



Expand and simplify

$$(2x - 1)(2x - 3)(x + 5)$$

$$(4x^2 - 6x - 3x + 3)(x + 5)$$

$$(4x^2 - 9x + 3)(x + 5)$$

$$4x^3 - 8x^2 + 3x + 20x^2 - 40x + 15$$

$$4x^3 + 12x^2 - 37x + 15$$

Point A has coordinates (9, 7)  
 Point B has coordinates (14, -8)  
 (11.5, -0.5)  
 Find the equation of the line perpendicular to AB, that passes through the midpoint of AB.

$$\text{gradient of } AB = -3$$

$$y = \frac{1}{3}x + c$$

$$-0.5 = \frac{23}{6} + c$$

$$c = -\frac{13}{3}$$

$$y = \frac{1}{3}x - \frac{13}{3}$$

A group of scientists want to estimate the number of eels in a lake. They catch and ring 400 eels. They return the 400 eels to the lake. They then catch 700 eels. Of these, 16 are ringed.

Estimate the number of eels in the lake.

$$\frac{400}{N} = \frac{16}{700}$$

$$280000 = 16N$$

$$N = 17500$$

There are only yellow and blue counters in a box. A counter is to be taken at random from the box. The probability that the counter is blue is  $\frac{2}{5}$ .

The counter is returned to the box. 4 more yellow counters and 1 blue counter is added to the box.

The probability of a yellow counter is now  $\frac{8}{13}$ .

Find the number of yellow counters and blue counters that were in the bag originally.

$$m = \text{yellow} \quad n = \text{blue} \quad \text{total} = m + n$$

$$\frac{n}{m+n} = \frac{2}{5}$$

$$\frac{m+4}{m+n+5} = \frac{8}{13}$$

$$5n = 2m + 2n$$

$$3n = 2m$$

$$13m + 52 = 8m + 8n + 40$$

$$5m + 12 = 8n$$

$$2.5(2m) + 12 = 8n$$

$$2.5(3n) + 12 = 8n$$

$$7.5n + 12 = 8n$$

$$0.5n = 12$$

$$n = 24$$

$$\text{blue} = 24$$

$$\text{yellow} = 36$$