Name: _____ 5-a-day Further Maths

3rd May

Corbettmaths

Simplify

$$\frac{(3x^4y)^4}{9x^7y^6}$$

$\frac{81x^{16}y^4}{9x^7y^6}$

$9x^9y^{-2} = \frac{9x^9}{y^2}$

$g(x) = x^2 + x - 2$ for $-1 \leq x \leq 4$

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

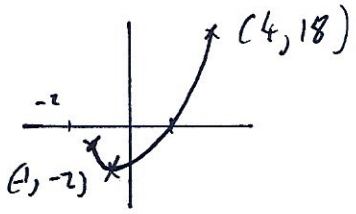
Work out the range of $g(x)$

$g(4) = 18$

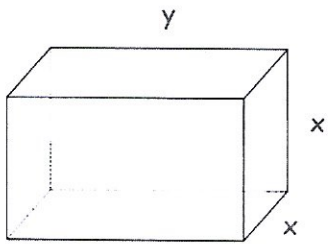
$g(-1) = -2$

$g(-0.5) = -2.25$

$-2.25 \leq g(x) \leq 18$



Shown below is a metal box in the shape of a cuboid.



$V = x^2y$

The volume of the box is 80cm³

Show that $y = \frac{80}{x^2}$

$80 = x^2y$

$y = \frac{80}{x^2}$

Show that the area of metal to make the box is given by

$A = 2x^2 + \frac{320}{x}$

$A = x^2 + x^2 + 4xy$

$= 2x^2 + 4x\left(\frac{80}{x^2}\right)$

$= 2x^2 + \frac{320}{x}$

Use differentiation to find the value of x for which A is a minimum

$A = 2x^2 + 320x^{-1}$

$\frac{dA}{dx} = 4x - 320x^{-2}$

$= 4x - \frac{320}{x^2}$

$0 = 4x - \frac{320}{x^2}$

$4x = \frac{320}{x^2}$

$4x^3 = 320$

$x = \sqrt[3]{80}$

4.31cm