



## Answers

(A)

①  $y = x^3 - x^2 + x - 5$  (4 units up so add 4)  
 $y = x^3 - x^2 + x - 5 + 4$  (simplify)  
 $y = x^3 - x^2 + x - 1$

②  $y = x^3 - x^2 + x - 5$  (1 to the left so substitute  $(x+1)$ )  
 $y = (x+1)^3 - (x+1)^2 + (x+1) - 5$  (Only simplify the last part)  
 $y = (x+1)^3 - (x+1)^2 + x - 4$

③  $y = x^3 - x^2 + x - 5$  (reflection in the y-axis so  $x \rightarrow (-x)$ )  
 $y = (-x)^3 - (-x)^2 + (-x) - 5$  (simplify)  
 $y = -x^3 - x^2 - x - 5$

④  $y = x^3 - x^2 + x - 5$  (vertical dilation so multiply  $\frac{1}{2}$  formula)  
 $y = 0.5(x^3 - x^2 + x - 5)$  (work out brackets)  
 $y = 0.5x^3 - 0.5x^2 + 0.5x - 2.5$

⑤  $y = x^3 - x^2 + x - 5$  (Reflection in the x-axis so  $f(x) \rightarrow -f(x)$ )  
 $y = -(x^3 - x^2 + x - 5)$  (work out brackets)  
 $y = -x^3 + x^2 - x + 5$

⑥  $y = x^3 - x^2 + x - 5$  (Horizontal dilation so multiply  $x$ )  
 $y = (\frac{1}{0.5}x)^3 - (\frac{1}{0.5}x)^2 + (\frac{1}{0.5}x) - 5$  (simplify)  
 $y = 8x^3 - 4x^2 + 2x - 5$

$$\frac{1}{0.5} = 2$$