

4th January



Corbettmaths

Solve the simultaneous equations

$$x + y = 3 \rightarrow y = 3 - x$$

$$x^2 + y^2 = 5$$

$$\begin{aligned} \rightarrow x^2 + (3-x)^2 &= 5 & x=2, y=1 \\ x^2 + 9 - 6x + x^2 &= 5 & x=1, y=2 \\ 2x^2 - 6x + 4 &= 0 \\ x^2 - 3x + 2 &= 0 \\ (x-2)(x-1) &= 0 \\ x=2 \text{ or } x=1 \end{aligned}$$

Donald saves some of his pocket money each week.

He saves 10p in week 1,
16p in week 2, 22p in week 3 and
so on for 40 weeks.

Find the amount he saves in week 40.

$$10, 16, 22, 28, \dots$$

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ +6 & +6 & +6 \end{array}$$

$$U_n = 6n + 4$$

$$\begin{aligned} U_{40} &= 6 \times 40 + 4 \\ &= 244 \end{aligned}$$

Calculate his total savings over the 40 weeks.

$$U_n = 6n + 4$$

$$S_n = \frac{n}{2}(a_1 + a_n)$$

$$S_{40} = \frac{40}{2}(10 + 244)$$

$$\begin{aligned} \rightarrow &= 20 \times 254 \\ &= 5080 \end{aligned}$$

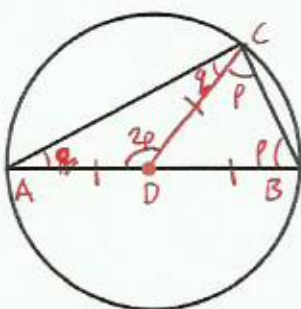
5080

Rationalise the denominator of

$$\frac{\sqrt{5}}{\sqrt{3} + 2} = \frac{\sqrt{3} - 2}{\sqrt{3} - 2} \left(\frac{\sqrt{5}}{\sqrt{3} + 2} \right)$$

$$= \frac{\sqrt{15} - 2\sqrt{5}}{3 - 2\sqrt{3} + 2\sqrt{3} - 4}$$

$$\begin{aligned} \rightarrow &= \frac{\sqrt{15} - 2\sqrt{5}}{-1} \\ &= 2\sqrt{5} - \sqrt{15} \end{aligned}$$

Prove that the angle in a semi-circle is always 90°

Two isosceles triangles:
 $\angle ADC = \angle DCB + \angle DBC$ (exterior angle theorem)
 $\therefore 2p + 2q = 180^\circ$ (angles in Δ sum to 180°)
 $2(p+q) = 180^\circ$
 $p+q = 90^\circ$ Q.E.D.