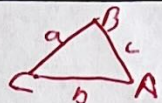


A - Level Maths 15 Minute Boost 5

$\int \sec(x)\tan(x) dx =$	$\sec(x) + C$
What does the mechanics modelling assumption "smooth" mean?	There is no friction
How can you find the area of a general triangle ABC?	$Area = \frac{1}{2} ab \sin(C)$ 
What is the Newton-Raphson iterative formula?	$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$
How do you calculate the moment of a force, F , about a point P ?	Force \times perpendicular distance from the line of action of the force to the point P .
<p>1) Find $\frac{dy}{dx}$ for the curve given implicitly by $3x^2y + 2y^2 = 7$</p> <p style="color: red;">Differentiating with respect to x,</p> $6xy + 3x^2 \frac{dy}{dx} + 4y \frac{dy}{dx} = 0$ $\Rightarrow \frac{dy}{dx} (3x^2 + 4y) = -6xy$ $\frac{dy}{dx} = \frac{-6xy}{3x^2 + 4y}$	



2 Let l_1 be the line $l_1 : y = 3x + 6$.

a) Find the equation of the line, l_2 which is perpendicular to l_1 passing through the point $(7,7)$.

Gradient of l_1 is 3 \Rightarrow gradient of l_2 is $-\frac{1}{3}$.

$y = -\frac{1}{3}x + c$ passing through $(7,7)$.

$$7 = -\frac{1}{3}(7) + c \Rightarrow c = \frac{21}{3} + \frac{7}{3} \\ = \frac{28}{3}$$

$$y = -\frac{1}{3}x + \frac{28}{3}$$

b) Find the coordinate of intersection of l_1 and l_2 and name this A.

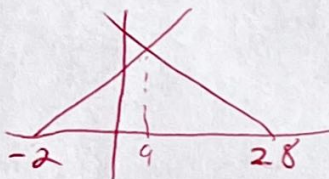
$$-\frac{1}{3}x + \frac{28}{3} = 3x + 6$$

$$\Rightarrow x = 1$$

When $x = 1$, $y = 9$

So coordinates of A are $(1,9)$

c) Let B be the point where l_1 crosses the x -axis and C be the point where l_2 crosses the x -axis. Find the area of triangle ABC.



$$\text{Area} = 30 \times 9$$

$$= 270 \text{ square units}$$

