

WS Chapter 5, Part II Review

1.  $(\sqrt[3]{216})^2 = 6^2 = \boxed{36}$

2.  $\frac{1}{1000^{2/3}} = \left(\frac{1}{\sqrt[3]{1000}}\right)^2 = \frac{1}{10^2} = \boxed{\frac{1}{100}}$

3.  $(16x^3)^{3/2} = (\sqrt{16x^3})^3 = 64(x^{3/2})^3 = \boxed{64x^{9/2}}$   
 $= \boxed{64x^4\sqrt{x}}$

4.  $(3x)^{4/5}$

5.  $(-6)^{3/5}$

6.  $(30x^3)^{1/4}$

7.  $25^{1/4} \cdot 25^{-7/4} = 25^{-6/4} = 25^{-3/2} = \frac{1}{\sqrt{25^3}} = \boxed{\frac{1}{125}}$

8.  $\left(\frac{x^8}{y^4}\right)^{3/4} = \boxed{\frac{x^6}{y^3}}$

9.  $\left(\frac{x^3}{125}\right)^{1/3} = \boxed{\frac{x}{5}}$

10.  $\frac{(8x^{18})^{2/3} (y^{4/3})}{(\sqrt[3]{-8})^2} = \boxed{4x^{12}y^2}$

11.  $\frac{\sqrt{xy^3z^5}}{\sqrt[4]{x^5y^3z}} = \frac{\sqrt[4]{x^2y^6z^{10}}}{\sqrt[4]{x^5y^3z}} = \frac{\sqrt[4]{y^3z^9}}{\sqrt[4]{x^3}} \cdot \frac{\sqrt[4]{x}}{\sqrt[4]{x}} = \boxed{\frac{z^2\sqrt[4]{xy^3z}}{x}}$

12.  $(-27x^6)^{1/3} = \boxed{-3x^2}$

13.  $(4x)^{-1/2} (9x)^{1/2} = \frac{\sqrt{9x}}{\sqrt{4x}} = \frac{\sqrt{9}}{\sqrt{4}} = \boxed{\frac{3}{2}}$

14.  $(\sqrt[3]{-8x^9})^2 = (-2x^3)^2 = \boxed{4x^6}$

15.  $(3x)^{2/3} (3x)^{7/3} = (3x)^{9/3} = \boxed{27x^3}$

16.  $\left(\frac{m^8}{n^{12}}\right)^{-1/4} = \frac{m^{-2}}{n^{-3}} = \boxed{\frac{n^3}{m^2}}$

17.  $\frac{\sqrt[4]{(2x)^8} \cdot \sqrt[3]{(2x)^6}}{(2x)^2 \cdot (2x)^{-2}} = (2x)^4 = \boxed{16x^4}$

$$18. \sqrt[3]{\frac{x^7}{27x^3}} = \sqrt[3]{\frac{x^4}{27}} = \frac{x\sqrt[3]{x}}{3}$$

$$19. \frac{3}{2\sqrt{x}-1} \cdot \frac{2\sqrt{x}+1}{2\sqrt{x}+1} = \frac{6\sqrt{x}+3}{4x-1}$$

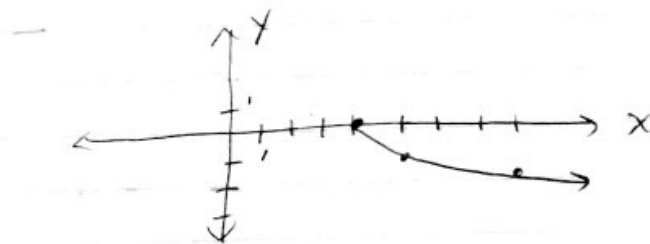
$$20. \frac{5 + \sqrt[4]{2x^2}}{\sqrt[4]{27x}} \cdot \frac{\sqrt[4]{3x^3}}{\sqrt[4]{3x^3}} = \frac{5\sqrt[4]{3x^3} + \sqrt[4]{6x^5}}{3x}$$

$$21. \left( \frac{a^{3/3} b^{-1}}{b a^{-1/5}} \right)^2 = \left( \frac{a^{13/5}}{b^2} \right)^2 = \frac{a^{26/5}}{b^4}$$

$$22. \frac{m^{3/2} n \cdot 4mn^{-2}}{6mn^{1/4}} = \frac{2m^{5/2} n^{-1}}{3mn^{1/4}} = \frac{2m^{3/2}}{3n^{5/4}} \cdot \frac{n^{3/4}}{n^{3/4}} = \frac{2m^{3/2} n^{3/4}}{3n^2}$$

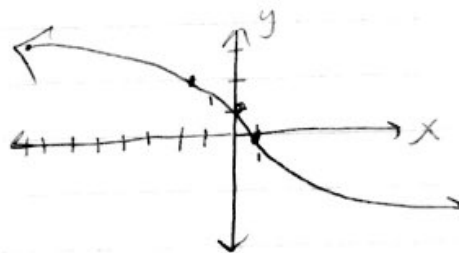
23. D:  $[4, \infty)$   
R:  $(-\infty, 0]$

x	f(x)
4	0
5	-1
8	-2



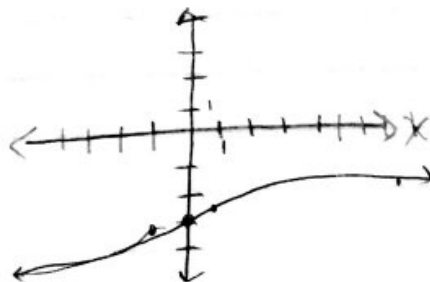
24. D:  $(-\infty, \infty)$   
R:  $(-\infty, \infty)$

x	f(x)
1	0
0	1
-1	2
-8	3



25. D:  $(-\infty, \infty)$   
R:  $(-\infty, \infty)$

x	f(x)
-1	-3 1/2
0	-3
1	-2 1/2
8	-2



$$26. g(x) = 4\sqrt{x+8}$$

vertical stretch by factor of 4  
horizontal shift left 8

$$27. g(x) = -\sqrt{3x} + 2$$

reflected in x-axis  
horizontal compression by  $\frac{1}{3}$   
shifts up 2

$$28. g(x) = 7\sqrt{-x} - 3$$

$$29. g(x) = -\sqrt{2(x-2)}$$

$$30. g(x) = -\frac{1}{4}\sqrt{x} + 6$$

31. endpoint:  $(1, -2)$  passes through  $(0, 1)$   
 $f(x) = 3\sqrt{-(x-1)} - 2$

32. endpoint:  $(-2, 0)$  passes through  $(-4, 1)$   $(-4, \frac{1}{2})$   
 $f(x) = \frac{1}{2}\sqrt{-2(x+2)}$   $f(x) =$

$$33. \sqrt[3]{4x+1} - 5 = 0$$

$$\sqrt[3]{4x+1} = 5$$

$$4x+1 = 125$$

$$4x = 124$$

$$x = 31$$

$$34. \sqrt[4]{10x+11} = 3$$

$$10x+11 = 81$$

$$10x = 70$$

$$x = 7$$

$$35. (x+2)^2 = (\sqrt{3x+6})^2$$

$$x^2 + 4x + 4 = 3x + 6$$

$$x^2 + x - 2 = 0$$

$$(x+2)(x-1) = 0$$

$$x = -2, 1$$

$$36. (10x-25)^{1/2} = x$$

$$10x-25 = x^2$$

$$x^2 - 10x + 25 = 0$$

$$(x-5)^2 = 0$$

$$x = 5$$

$$\begin{aligned}
 37. \quad & 5(6x+1)^{1/4} = 10 \\
 & (6x+1)^{1/4} = 2 \\
 & 6x+1 = 16 \\
 & 6x = 15 \\
 & x = 15/6 = \left(\frac{5}{2}\right)
 \end{aligned}$$

$$\begin{aligned}
 38. \quad & 4(7x+18)^{1/2} = 4x \\
 & (7x+18)^{1/2} = x \\
 & 7x+18 = x^2 \\
 & x^2 - 7x - 18 = 0 \\
 & (x-9)(x+2) = 0 \\
 & \left(x-9\right) \cancel{x+2}
 \end{aligned}$$

$$\begin{aligned}
 39. \quad & (\sqrt{x+2})^2 = (1 + \sqrt{x-3})^2 \\
 & x+2 = 1 + 2\sqrt{x-3} + x-3 \\
 & 4 = 2\sqrt{x-3} \\
 & 2 = \sqrt{x-3} \\
 & x-3 = 4 \\
 & \left(x=7\right)
 \end{aligned}$$

$$\begin{aligned}
 40. \quad & \sqrt{\sqrt{x-3}} = \sqrt{x-15} \\
 & \sqrt{x-3} = x-15 \\
 & x-3 = x^2 - 30x + 225 \\
 & x^2 - 31x + 228 = 0 \\
 & (x-12)(x-19) = 0 \\
 & x = \cancel{12}, 19 \\
 & \left(x=19\right)
 \end{aligned}$$

$$41. \quad \sqrt{x-3} = \frac{2}{\sqrt{x-3}}$$

$$\begin{aligned}
 & x-3 = 2 \\
 & \left(x=5\right)
 \end{aligned}$$

$$42. \quad \left(\sqrt[3]{x+2}\right)^3 = \left(\sqrt[3]{\frac{x}{2}+5}\right)^3$$

$$\begin{aligned}
 & x+2 = \frac{x}{2} + 5 \\
 & 2x+4 = x+10 \\
 & \left(x=6\right)
 \end{aligned}$$

$$43. \sqrt{x+5} < 4$$

$$x+5 < 16$$

$$x < 11$$

$$x \geq -5$$

and

$$x < 11$$



Solution  $[-5, 11)$

$$44. \sqrt{2x+7} - 6 > -1$$

$$\sqrt{2x+7} > 5$$

$$2x+7 > 25$$

$$2x > 18$$

$$x > 9$$

and  $x \geq -7/2$

Solution  $(9, \infty)$

$$45. \sqrt{10x} \leq 3\sqrt{x+1}$$

$$10x \leq 9(x+1)$$

$$10x \leq 9x+9$$

$$x \leq 9$$

$x \geq 0, x \geq -1$

$[0, 9]$

$$46. 6 - \sqrt{x-4} \geq -2$$

$$-\sqrt{x-4} \geq -8$$

$$\sqrt{x-4} \leq 8$$

$$x-4 \leq 64$$

$$x \leq 68$$

$$x-4 \geq 0$$

$$x \geq 4$$

Solution  $[4, 68]$

$$47. 2\sqrt[3]{3x-1} - 4 \geq 0$$

$$2\sqrt[3]{3x-1} \geq 4$$

$$\sqrt[3]{3x-1} \geq 2$$

$$3x-1 \geq 8$$

$$3x \geq 9$$

$$x \geq 3$$

$[3, \infty)$

No restriction on domain of cube root function

$$48 \quad \sqrt{2} - \sqrt{x+6} \leq -\sqrt{x} \quad x \geq -6, \quad x \geq 0$$

$$(\sqrt{2} - \sqrt{x+6})(\sqrt{2} - \sqrt{x+6}) \leq x$$

$$2 - \sqrt{2x+12} - \sqrt{2x+12} - (x+6) \leq x$$

$$-4 - x - 2\sqrt{2x+12} \leq x$$

$$-2\sqrt{2x+12} \leq 2x+4$$

$$\sqrt{2x+12} \geq -x-2$$

$$2x+12 \geq x^2+4x+4$$

$$x^2+2x-8 \leq 0$$

$$(x+4)(x-2) \leq 0$$

$$[0, 2]$$

