

## Point of Intersection of A Line and a Curve

Find the coordinates of the point(s) where the line  $y = 2x + 5$  meets the curve  $y = x^3 - 17x - 25$

Curves meet when  $y = y$  (or  $x = x$ )

$$x^3 - 17x - 25 = 2x + 5$$

$$x^3 - 19x - 30 = 0$$

$$(x-5)(x^2 + 5x + 6) = 0$$

$$(x-5)(x+2)(x+3) = 0$$

Solutions:  $x = 5$   $x = -2$   $x = -3$

When  $x = 5$ ,  $y = 2 \times 5 + 5 = 15$   $(5, 15)$

When  $x = -2$ ,  $y = 2 \times -2 + 5 = 1$   $(-2, 1)$

When  $x = -3$ ,  $y = 2 \times -3 + 5 = -1$   $(-3, -1)$

If  $(x-5)$  is a factor  $f(5) = 0$

$$\begin{array}{r|rrrr} 5 & 1 & 0 & -19 & -30 \\ & \downarrow & 5 & 25 & 30 \\ \hline & 1 & 5 & 6 & \underline{0} \end{array}$$

$f(5) = 0 \therefore (x-5)$  is a factor.

} Points of  
Intersection