Name: _____ 5-a-day Further Maths

9th January

Corbettmaths

Simplify this ratio fully

$\sqrt{20} : \sqrt{45} : \sqrt{2000}$

$2\sqrt{5} : 3\sqrt{5} : 20\sqrt{5}$

$2 : 3 : 20$

The nth term of a sequence is $\frac{3n^2+5}{6n^2-1}$

Find the limiting value of $\frac{3n^2+5}{6n^2-1}$ as $n \to \infty$

$\frac{3}{6} = \frac{1}{2}$

Given that

$(ax+b)(x+4)(x+c) \equiv 2x^3 + 19x^2 + 49x + 20$

$a=2, b=1, c=5$

Find the values of a, b and c

$(ax^2 + 4ax + bx + 4b)(x+c)$

$ax^3 + acx^2 + 4ax^2 + 4acx + bx^2 + bcx + 4bx + 4bc$

coefficients of x^3 $a=2$

coefficients of x^2 $ac + 4a + b = 19$

$2c + 8 + b = 19$

$b + 2c = 11$ $b = 11 - 2c$

constants $4bc = 20$

$bc = 5$ $2c^2 - 11c + 5$

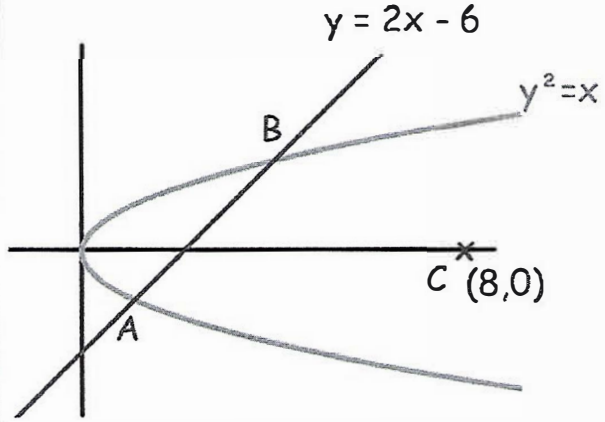
$c(11-2c) = 5$ $c = \frac{1}{2}$ or $c = 5$

$19c - 2c^2 = 5$

$b = 1$

$c = 5$

Shown is the curve $y^2 = x$ and the line $y = 2x - 6$



$2x - \frac{1}{2} = -1$

$\therefore \angle ABC = 90°$

as lines are perpendicular

The curve and the line meet at the points A and B.

The point C is (8, 0)

Show ABC is a right angled triangle.

$(2x-6)^2 = x$

$4x^2 - 24x + 36 = x$

$4x^2 - 25x + 36 = 0$

$(4x-9)(x-4) = 0$

$x = \frac{9}{4}$ or $x = 4$

$A(\frac{9}{4}, -\frac{3}{2})$ $B(4, 2)$ $C(8,0)$

gradient of AB: $\frac{3.5}{1.75} = 2$

gradient of BC: $\frac{-2}{4} = -\frac{1}{2}$