

Name: _____ Score: _____

Teacher: _____ Date: _____

Composite functions

1- Given $f(x) = 2x$, $g(x) = x + 3$ and $h(x) = x^2 + 4$, find

- | | | | |
|----------------------|----------------------|-----------------------|-----------------------|
| (a) $(f \circ g)(x)$ | (b) $(g \circ f)(x)$ | (c) $(f \circ g)(2)$ | (d) $(f \circ g)(2)$ |
| (e) $(f \circ h)(x)$ | (f) $(h \circ f)(x)$ | (g) $(f \circ h)(-3)$ | (h) $(h \circ f)(-3)$ |
| (i) $(g \circ h)(x)$ | (j) $(h \circ g)(x)$ | (k) $(g \circ h)(0)$ | (l) $(h \circ g)(0)$ |

2- Given $f(x) = x^2 - 4$, and $g(x) = 2x - 6$, Find

- | | | | |
|----------------------|-----------------------|--|--------------------------|
| (a) $(f \circ g)(2)$ | (b) $(f \circ g)(3)$ | (c) $(f \circ g)\left(\frac{1}{2}x\right)$ | (d) $(f \circ g)(x + 3)$ |
| (e) $(g \circ f)(2)$ | (f) $(g \circ f)(-3)$ | (g) $(g \circ f)(x^2)$ | (h) $(g \circ f)(x + 2)$ |

3- Let $f(x) = 2x + 4$, and $g(x) = 7x^2$

- (a) Find $(f \circ g)(x)$
(b) Find $(f \circ g)(3.5)$.

4. Let $f(x) = 3x$, $g(x) = 2x - 5$, and $h(x) = (f \circ g)(x)$

- (a) Find $h(x)$
(b) Find $h(0)$
(c) Find $(g \circ h)(x)$
(d) Hence solve the equation $(g \circ h)(x) = g(x)$

5- Let $f(x) = 2x - 5$, and $g(x) = x^2 - 18$

- (a) Find $(f \circ g)(x)$
(b) Find $(g \circ f)(x)$
(c) Hence solve the equation $(f \circ g)(x) = (g \circ f)(x)$

Solutions

1-

- | | | | |
|-----------------|---------------------|--------|--------|
| (a) $2x + 6$ | (b) $2x + 3$ | (c) 10 | (d) 7 |
| (e) $2x^2 + 11$ | (f) $4x^2 + 4$ | (g) 29 | (h) 40 |
| (i) $x^2 + 7$ | (j) $x^2 + 6x + 13$ | (k) 7 | (l) 13 |

2-

- | | | | |
|----------|----------|----------------------|---------------------|
| (a) 0 | (b) -4 | (c) $x^2 - 12x + 32$ | (d) $4x^2 - 4$ |
| (e) -6 | (f) 4 | (g) $2x^4 - 14$ | (h) $2x^2 + 8x - 6$ |

3- (a) $14x^2 + 4$ (b) 175.5

4-

- (a) $h(x) = 6x^2 - 15$
- (b) $h(0) = -15$
- (c) $(g \circ h)(x) = 12x^2 - 35$
- (d) $x_1 = \frac{5}{3}$ $x_2 = -\frac{3}{2}$

5- (a) $(f \circ g)(x) = 2x^2 - 41$

(b) $(g \circ f)(x) = 4x^2 - 20x + 7$

(c) $x_1 = 6$, $x_2 = 4$