Name: _____ 5-a-day Further Maths

13th July

Corbettmaths

Rationalise the denominator

$$\frac{5-\sqrt{3}}{2+\sqrt{3}}$$

$$\frac{5-\sqrt{3}}{2+\sqrt{3}} \times \frac{2-\sqrt{3}}{2-\sqrt{3}} = \frac{10+3-7\sqrt{3}}{4-3}$$

$$= 13-7\sqrt{3}$$

A circle C has centre P

The points A (1, 8) and B (6, 8) lie on the diameter of C.

Write down the equation of the circle.

$P\left(\frac{7}{2}, 8\right)$

$AB = 5 \Rightarrow r = \frac{5}{2}$

$$\left(x-\frac{7}{2}\right)^2 + (y-8)^2 = \frac{25}{4}$$

$A = \frac{8}{x+1}$ and $B = \frac{3x+5}{x}$

Given $5 - A - B = 0$

Work out the possible values of x.
Give your solutions to two decimal places.

$$5 - \frac{8}{x+1} - \frac{3x+5}{x} = 0$$

$$5x(x+1) - 8x - (3x+5)(x+1) = 0$$

$$5x^2 + 5x - 8x - 3x^2 - 8x - 5 = 0$$

$$2x^2 - 11x - 5 = 0$$

$$x = \frac{11 \pm \sqrt{161}}{4}$$

$x = -0.42, 5.92$ (2 d.p.)

Solve $2\sin\theta = 5\cos\theta$ for $0° \leq \theta \leq 360°$

$\tan\theta = \frac{5}{2}$

$\Rightarrow \theta = 68.2°, 248.2°$