

Higher Mathematics

Inverse Functions - Solutions - 2013-2017

Marks are indicated in brackets after each question number

2015 Paper 1 Question 5, (2) (1)

a) $g(x) = 6 - 2x$

$$y = 6 - 2x$$

Interchange x y to give

$$x = 6 - 2y$$

Solve for y

$$y = 3 - \frac{1}{2}x$$

$$\text{So, } g^{-1}(x) = 3 - \frac{1}{2}x$$

b) $g(g^{-1}(x)) = x$ since g and g^{-1} are inverses of each other

2016 Paper 1 Question 6, (3) (1)

a) $f(x) = 3x + 5$

Let $y = 3x + 5$

Swap x y to give

$$x = 3y + 5$$

$$y = \frac{x - 5}{3}$$

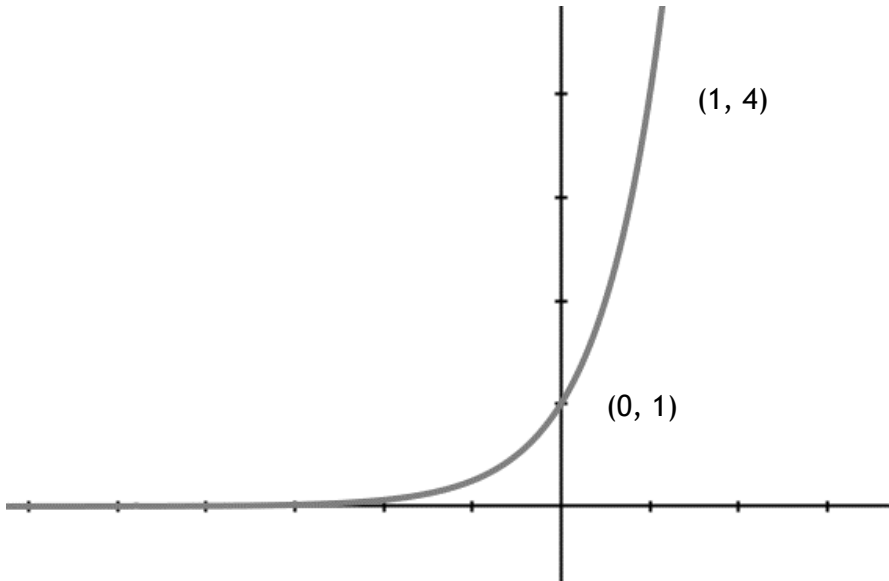
$$\text{So, } f^{-1}(x) = \frac{x - 5}{3}$$

b) $g^{-1}(7) = 2$

2016 Paper 1 Question 10, (2)

The point $(1, 0)$ on the graph of $f(x)$ is transformed to $(0, 1)$ on the graph of $f^{-1}(x)$

The point $(4, 1)$ on the graph of $f(x)$ is transformed to $(1, 4)$ on the graph of $f^{-1}(x)$



2017 Paper 1 Question 6, (3)

$$h(x) = x^3 + 7$$

Let $y = h(x)$

$$y = x^3 + 7$$

Swapping x y gives

$$x = y^3 + 7$$

$$y^3 = x - 7$$

$$y = \sqrt[3]{x - 7}$$

So, $h^{-1}(x) = \sqrt[3]{x - 7}$