Composite functions

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① $gf(x)$ → gof "g after f"

Put the f function into the x part of g function.

② $fg(x)$ → fog "f after g"

Put the g function into the x part of the f function.

Eg1 $f(x) = 2x - 3$ and $g(x) = x + 5$

Find 1) $fg(2)$ put the g function into the x part of the f function.

$2(x+5)-3$

$2x+10-3$

$2(2)+10-3$

$4+10-3$

$= 11$

$fg(2) = 11$

Find 2) $gf(-2)$ put the f function into the x part of the g function.

$f(x) = 2x-3$ $g(x) = x+5$

$(2x-3)+5$

$2x-3+5$

$2x+2$

$2(-2)+2$

$-4+2 = -2$

$gf(-2) = -2.$

Classwork Q14 Pg 461

Q14 $f: x \to 2x+1$ and $g: x \to 4x-3$

Find

i) $f(3)$

$2(3)+1$

$6+1$

$f(3) = 7$

ii) $gf(3)$

$4(2x+1)-3$

$8x+4-3$

$8x+1$

$8(3)+1$

$24+1 = 25$

iii) $fg(-2)$

$2(4x-3)+1$

$8x-6+1$

$8x-5$

$8(-2)-5$

$-16-5 = -21$

iv) $gf(x) = 4(2x+1)-3$

$8x+4-3$

$= 8x+1$

$fg(x) = 19$

$8x-5 = 19$

$+5$ | $8x = 24$ | $+5$

$\div 8$ | $x = 3$ | $\div 8$

Q15 $f: x \to 2x+1$ $g(x) \to x^2$

i) $f(4)$

$2(4)+1$

$8+1=9$

ii) $g(-3)$

$(-3)^2$

$=9$

iii) $fg(2)$

$2(x^2)+1$

$2x^2+1$

$2(2)^2+1$

$=9$

iv) $gf(4)$

$(2x+1)^2$

$(2(4)+1)^2$

$(8+1)^2$

$(9)^2 = 81$

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Q16 $f(x) = 2x-1$ and $g(x) = 3x+2$

Find

i) $fg(1)$ ii) $gf(3)$ iii) $gf(x)$ iv) $fg(x)$

Q17) $f(x) = 2x-1$ and $g(x) = x^2+2$

Find

i) $fg(2)$ ii) $gf(\frac{1}{2})$ iii) $fg(x)$

$gf(x)$