24th July **Higher Plus 5-a-day**

Corbettmaths

Make y the subject of

$$\frac{x-3y}{y+x}=p$$

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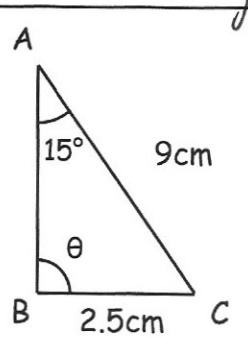
$$x-3y=p(y+x)$$

$$x-3y=py+px$$

$$x-px=y(p+3)$$

$$y=\frac{x-px}{p+3}$$



$$\frac{\sin\theta}{9}=\frac{\sin 15}{2.5}$$

$$\sin\theta=0.9317...$$

Find the two possible values of θ

$$\theta=68.71°$$

or

$$\theta=111.29°$$

Prove that when any odd integer is squared, the result is always one more than a multiple of 8.

$$(2n+1)^2=4n^2+4n+1$$

$$4n(n+1)+1$$

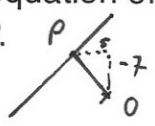
$n(n+1)$ is even as it is the product of two consecutive numbers.

$4n(n+1)$ is a multiple of 8.
(even)

$\therefore 4n(n+1)+1$ is one more than a multiple of 8.

The point P$(-5, 7)$ is a point on the circle $x^2+y^2=74$

Find the equation of the tangent to the circle at P.



gradient of OP $=-\frac{7}{5}$

$$y=\frac{5}{7}x+c$$

$$7=-\frac{25}{7}+c$$

$$c=\frac{74}{7}$$

$$y=\frac{5}{7}x+\frac{74}{7}$$

Find the coordinates of the point of intersection of this tangent and the line $y=x$

$$x=\frac{5}{7}x+\frac{74}{7}$$

$$\frac{2}{7}x=\frac{74}{7}$$

$$x=37$$

$$y=37$$

$$(37, 37)$$