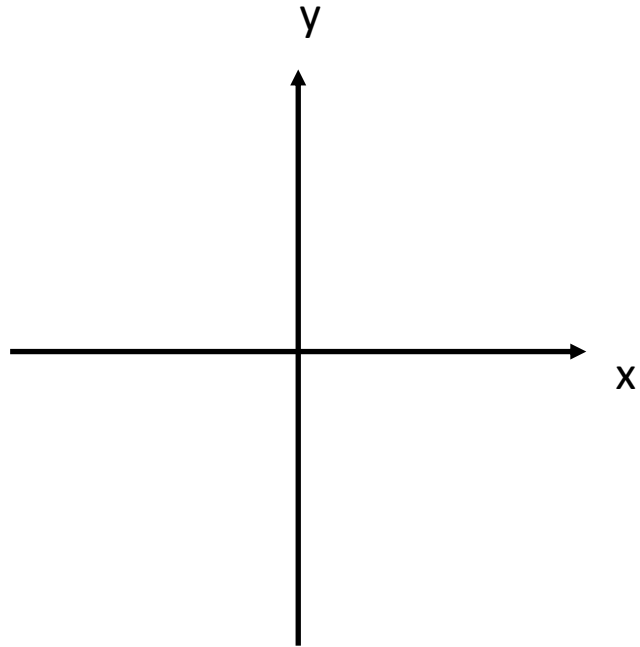

1. Sketch the graph of the function:
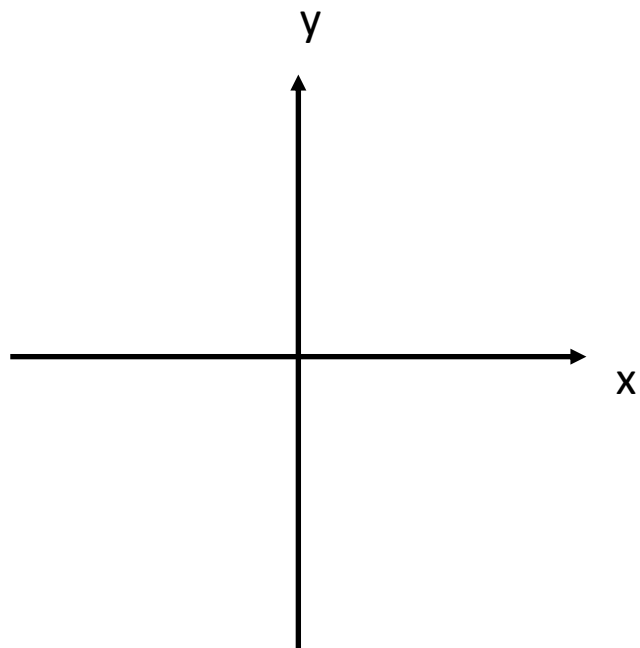
$$y = (x - 2)(x - 1)(x + 1)$$

2. Sketch the graph of the function:

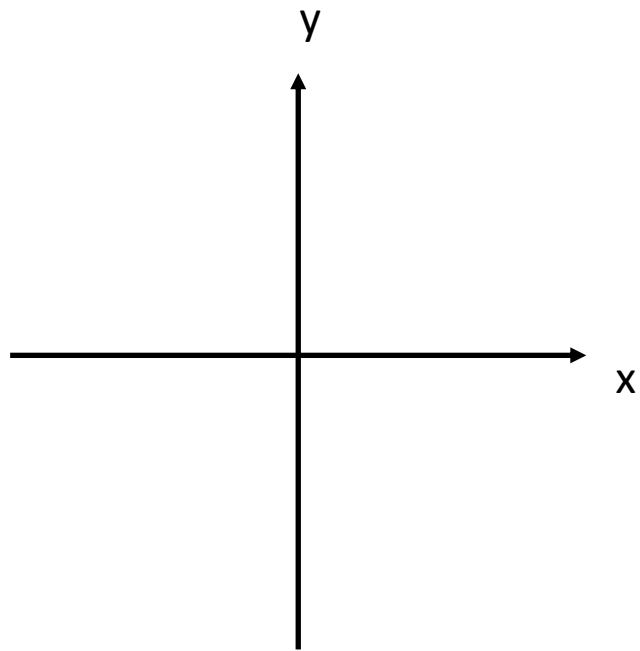$$y = (x - 2)(1 - x)(x + 1)$$

y

x

3. Sketch the graph of the function:

$$y = (x - 1)^2(x + 1)$$

y
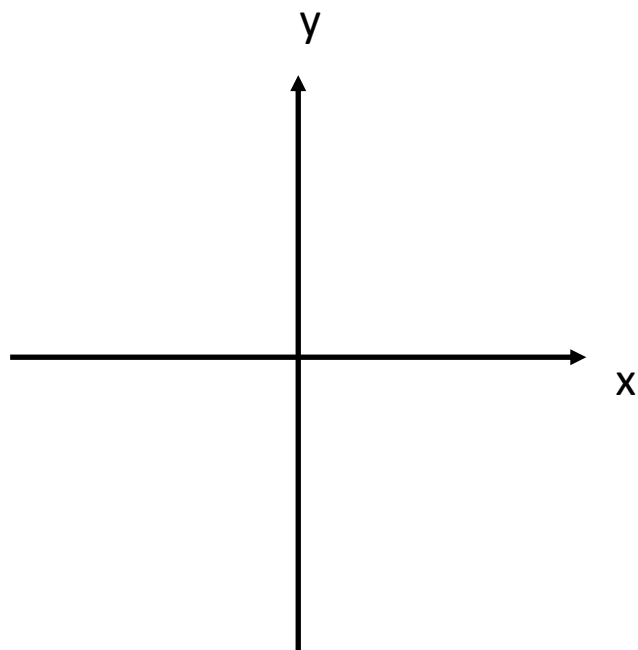
x

4. Sketch the graph of the function:

$$y = (x - 1)(x^2 + x + 2)$$

y

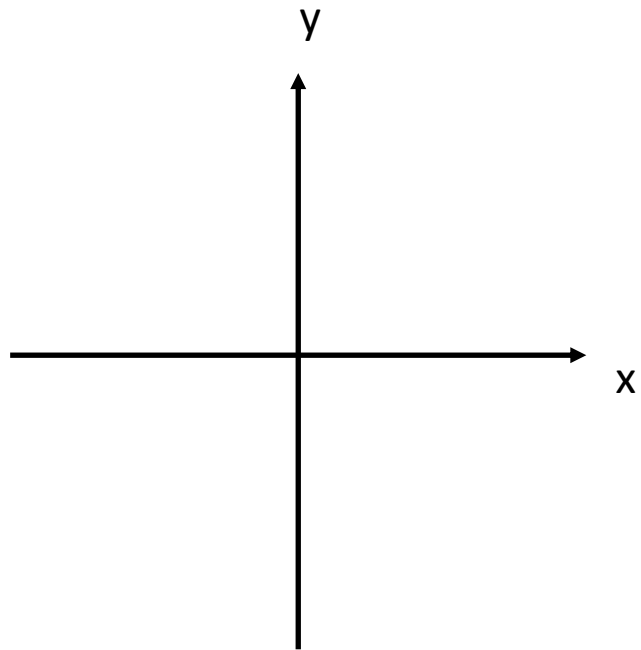x

4B Sketching Quartic Graphs

1. Sketch the curve:
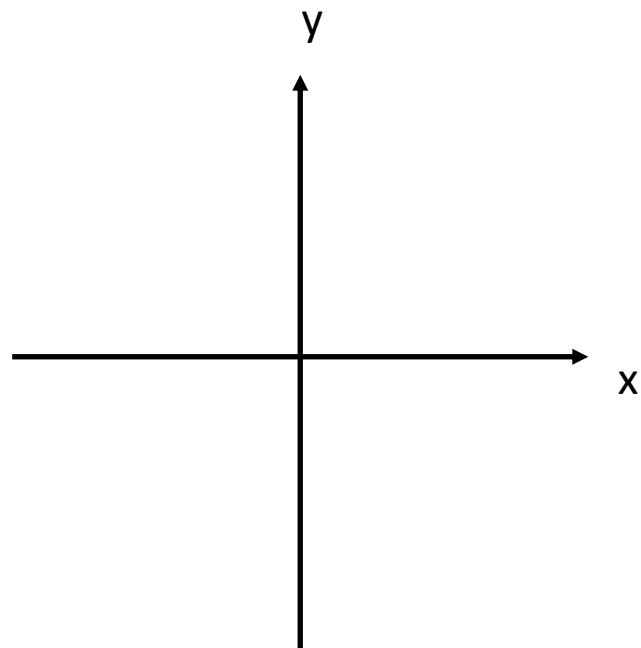$$y = (x + 1)(x + 2)(x - 1)(x - 2)$$

y

x

2. Sketch the curve:

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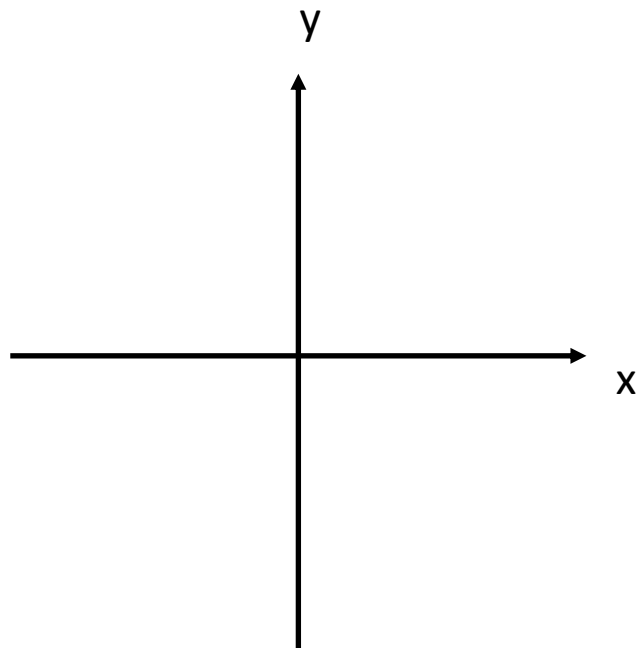
y

x

3. Sketch the curve:

$$y = (x - 1)^2(x - 3)^2$$

y
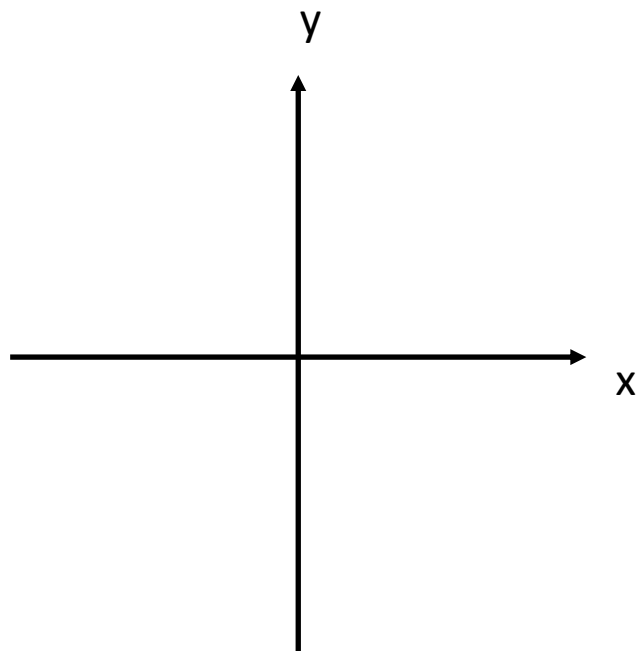
x

4C Sketching Reciprocal Graphs

1. Sketch the graph:
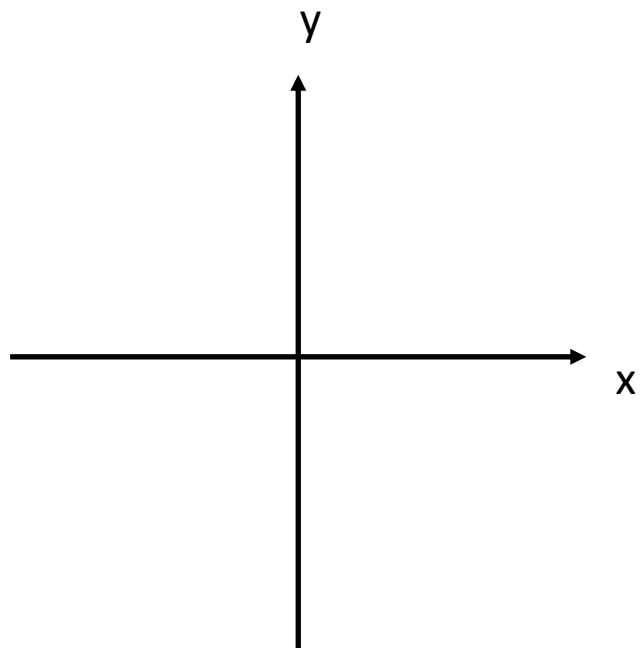
$$y = \frac{3}{x}$$

y

x

2. Sketch the graph:
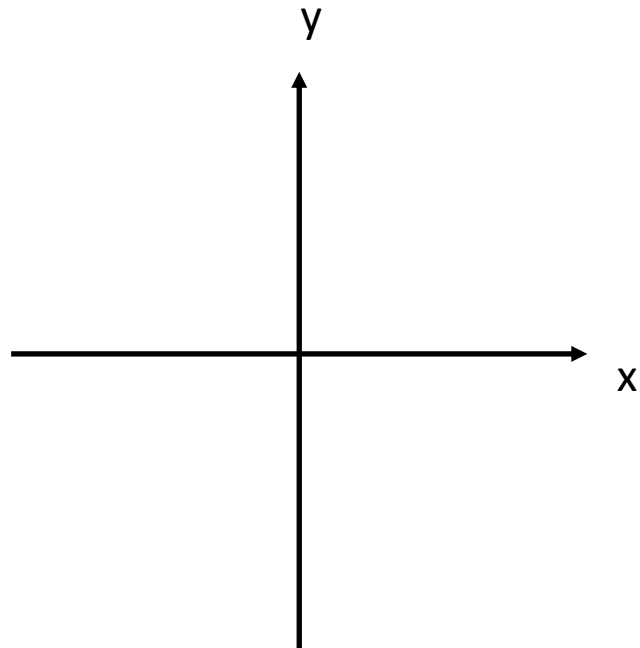
$$y = -\frac{1}{x}$$

y

x

3. Sketch the graph:

$$y = \frac{1}{x^2}$$

y

x

4D Intersecting Graphs

1.

a) On the same diagram, sketch the following curves:

$$y = x(x-3) \text{ and } y = x^2(1-x)$$
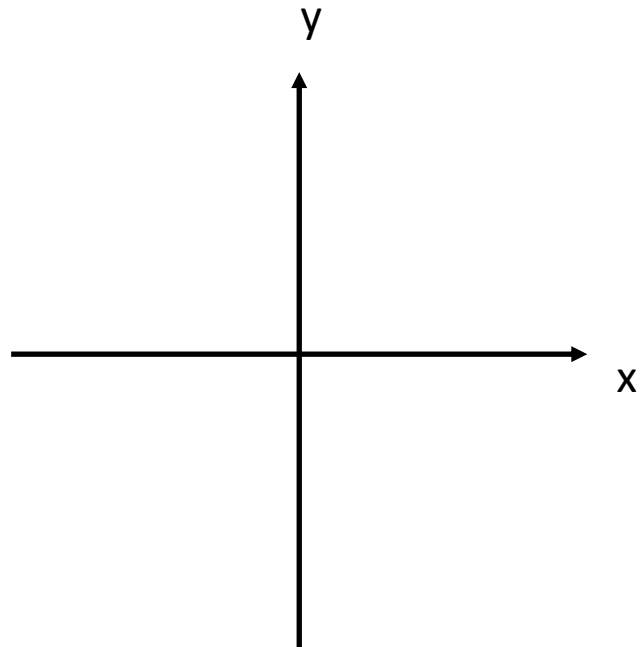
y

X

b) Find the co-ordinates of the points of intersection

2.

a) On the same diagram, sketch the following curves:

$$y = \frac{3}{x} \quad \text{and} \quad y = x^2(x - 1)$$

y

x

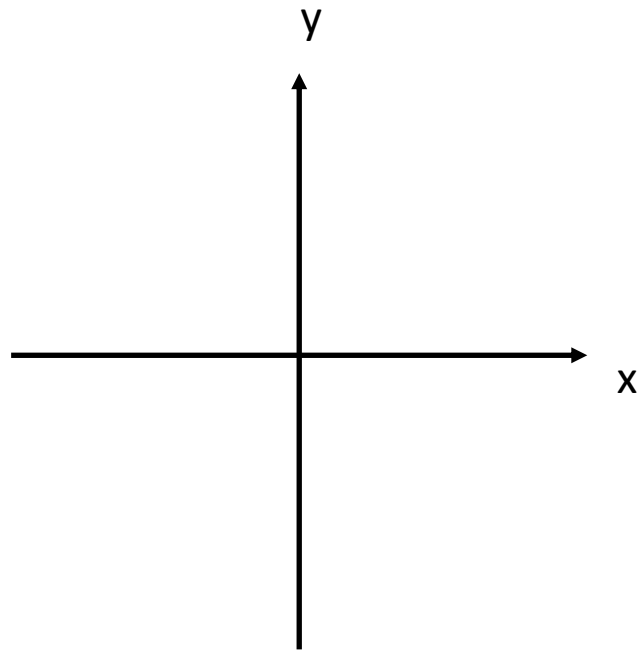b) Explain how the graph shows that the following equation has 2 solutions

4E Translating Graphs
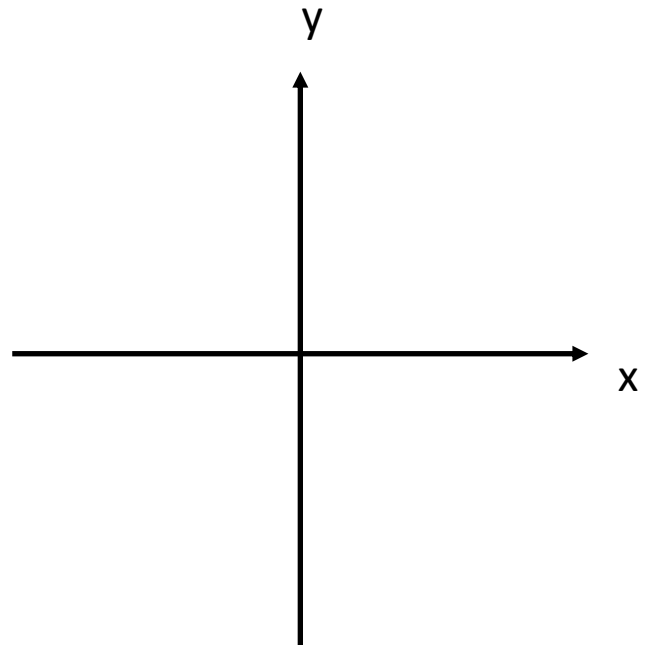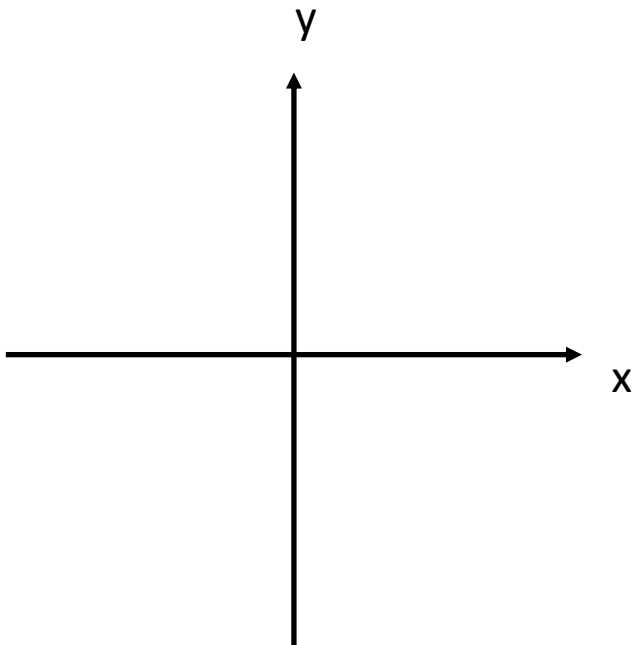
1. Sketch the following graphs:
a) $y = x^2$
b) $y = (x - 2)^2$
c) $y = x^2 + 2$
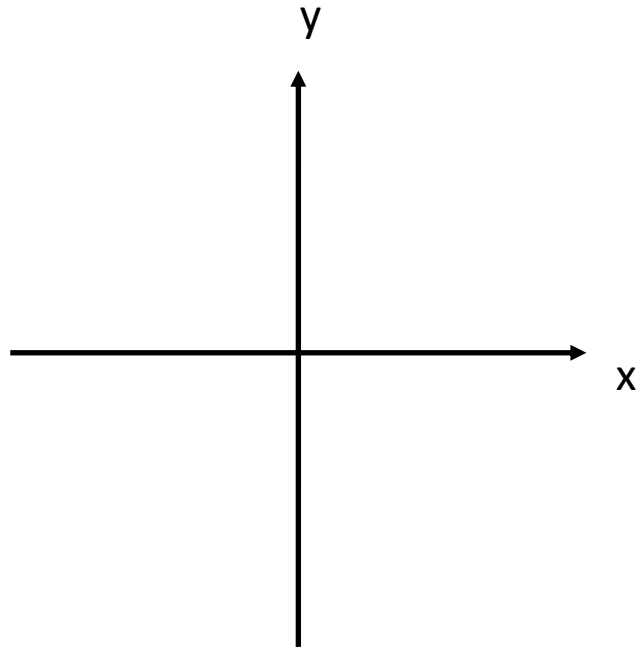
y

x

2. Given that $f(x) = x^3$ and $g(x) = x(x - 2)$,
sketch the graphs of $y = f(x + 1)$ and $y = g(x + 1)$

y

x

y

x

3. Given that $h(x) = \frac{1}{x}$, sketch the curve with equation $y = h(x) + 1$, stating the equations of any asymptotes and intersections with the axes
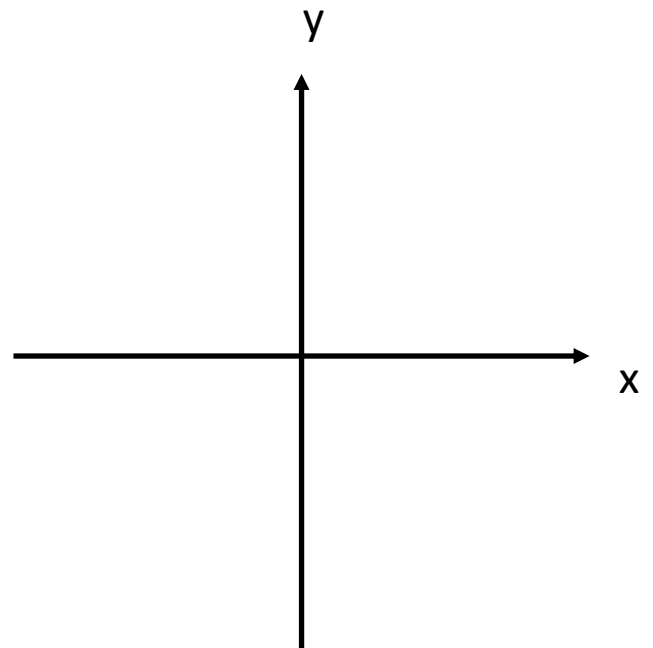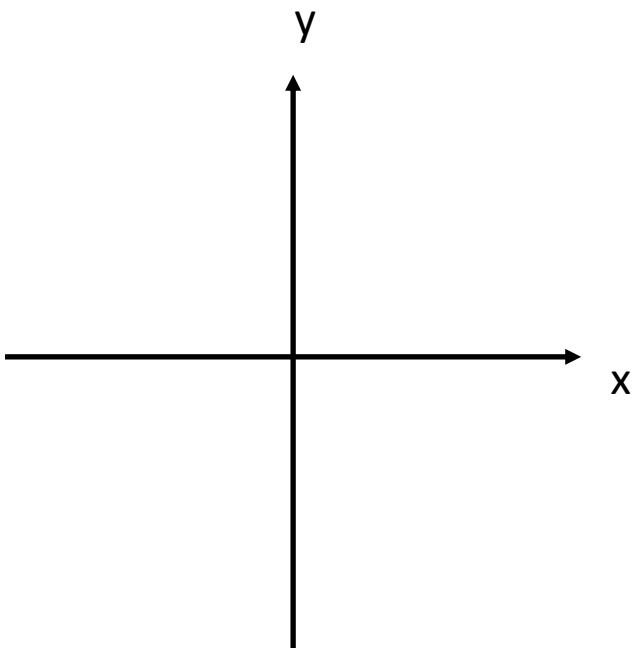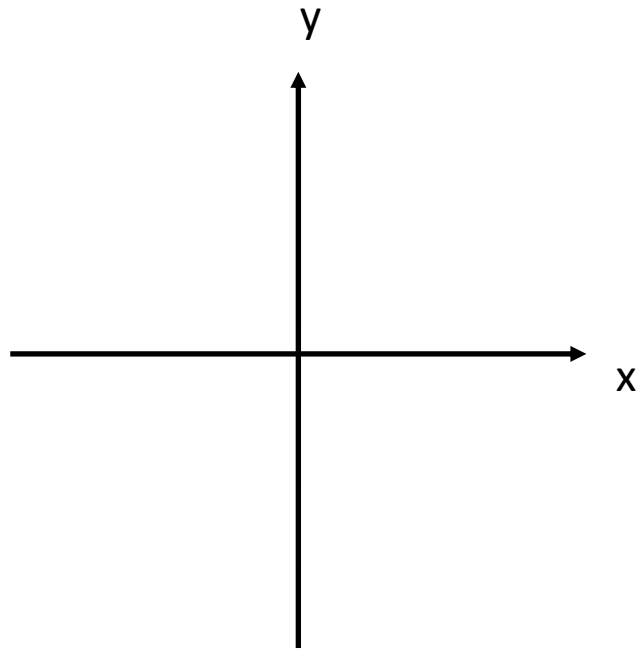
4F Stretching Graphs

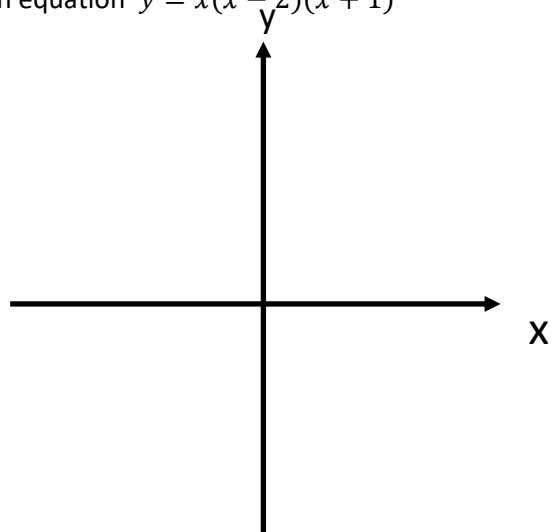1. Given that $f(x) = 9 - x^2$, sketch the curves with equations:
a) $y = f(2x)$
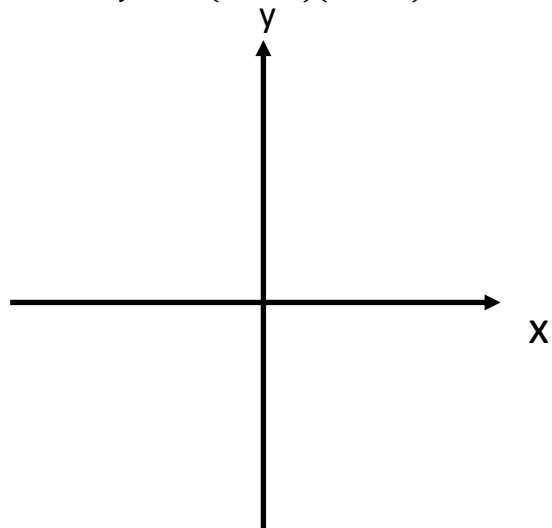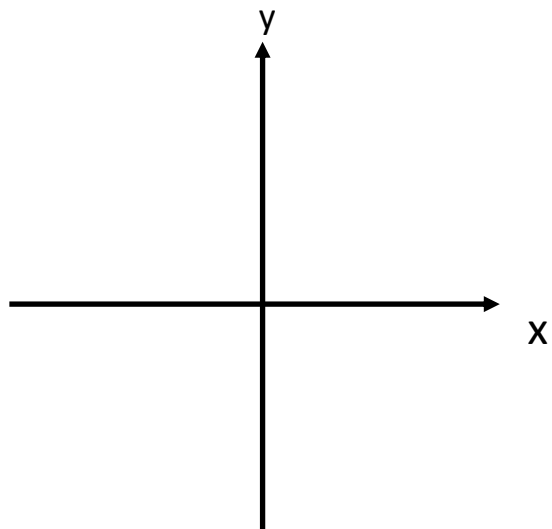b) $y = 2f(x)$

y

x

y

x

y

x

2.

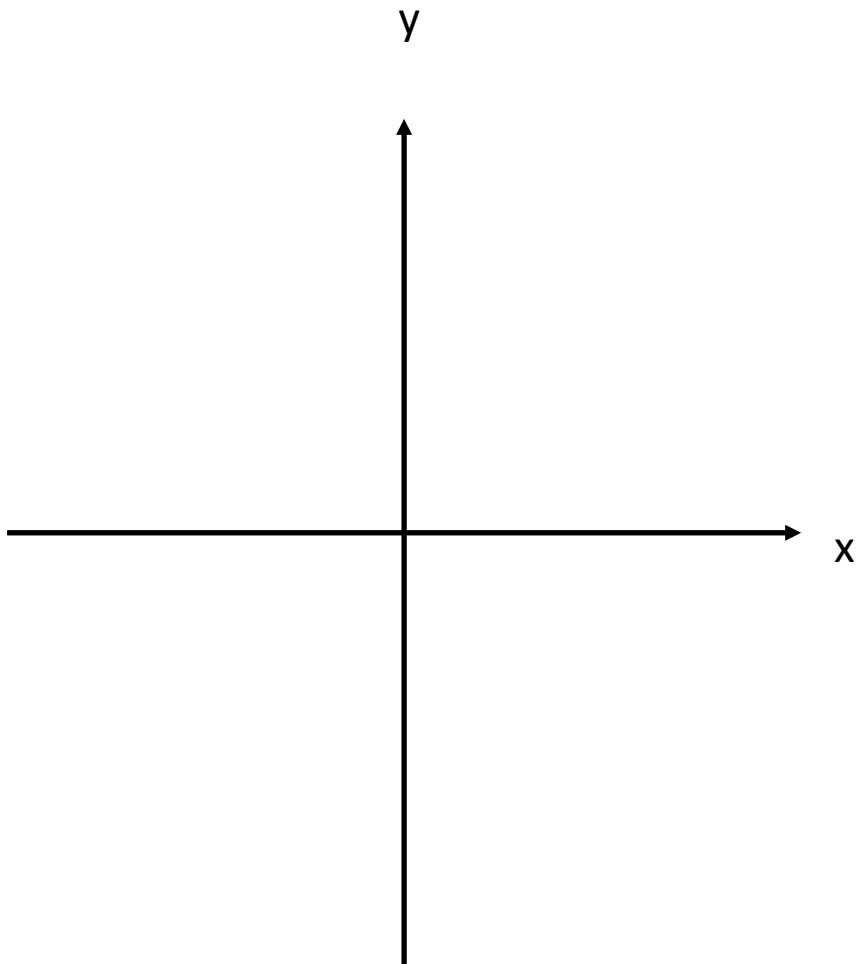a) Sketch the curve with equation $y = x(x - 2)(x + 1)$

b) Hence, sketch the curve $\quad y = 2x(2x - 2)(2x + 1)$

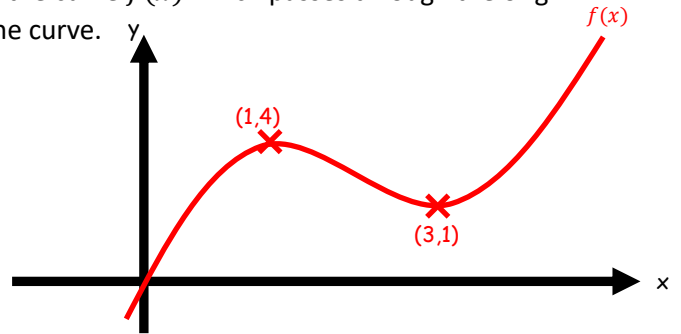c) Based on your sketch in a), also sketch the curve $y = -x(x - 2)(x + 1)$

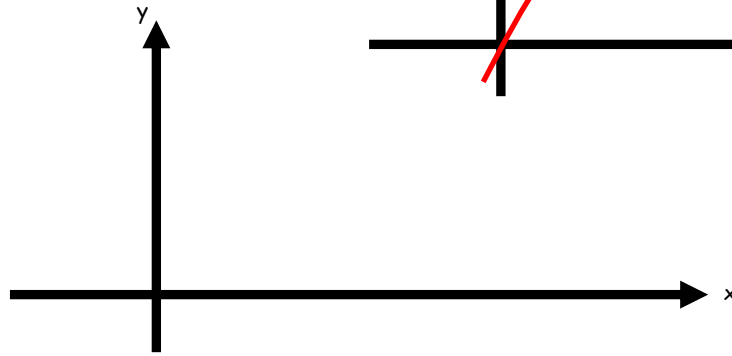3. On the same set of axes, draw the graphs of $y = f(x)$, $y = f(-x)$ and $y = -f(x)$ where $f(x) = x(x+2)$

4G Unfamiliar Functions

1. The diagram to the right shows a sketch of the curve $f(x)$ which passes through the origin. The points $A(1,4)$ and $B(3,1)$ also lie on the curve.

$f(x)$

$(1,4)$

$(3,1)$

a) Sketch the graph of $y = f(x+1)$

b) Sketch the graph of $y = f(x-1)$

c) Sketch the graph of $y = f(x) - 4$

d) Sketch the graph of $2y = f(x)$