FUNCTIONS

COMPOSITE FUNCTIONS

Ref: G294. 5R1

A1

$$f(x) = 2x - 5 \ , \ \ g(x) = x^2 - 10$$

Find fg(4)

A2

$$f(x) = x + 2 \ , \ \ g(x) = \frac{1}{x-3}$$

Find fg(x)

A3

$$f(x) = 2x + 5 \ , \ \ g(x) = x^2 - 25$$

Solve gf(x) = 0

B1

$$f(x) = \frac{1}{2}x + 4 \ , \ \ g(x) = \frac{2x}{x+1}$$

work out fg(–3)

B2

$$f(x) = x + 4 \ , \ \ g(x) = \frac{x}{2x-5}$$

Find gf(x)

B3

$$f(x) = \frac{2}{x} \ , \ \ g(x) = \frac{x+1}{x}$$

Solve gf(a) = 3

C1

$$f(x) = \sqrt{x-1} \ , \ \ g(x) = \frac{1}{x+2}$$

Calculate gf(10)

C2

$$f{:}x \mapsto 2x^2 + 1 \ , \ \ g{:}x \mapsto \frac{2x}{x-1}$$

Express the composite function gf in the form gf:$x \mapsto$ ...

C3

$$f(x) = x^2 \ , \ \ g(x) = 2 + x$$

Solve the equation fg(x) = g(x)

D1

$$f{:}x \mapsto 2x - 3 \ , \ \ g{:}x \mapsto 1 + \sqrt{x}$$

Calculate fg(6)

D2

$$f(x) = \frac{x-6}{2} \ , \ \ g(x) = \sqrt{x-4}$$

Express the function gf in the form gf(x) = …
Give your answer as simply as possible.

D3

$$f(x) = x^2 \ , \ \ g(x) = x - 3$$

Solve the equation gf(x) = $g^{-1}(x)$

FUNCTIONS

COMPOSITE FUNCTIONS

Ref: G294. 5R1

A1

$g(4) = (4)^2 - 10 = 6$ $\quad f(6) = 2(6) - 5 = 7$

A2

$fg(x) = f\left(\frac{1}{x-3}\right) = \left(\frac{1}{x-3}\right) + 2 = \frac{2x-5}{x-3}$

A3

$gf(x) = g(2x+5) = (2x+5)^2 - 25 = 4x^2 + 20$

so solve $4x^2 + 20 = 0$ $\quad x = 0, \quad x = -5$

B1

$g(-3) = \frac{2(-3)}{(-3)+1} = 3$ $\quad f(3) = \frac{1}{2}(3) + 4 = 5.5$

B2

$gf(x) = g(x+4) = \frac{(x+4)}{2(x+4)-5} = \frac{x+4}{2x+3}$

B3

$gf(a) = \frac{a}{2} + 1$

so solve $\frac{a}{2} + 1 = 3$ $\quad a = 4$

C1

$f(10) = \sqrt{(10)-1} = 3$ $\quad g(3) = \frac{1}{(3)+2} = 0.2$

C2

$gf(x) = g(2x^2+1) = \frac{2(2x^2+1)}{(2x^2+1)-1} = \frac{4x^2+2}{2x^2} = \frac{2x^2+1}{x^2}$

C3

$fg(x) = f(2+x) = (2+x)^2$

so solve $(2+x)^2 = 2+x$ $\quad x = -1$

D1

$g(6) = 1+\sqrt{6} \rightarrow f(1+\sqrt{6}) = 2(1+\sqrt{6}) - 3 = -1 + 2\sqrt{6} = (3.90)$

D2

$gf(x) = g\left(\frac{x-6}{2}\right) = \sqrt{\left(\frac{x-6}{2}\right) - 4} = \sqrt{\frac{x-14}{2}}$

D3

$gf(x) = g(x^2) = x^2 - 3$ $\quad g^{-1}(x) = x + 3$

so solve $x^2 - 3 = x + 3$ $\quad x = -2, \quad x = 3$