Name: _____ 5-a-day Further Maths

17th May

Corbettmaths

How many 6 digit even numbers, less than 700,000 can be made using the digits

1 2 4 6 7 8

with no repetition?

$\underset{1,2,4,6}{4} \times 4 \times 3 \times 2 \times 1 \times \underset{8}{1} = 96$

$\underset{2,4,6}{3} \times 4 \times 3 \times 2 \times 1 \times 3 = 216$

$96 + 216 = 312$

Solve

$\sqrt{300} + \sqrt{27} = \sqrt{y} + \sqrt{108}$

$10\sqrt{3} + 3\sqrt{3} = \sqrt{y} + 6\sqrt{3}$

$7\sqrt{3} = \sqrt{y}$

$147 = y$

The circle C has equation

$(x-3)^2 + (y+4)^2 = 25$

Find where C crosses the y-axis.

$y\text{-axis} \Rightarrow x = 0$

$\Rightarrow 9 + (y+4)^2 = 25$

$(y+4)^2 = 16$

$y + 4 = 4, -4$

$y = 0, -8$

$(0,0), (0,-8)$

Solve $\dfrac{32^{x-20}}{8^x} = 16$

$\dfrac{(2^5)^{x-20}}{(2^3)^x} = 2^4$

$2^{2x-100} = 2^4$

$2x - 100 = 4$

$x = 52$

A straight line, L, is perpendicular to the tangent of $y = x^2 + x + 8$ at the point where $x = -1$

L passes through the point (–8, –3)

Find the equation of L

$\dfrac{dy}{dx} = 2x + 1$

$x = -1 \Rightarrow \dfrac{dy}{dx} = -1 \Rightarrow m_{\perp} = 1$

L is $y + 3 = x + 8$

$\Rightarrow y = x + 5$