

Name: _____

<p>1. (a) Express $4x^2 - 8x + 7$ in the form $a(x+b)^2 + c$, where a, b and c are constants.</p> <p>(b) Hence, or otherwise, write down the coordinates of the turning point on the curve $y = 4x^2 - 8x + 7$. Is it a maximum or minimum?</p>	<p>(a) $4[x^2 - 2x] + 7 = 4(x-1)^2 + 3$</p> <p>(b) Turning point at $(1, 3)$. It is a minimum (since the coefficient of $x^2 = 4 > 0$)</p>
<p>2. Sketch the curve with equation $y = (x+2)^2(x-1)$. Show clearly the coordinates of any points where the curve crosses or meets the coordinate axes.</p>	<p>Positive cubic, repeated root at $x = -2$. Intersects y axis at $y = -4$</p> <p>https://www.desmos.com/calculator/k4s9vjwwiv</p>
<p>3. Differentiate $\frac{\sqrt{x} - 2x}{x^2}$ with respect to x</p>	<p>Simplify into index form first to give $x^{-\frac{3}{2}} - 2x^{-1}$</p> <p>Then differentiating wrt x gives $-\frac{3}{2}x^{-\frac{5}{2}} + 2x^{-2}$</p>
<p>4. The circle C has the equation $x^2 + y^2 + 6x = 5 - 7y$</p> <p>(a) Find the coordinates of the centre of C and find the radius of C.</p> <p>(b) Does the origin $(0, 0)$ lie inside or outside the circle?</p>	<p>(a) Circle can be written in the form $(x+3)^2 + \left(y + \frac{7}{2}\right)^2 = \frac{105}{4}$. So centre is $\left(-3, -\frac{7}{2}\right)$ and radius $\frac{\sqrt{105}}{2}$</p> <p>(b) Distance from the origin to the centre is $\sqrt{(-3)^2 + \left(-\frac{7}{2}\right)^2} = \frac{\sqrt{85}}{2} < \frac{\sqrt{105}}{2}$, so the origin lies in the circle</p>