

(22) The Intersection of Graphs

WORKING AT D/E

- (1) (a) On the same set of axes, draw the graphs of $x^2 + y^2 = 1$ and $y = x + 5$
- (b) Write down how many points of intersection there are of the two graphs.

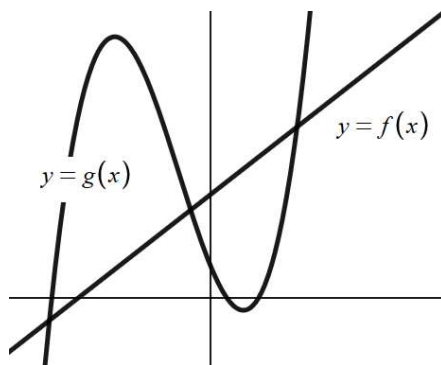
- (2) By drawing the graphs of $y = x^2$ and $y = 2x$, state the number of solutions to the simultaneous equations:

$$y = x^2$$

$$y = 2x$$

WORKING AT B/C

- (1) The diagram below shows the cubic function $g(x)$ and the linear function $f(x)$



Beryl is a maths student and she says there are 4 real solutions to the equations $f(x) = g(x)$. Explain why she is wrong.

- (2) **By drawing two graphs**, state the number of real solutions to the simultaneous equations

$$y = 8 - x^3$$

$$y = 2x^2$$

- (3) **By drawing two graphs**, state the number of real solutions to the simultaneous equations

$$y = (x + 2)(x - 3)(x - 5)(x - 7)$$

$$y = 0$$

WORKING AT A*/A

- (1) (a) On the same set of axes, draw the graphs of $y = x^3 - 3x^2$ and $y = 8 - 3x^2$
- (b) Explain why there are no points of intersection when $x < 0$.

- (2) (a) On the same set of axes, draw the graphs of $y = ax^2$ and $y = \frac{a}{x}$ where a is a positive constant.
- (b) Find the coordinates of any points where the graphs meet. Give your answer(s) in terms of a

- (3) What is the maximum number of real solutions to the equation $f(x) = g(x)$ if $f(x)$ is a cubic function and $g(x)$ is a quartic function? You must explain your answer fully.