

$$f(x) = 2x^2 - 5 \text{ and } g(x) = x - 3$$

5.  $(f \circ g)(x)$

$$2(x-3)^2 - 5$$

$$2(x^2 - 6x + 9) - 5$$

$$2x^2 - 12x + 18 - 5$$

	$x$	$-3$
$x$	$x^2$	$-3x$
$-3$	$-3x$	$9$

$$f(g(x)) = 2x^2 - 12x + 13$$

7.  $f(f(x))$

$$2(2x^2 - 5)^2 - 5$$

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

$$8x^4 - 40x^2 + 50 - 5$$

	$2x^2$	$-5$
$2x^2$	$4x^4$	$-10x^2$
$-5$	$-10x^2$	$25$

$$f(f(x)) = 8x^4 - 40x^2 + 45$$

6.  $(g \circ f)(x)$

$$(2x^2 - 5) - 3$$

$$g(f(x)) = 2x^2 - 8$$

8.  $g(g(x))$

$$(x-3) - 3$$

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

$$f(x) = x - 4 \text{ and } g(x) = 6x + 1$$

9.  $(f \circ g)(x)$

$$(6x + 1) - 4$$

$$f(g(x)) = 6x - 3$$

11.  $f(f(x))$

$$(x - 4) - 4$$

$$f(f(x)) = x - 8$$

$$f(x) = x^2 + 2 \text{ and } g(x) = 3(x - 5)^2$$

10.  $g(f(x))$

$$6(x - 4) + 1$$

$$6x - 24 + 1$$

$$g(f(x)) = 6x - 23$$

12.  $(g \circ g)(x)$

$$6(6x + 1) + 1$$

$$36x + 6 + 1$$

$$g(g(x)) = 36x + 7$$

14.  $g(f(x))$

$$g(g(x)) = 36x + 7$$

$$f(x) = x^2 + 2 \text{ and } g(x) = 3(x - 5)^2$$

13.  $(f \circ g)(x)$

$$(3(x-5)^2)^2 + 2$$

$$(3(x^2 - 10x + 25))^2 + 2$$

$$(3x^2 + 30x + 75)^2 + 2$$

$$9x^4 - 180x^3 + 1350x^2 - 4500x + 5625 + 2$$

$$f(g(x)) = 9x^4 - 180x^3 + 1350x^2 - 4500x + 5627$$

	$3x^2$	$-30x$	$75$
$3x^2$	$9x^4$	$-90x^3$	$225x^2$
$-30x$	$-90x^3$	$900x^2$	$-2250x$
$75$	$225x^2$	$-2250x$	$5625$

14.  $g(f(x))$

$$3((x^2 + 2) - 5)^2$$

$$3(x^2 - 3)^2$$

$$3(x^4 - 6x^2 + 9)$$

$$g(f(x)) = 3x^4 - 18x^2 + 27$$

	$x^2$	$-3$
$x^2$	$x^4$	$-3x^2$
$-3$	$-3x^2$	$9$

15.  $f(f(x))$

$$(x^2 + 2)^2 + 2$$

$$x^4 + 4x^2 + 4 + 2$$

$$f(f(x)) = x^4 + 4x^2 + 6$$

	$x^2$	$2$
$x^2$	$x^4$	$2x^2$
$2$	$2x^2$	$4$

16.  $(g \circ g)(x)$

$$3((3(x-5)^2) - 5)^2$$

$$3(3x^2 - 30x + 75 - 5)^2$$

$$3(3x^2 - 30x + 70)^2$$

$$3(9x^4 - 180x^3 + 1320x^2 - 4200x + 4900)$$

$$g(g(x)) = 27x^4 - 540x^3 + 3960x^2 - 12600x + 14700$$

	$3x^2$	$-30x$	$70$
$3x^2$	$9x^4$	$-90x^3$	$210x^2$
$-30x$	$-90x^3$	$900x^2$	$-2100x$
$70$	$210x^2$	$-2100x$	$4900$