

Adv. Alg. OPERATIONS & COMPOSITIONS
EXAM REVIEW

Name Key hr

Perform each function operation.

$$f(x) = x^2 + 4x + 3$$

$$g(x) = x + 1$$

1. $(f+g)(x) = \underline{x^2 + 5x + 4}$
 $x^2 + 4x + 3 + x + 1$

2. $(f-g)(x) = \underline{x^2 + 3x + 2}$
 $x^2 + 4x + 3 - (x + 1)$
 $x^2 + 4x + 3 - x - 1$

3. $\frac{f(x)}{g(x)} = \underline{\frac{x+3}{x+1}}$
 $\frac{x^2 + 4x + 3}{x+1} = \frac{(x+3)(\cancel{x+1})}{(\cancel{x+1})}$

4. $f(x) \cdot g(x) = \underline{x^3 + 5x^2 + 7x + 3}$
 $(x^2 + 4x + 3)(x + 1)$
 $x^3 + 4x^2 + 3x + x^2 + 4x + 3$
 $x^3 + 5x^2 + 7x + 3$

Perform each function operation.

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

$$g(x) = x^2 - 5x + 6$$

5. $(f+g)(x) = \underline{x^2 - 4x + 3}$
 $x - 3 + x^2 - 5x + 6$

6. $(f-g)(x) = \underline{-x^2 + 6x - 9}$
 $x - 3 - (x^2 - 5x + 6)$
 $x - 3 - x^2 + 5x - 6$

7. $\frac{f(x)}{g(x)} = \underline{\frac{1}{x-2}}$
 $\frac{x-3}{x^2 - 5x + 6} = \frac{\cancel{x-3}}{(\cancel{x-3})(x-2)}$

8. $f(x) \cdot g(x) = \underline{x^3 - 8x^2 + 21x - 18}$
 $(x-3)(x^2 - 5x + 6)$
 $x^3 - 5x^2 + 6x - 3x^2 + 15x - 18$
 $x^3 - 8x^2 + 21x - 18$

Find the value of each composition.

$$f(x) = 5x - 4$$

$$g(x) = x^2 - 1$$

9. $g(f(-1)) = \underline{80}$

10. $(f \circ g)(2) = \underline{11}$

11. $g(f(0)) = \underline{15}$

$$f(-1) = 5(-1) - 4$$

 $= -5 - 4$
 $= -9$

$$g(-9) = (-9)^2 - 1$$

 $= 81 - 1$
 $= 80$

$$g(2) = 2^2 - 1$$

 $= 4 - 1$
 $= 3$

$$f(3) = 5(3) - 4$$

 $= 15 - 4$
 $= 11$

$$f(0) = 5(0) - 4$$

 $= 0 - 4$
 $= -4$

$$g(-4) = (-4)^2 - 1$$

 $= 16 - 1$
 $= 15$

Find the value of each composition.

$$h(x) = 2x^2 + 3$$

$$j(x) = x - 2$$

12. $h(j(-2)) = \underline{35}$

13. $(j \circ h)(5) = \underline{51}$

14. $j(h(\frac{1}{2})) = \underline{1.5}$

$$j(-2) = -2 - 2$$

 $= -4$

$$h(-4) = 2(-4)^2 + 3$$

 $= 2(16) + 3$
 $= 32 + 3$
 $= 35$

$$h(5) = 2(5)^2 + 3$$

 $= 2(25) + 3$
 $= 50 + 3$
 $= 53$

$$j(53) = 53 - 2$$

 $= 51$

$$h(\frac{1}{2}) = 2(\frac{1}{2})^2 + 3$$

 $= 2(\frac{1}{4}) + 3$
 $= .5 + 3$
 $= 3.5$

$$j(3.5) = 3.5 - 2$$

 $= 1.5$

Find the inverse of each function.

15. $f(x) = 3x + 2$

$$y = 3x + 2$$

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

$$x-2 = 3y$$

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

$$f^{-1}(x) = \frac{1}{3}x - \frac{2}{3} = \frac{x-2}{3}$$

16. $f(x) = (x+3)^2 + 1$

$$y = (x+3)^2 + 1$$

$$x = \sqrt{y-1} - 3$$

$$x-1 = (y+3)^2$$

$$\sqrt{x-1} = y+3$$

$$y = \sqrt{x-1} - 3$$

$$f^{-1}(x) = \sqrt{x-1} - 3$$

17. $f(x) = \frac{1}{2}x - 3$

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

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

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

$$2x+6 = y$$

$$f^{-1}(x) = 2x+6$$

18. $f(x) = (x+2)^2 - 1$

$$y = (x+2)^2 - 1$$

$$x = \sqrt{y+1} - 2$$

$$x+1 = (y+2)^2$$

$$\sqrt{x+1} = y+2$$

$$y = \sqrt{x+1} - 2$$

$$f^{-1}(x) = \sqrt{x+1} - 2$$

Describe how the graphs below compare to the parent function, $y = \sqrt{x}$

19. $y = \sqrt{x} - 1$

down 1

20. $y = \sqrt{x+2}$

left 2

21. $y = \sqrt{x-1} + 3$

right 1, up 3

22. $y = \sqrt{x} - 4$

down 4

23. $y = 3\sqrt{x+5}$

left 5
wider by factor of 3

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

down 3,
narrower by factor of 2