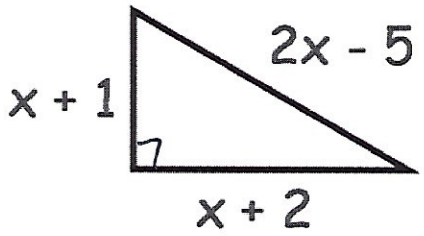
Name: _____ 5-a-day Further Maths

25th December

Corbettmaths

Below is a right angled triangle.



Find the possible values of x.

$(x+1)^2 + (x+2)^2 = (2x-5)^2$

$x^2 + 2x + 1 + x^2 + 4x + 4 = 4x^2 - 20x + 25$

$2x^2 - 26x + 20 = 0$

$x^2 - 13x + 10 = 0$

$a = 1 \quad b = -13 \quad c = 10$

$x = \frac{13 \pm \sqrt{129}}{2}$

$x = 0.821$ X

$x = 12.179$ ✓

Show that $x - 2$ is a factor of

$x^7 - 6x^4 - x - 30$

$f(x) = x^7 - 6x^4 - x - 30$

if $(x-2)$ is a factor, $f(2) = 0$

$f(2) = 2^7 - 6 \times 2^4 - 2 - 30$

$= 0$

$\therefore$ factor

The transformation matrix

$$\begin{pmatrix} p & q \\ 5p & 2q \end{pmatrix} \begin{pmatrix} 2 \\ 1 \end{pmatrix} = \begin{pmatrix} 0 \\ -12 \end{pmatrix}$$

maps the point (2, 1) to the point (0, –12).

Find p and q

$2p + q = 0 \qquad 4p + 2q = 0$

$10p + 2q = -12 \qquad 2q = -4p$

$10p - 4p = -12$

$6p = -12$

$p = -2 \quad q = 4$

$A = 4 - x \qquad 3A + B = 12 - 3x + 7x - 4$

$B = 7x - 4 \qquad = 4x + 8$

$C = x^2 \qquad (3A+B)^2 = 16x^2 + 64x + 64$

Show that

$(3A + B)^2 \equiv 6A + 10B + 16C + 80$

$6A + 10B + 16C + 80$

$24 - 6x + 70x - 40 + 16x^2 + 80$

$= 16x^2 + 64x + 64$

QED