

20th March



Corbettmaths

Use Pascal's triangle to expand $(10 - 2x)^5$

$$\begin{array}{cccccc}
 & & & & & & & \\
 & & & & & & 1 & \\
 & & & & & 1 & & 1 \\
 & & & & 1 & 2 & 1 & \\
 & & & 1 & 3 & 3 & 1 & \\
 & & 1 & 4 & 6 & 4 & 1 & \\
 1 & 5 & 10 & 10 & 5 & 1 & &
 \end{array}$$

$$1 \times 10^5 = 100000$$

$$5 \times 10^4 \times (-2x) = -100000x$$

$$10 \times 10^3 \times (-2x)^2 = 40000x^2$$

$$\begin{aligned}
 10 \times 10^2 \times (-2x)^3 \\
 = -8000x^3
 \end{aligned}$$

$$5 \times 10 \times (-2x)^4 = 800x^4$$

$$1 \times (-2x)^5 = -32x^5$$

$$\begin{aligned}
 100000 - 100000x + 40000x^2 \\
 - 8000x^3 + 800x^4 - 32x^5
 \end{aligned}$$

A is the point (0, 0)

B is the point (5, 3)

$$\begin{aligned}
 \sqrt{5^2 + 3^2} \\
 = \sqrt{34}
 \end{aligned}$$

AB is the radius of the circle.

Work out the equations of the two possible circles.

$$x^2 + y^2 = 34$$

or

$$(x-5)^2 + (y-3)^2 = 34$$

Solve the simultaneous equations

$$2x + 3y - z = -9 \quad \text{--- (1)}$$

$$x - 2y - 2z = -2 \quad \text{--- (2)}$$

$$\begin{aligned}
 4x + 4y + 4z &= 52 \\
 x + y + z &= 13 \quad \text{--- (3)}
 \end{aligned}$$

$$2x + 2y + 2z = 26$$

$$\begin{aligned}
 \text{(2)} + 2 \times \text{(3)} \quad 3x &= 24 \\
 \boxed{x=8}
 \end{aligned}$$

$$\text{(1)} + \text{(3)} \Rightarrow 3x + 4y = 4$$

$$8 \times 3 + 4y = 4$$

$$24 + 4y = 4$$

$$4y = -20$$

$$\boxed{y = -5}$$

$$x + y + z = 13$$

$$8 + (-5) + z = 13$$

$$\boxed{z = 10}$$