Problem 0580/43/O/N/21/ Q9

$f(x) = x(x-1)(x-2)$

(a) Find the coordinates of the points where the graph of $y = f(x)$ crosses the x-axis.

$f(x) = 0$

$x(x-1)(x-2) = 0$

$x = 0 \quad x-1 = 0 \quad x-2 = 0$

$x = 1 \quad x = 2$

$(0,0) \quad (1,0) \quad (2,0)$

(b) Show that $f(x) = x^3 - 3x^2 + 2x$.

$x(x-1)(x-2)$

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

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

(c) Find the coordinates of the turning points of the graph of $y = f(x)$.
Show all your working and give your answers correct to 1 decimal place.

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

$\frac{dy}{dx} = 3x^2 - 6x + 2$

$0 = 3x^2 - 6x + 2$

$x = 1{\cdot}6 \qquad x = 0{\cdot}4$

$y = (1{\cdot}6)^3 - 3(1{\cdot}6)^2 + 2(1{\cdot}6) = -0{\cdot}4$

$(1{\cdot}6, -0{\cdot}4)$

$y = (0.4)^3 - 3(0.4)^2 + 2(0.4) = 0.4$

$(0.4, 0.4)$