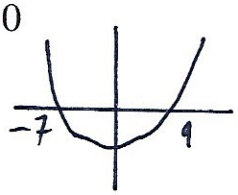
Name: _____ 5-a-day Further Maths

18th December

Corbettmaths

Work out the range of values of x for which

$x^2 - 2x - 63 \leq 0$



$-7 \leq x \leq 9$

$f(x) = 200 - x^3$ for all values of x.

Solve $f(2x) = 15$

$200 - (2x)^3 = 15$

$200 - 8x^3 = 15$

$8x^3 = 185$

$x^3 = 185/8$

$x = \sqrt[3]{185/8}$

$x = 2.849$

The expansion of $(2 + ax)^5$ in ascending powers of x, as far as x^2 is

$32 + bx + 720x^2$

Given a is positive, find the values of a and b.

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1

$2^5 = 32$

$5 \times 2^4 \times (ax) = 80ax$

$10 \times 2^3 \times (ax)^2 = 80a^2x^2$

$32 + 80ax + 80a^2x^2$

$a > 0$ $720 = 80a^2$

$a = 3$

$80 \times 3 = 240$

$b = 240$

The point (3, a) is invariant when transformed by the matrix

$\begin{pmatrix} 6 & -2 \\ -5 & 3 \end{pmatrix} \begin{pmatrix} 3 \\ a \end{pmatrix} = \begin{pmatrix} 3 \\ a \end{pmatrix}$

Find a

$18 - 2a = 3$

$2a = 15$

$a = 7.5$

$a = 7.5$