SM3
Chapter 5 Review

Name: _____
Period: _____

Let $f(x) = x^2 + 4$ and $g(x) = 7 - x$. Perform the indicated operation.

1. $f(x) + g(x)$

$x^2+4+7-x$

x^2-x+11

2. $f(x) - g(x)$

$x^2+4-(7-x)$

x^2+x-3

3. $f(x) \cdot g(x)$

$(x^2+4)(7-x)$

$-x^3+7x^2-4x+28$

4. $\frac{f(x)}{g(x)}$ **(state the domain)**

$\frac{x^2+4}{7-x}$ $x \neq 7$

5. $f(g(x))$

$f(7-x) =$

$(7-x)^2+4 = 49-14x+x^2+4$

$x^2-14x+53$

6. $g(f(x))$

$g(x^2+4) = 7-(x^2+4)$

$-x^2+3$

7. $f(g(-2))$

$f(7-(-2)) = f(9)$

$= (9)^2+4 = 85$

8. $g(f(4))$

$g(4^2+4) = g(20)$

$= 7-20 = -13$

Find the Inverse of the function, then verify that they are inverses:

9. $f(x) = 2x + 4$

$y = \frac{x-4}{2}$ or $y = \frac{1}{2}x-2$

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

10. $f(x) = -\frac{2}{3}x + 4$

$y = -\frac{3}{2}x+6$

$-\frac{2}{3}(-\frac{3}{2}x+6)+4 = x-4+4$

$= x$

11. $f(x) = x^2 + 5;\ x \geq 0$

$y = \sqrt{x-5}$

$(\sqrt{x-5})^2+5 = x-5+5$

$= x$

12. $f(x) = (x-7)^{\frac{1}{3}}$

$y = x^3+7$

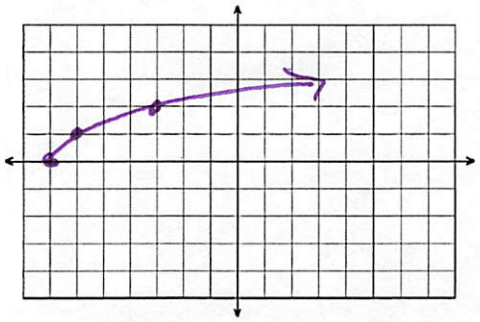
$((x^3+7)-7)^{1/3} = (x^3)^{1/3}$

$= x$

Graph the function then state the domain, range and starting point:

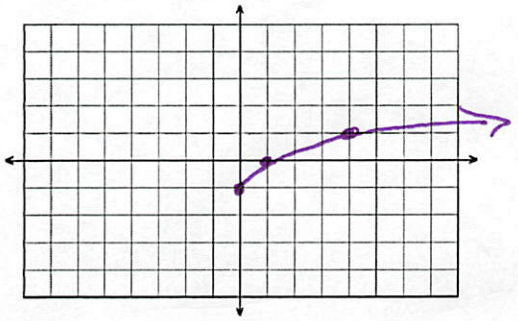
13. $f(x) = \sqrt{x+7}$

Domain: $x \geq -7$
Range: $y \geq 0$
Starting Point: $-7, 0$



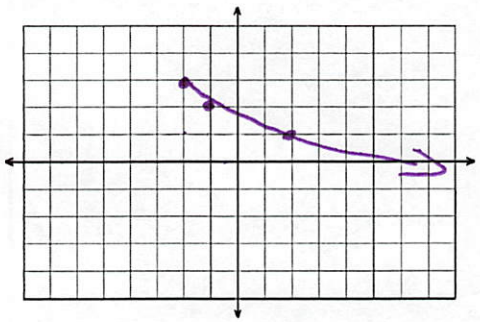
14. $f(x) = \sqrt{x} - 1$

Domain: $x \geq 0$
Range: $y \geq -1$
Starting Point: $(0, -1)$



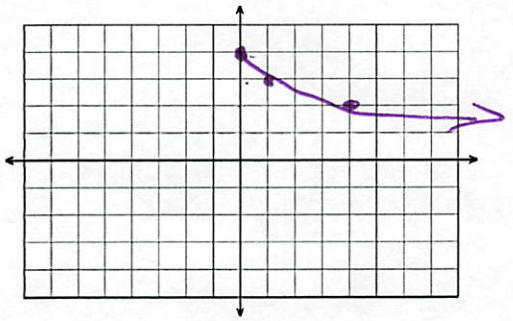
15. $f(x) = 3 - \sqrt{x+2}$

Domain: $x \geq -2$
Range: $y \leq 3$
Starting Point: $(-2, 3)$



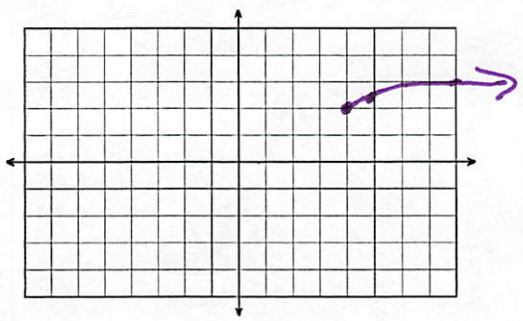
16. $f(x) = -\sqrt{x} + 4$

Domain: $x \geq 0$
Range: $y \leq 4$
Starting Point: $(0, 4)$



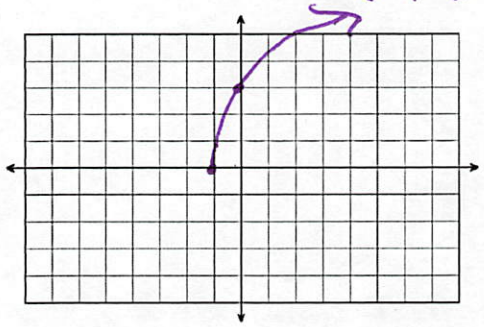
17. $f(x) = 2 + \frac{1}{2}\sqrt{x-4}$

Domain: $x \geq 4$
Range: $y \geq 2$
Starting Point: $(4, 2)$



18. $f(x) = 3\sqrt{x+1}$

Domain: $x \geq -1$
Range: $y \geq 0$
Starting Point: $(-1, 0)$



Simplify:

19. $\sqrt{49x^6y^4}$

$7x^3y^2$

20. $\sqrt[3]{125x^6y^9}$

$5x^2y^3$

21. $2\sqrt[4]{48x^2y^9z^{12}}$

$2y^2z^3\sqrt[4]{3x^2y}$

22. $6\sqrt[5]{-288a^5b^{16}}$

$-4ab^3\sqrt[5]{9b}$

Simplify the expression:

23. $\sqrt{98}+\sqrt{2}$

$7\sqrt{2}+\sqrt{2}=8\sqrt{2}$

24. $\sqrt{5}+\sqrt{20}-\sqrt{27}+\sqrt{147}$

$\sqrt{5}+2\sqrt{5}-3\sqrt{3}+7\sqrt{3}$

$3\sqrt{5}+4\sqrt{3}$

25. $2\sqrt{32}+4\sqrt{54}-3\sqrt{18}$

$8\sqrt{2}+12\sqrt{6}-9\sqrt{2}$

$12\sqrt{2}-\sqrt{2}$

26. $\sqrt[3]{-32}+3\sqrt[3]{-216}+\sqrt[3]{256}$

$-2\sqrt[3]{4}+3(-6)+4\sqrt[3]{4}$

$-18+2\sqrt[3]{4}$

27. $\sqrt{\frac{50a^5}{4b^3}}$

$\frac{5a^2\sqrt{2a}}{2b\sqrt{b}}\cdot\frac{\sqrt{b}}{\sqrt{b}}$

$=\frac{5a^2\sqrt{2ab}}{2b^2}$

28. $\sqrt[3]{\frac{81d^4}{8f^9}}$

$\frac{3d\sqrt[3]{3d}}{2f^3}$

29. $2\sqrt{32a^3b^5}\cdot\sqrt{8a^7b^2}$

$2\sqrt{2\cdot16\cdot2\cdot4\,a^{10}b^7}$

$32a^5b^3\sqrt{b}$

30. $(4\sqrt{3}-\sqrt{2})(\sqrt{3}-5\sqrt{2})$

$12-20\sqrt{6}-\sqrt{6}+10$

$22-21\sqrt{6}$

31. $\frac{5}{(2+\sqrt{5})}\cdot\frac{2-\sqrt{5}}{2-\sqrt{5}}$

$\frac{10-5\sqrt{5}}{4-5}=-10+5\sqrt{5}$

32. $\frac{3}{\sqrt{x}-1}\quad\frac{\sqrt{x}+1}{\sqrt{x}+1}$

$\frac{3\sqrt{x}+3}{x-1}$

Write the radical using rational exponents and simplify:

33. $\sqrt[6]{y^4}$ $y^{4/6} = y^{2/3}$

34. $\sqrt[5]{32m^3}$ $(32m^3)^{1/5} = 2m^{3/5}$

35. $\sqrt[4]{162x^3}$ $(162x^3)^{1/4} = 3 \cdot 2^{1/4} x^{3/4}$

36. $\sqrt[3]{-125x^2}$ $-5x^{2/3}$

Write the rational exponents using radicals and simplify:

37. $8^{\frac{1}{3}}x^{\frac{2}{3}}$ $\sqrt[3]{8}\ \sqrt[3]{x^2} = 2\sqrt[3]{x^2}$

38. $(27b)^{\frac{2}{3}}$ $27^{2/3} b^{2/3}$ $9b^{2/3}$

39. $(16^3 d^8)^{\frac{1}{4}}$ $16^{3/4} d^2 = 8d^2$

40. $\left(4^{\frac{1}{4}} g^{\frac{3}{4}}\right)^2$ $4^{1/2} g^{3/2}$ $2\sqrt{g^3} = 2g\sqrt{g}$

Simplify the expression:

41. $\dfrac{f^{\frac{3}{2}}}{f^{\frac{3}{4}} \cdot f^{\frac{5}{4}}}$ $\dfrac{f^{3/2}}{f^2} = \dfrac{1}{f^{1/2}} = \dfrac{1}{\sqrt{f}}$ or $\dfrac{\sqrt{f}}{f}$

42. $\sqrt[3]{\sqrt{64}}$ $\sqrt[3]{8} = 2$

Solve the equation:

43. $\sqrt{x-4} = 5$ $x - 4 = 25$ $x = 29$

44. $\sqrt[3]{y+2} + 3 = -1$ $\sqrt[3]{y+2} = -4$ $y + 2 = -64$ $y = -66$

45. $-\sqrt{7x-3} = -5$ $\sqrt{7x-3} = 5$ $7x - 3 = 25$ $7x = 28$ $x = 4$

46. $2\sqrt{x+3} + 6 = 2$ $2\sqrt{x+3} = -4$ $\sqrt{x+3} = -2$ no solution

47. $\sqrt{3x} = \sqrt{x+6}$ $3x = (x+6)^2$ $2x = 6$ $x = 3$

48. $(10k+1)^{\frac{1}{4}} = 3$ $10k + 1 = 81$ $10k = 80$ $k = 8$

Solve the inequality:

49. $\sqrt{2x+4} + 1 \geq 5$ $2x+4 \geq 0$ $2x \geq 0$ $x \geq 2$ $\sqrt{2x+4} \geq 4$ $2x + 4 \geq 16$ $2x \geq 12$ $x \geq 6$

50. $\sqrt{3x+6} - 1 \leq 5$ $3x+6 \geq 0$ $3x \geq -6$ $x \geq -2$ $\sqrt{3x+6} \leq 6$ $3x + 6 \leq 36$ $3x \leq 30$ $-2 \leq x \leq 10$

51. $4 - \sqrt{5y-10} \geq -1$ $5y - 10 \geq 0$ $5y \geq 10$ $y \geq 2$ $-\sqrt{5y-10} \geq -5$ $\sqrt{5y-10} \leq 5$ $5y - 10 \leq 25$ $5y \leq 35$ $2 \leq y \leq 7$

52. $2 + \sqrt{3t+6} > 5$ $\sqrt{3t+6} > 3$ $3t + 6 \geq 0$ $3t \geq -6$ $t \geq -2$ $3t + 6 > 9$ $3t > 3$ $t > 1$