9th February

Corbettmaths

Solve

$$\frac{81^x}{9^{x+1}} = 3\sqrt{3}$$

$\dfrac{(3^4)^x}{(3^2)^{x+1}} = \dfrac{3^{4x}}{3^{2x+2}}$

$3\sqrt{3} = 3^1 \times 3^{0.5} = 3^{1.5}$

$4x - (2x+2)$

$= 2x - 2$

$2x - 2 = 1.5$

$2x = 3.5$

$x = \frac{7}{4}$

Pattern 1 Pattern 2 Pattern 3

1 7 19

6 12

6

$2a = 6$ $a = 3$

$3a + b = 6$ $b = -3$

$c = 1$

How many of these tiles are needed to make Pattern number 12?

$3n^2 - 3n + 1$

$3 \times 12^2 - 3 \times 12 + 1 = 397$

The coefficient of the x^2 in the expansion of $(3x+a)^4$ is 1350.

Work out the possible values of a

1

1 1

1 2 1

1 3 3 1

1 4 6 4 1

$6 \times (3x)^2 \times a^2$

$6a^2 \times 9x^2 = 54a^2x^2$

$54a^2 = 1350$

$a^2 = 25$

$a = 5$ or $a = -5$

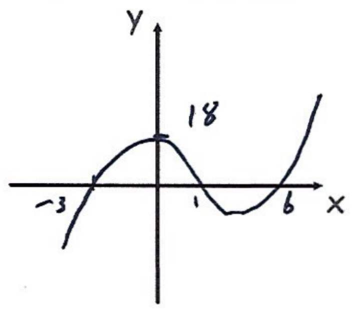
Sketch the curve

$-6 \times -1 \times 3 = 18$

$$y = (x-6)(x-1)(x+3)$$

6 1 -3

Label the points where the curve crosses the axes.



Point A lies on the curve
$y = x^2 + 2x + 10$

The x-coordinate of A is –5

Find the equation of the normal to the curve at A.

$y = \frac{1}{8}x + \frac{205}{8}$

$\frac{dy}{dx} = 2x + 2$

when $x = -5$ $y = 25$ $\frac{dy}{dx} = -8$

$y = \frac{1}{8}x + c$

$25 = \frac{1}{8}(-5) + c$

$c = \frac{205}{8}$