Chapter 6 Review

#1) $27^{2/3} = (\sqrt[3]{27})^2 = (3)^2 = 9$

#2) $(\sqrt[3]{-64})^2 = (-4)^2 = 16$

#3) $8^{-2/3} = (\sqrt[3]{8})^{-2} = (2)^{-2} = \frac{1}{4}$

#4) $(\sqrt[4]{16})^{-2} = (2)^{-2} = \frac{1}{4}$

#7) $\frac{80^{1/4}}{5^{1/4}} = 16^{1/4} = \sqrt[4]{16} = 2$

#8) $25^{1/6} \cdot 25^{2/6} = 25^{3/6} = 25^{1/2} = \sqrt{25} = 5$

#9) $\left(\frac{4}{9}\right)^{-2} = \left(\frac{9}{4}\right)^2 = \frac{81}{16}$

#10) $\sqrt[3]{54} = \sqrt[3]{27 \cdot 2} = 3\sqrt[3]{2}$

#11) $2\sqrt[6]{3} + 7\sqrt[6]{3} = 9\sqrt[6]{3}$

#12) $-6\sqrt[3]{5} + 4\sqrt[3]{\overset{125 \cdot 5}{625}} = -6\sqrt[3]{5} + 20\sqrt[3]{5} = 14\sqrt[3]{5}$

#13) $\sqrt[4]{\overset{16 \cdot 2}{32}\overset{x^4 x^2}{x^6} y^8} = 2x\sqrt[4]{2x^2 y^8}$

#14) $x^{1/4} \cdot x^{-3/4} = x^{-2/4} = x^{-1/2} = \frac{1}{x^{1/2}}$

#15) $(3x^2 y)^3 = 3^3 x^6 y^3 = 27x^6 y^3$

#16) $\frac{8x^{-2}y^{3}z}{12x^{3}yz^{1/3}} = \frac{2x^{-5}y^{2}z^{2/3}}{3} = \frac{2y^{2}z^{2/3}}{3x^{5}}$

#17) $\frac{4xy^{-1}}{3x^{4}y} \cdot \frac{3x^{-4}y^{2}}{2x^{-2}y^{3}} = \frac{12x^{-3}y^{1}}{6x^{2}y^{4}} = 2x^{-5}y^{-3} = \frac{2}{x^{5}y^{3}}$

SKIP #18 AND #19

#20) $\frac{2x^{-1}}{3x^{2}} = \frac{2x^{-3}}{3} = \frac{2}{3x^{3}}$

#21) $(2x^{-1})(3x^{2}) = 6x^{1}$

#22) $2(3x^{2})^{-1} = \frac{2}{3x^{2}}$

#23) $3(3x^{1/2})^{2} = 3 \cdot 3^{2}x^{1} = 27x$

#24) $y = 12x^{3} + 7 \rightarrow x = 12y^{3} + 7$

$= x - 7 = 12y^{3}$

$= \frac{x-7}{12} = y^{3}$

$= \sqrt[3]{\frac{x-7}{12}} = y$

#25) $y = 3(x-1)^5 + 2 \rightarrow x = 3(y-1)^5 + 2$

$= x - 2 = 3(y-1)^5$

$= \frac{x-2}{3} = (y-1)^5$

$= \sqrt[5]{\frac{x-2}{3}} = y - 1$

$= \sqrt[5]{\frac{x-2}{3}} + 1 = y$

#26) $y = -1(x+1)^3 - 2 \rightarrow x = -1(y+1)^3 - 2$

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

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

$= \sqrt[3]{-x-2} = y + 1$

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

#30a) $g(f(x))$

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

$= \frac{2x}{2} = x$

$f(g(x))$

$= 2\left(\frac{x-3}{2}\right) + 3$

$= x - 3 + 3$

$= x$

#30b) $f(g(x))$

$= -1(\sqrt[3]{-x-2} - 1 + 1)^3 - 2$

$= -1(\sqrt[3]{-x-2})^3 - 2$

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

$= x + 2 - 2$

$= x$

$g(f(x))$

$= \sqrt[3]{-(-1(x+1)^3 - 2) - 2} - 1$

$= \sqrt[3]{1(x+1)^3 + 2 - 2} - 1$

$= \sqrt[3]{(x+1)^3} - 1$

$= x + 1 - 1$

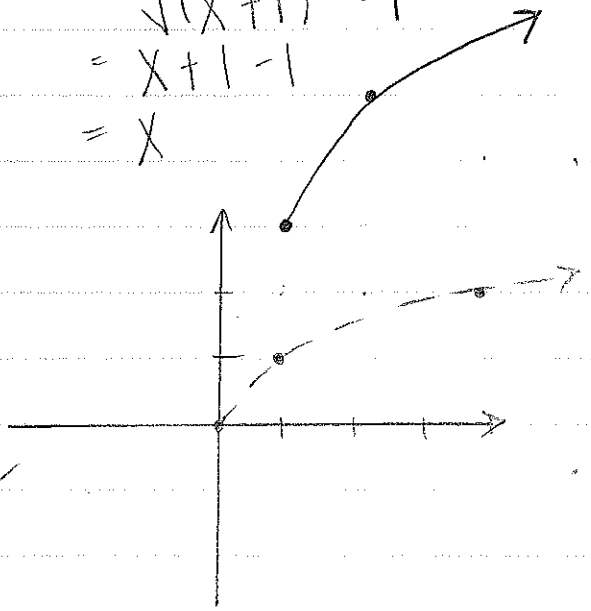
$= x$

#31) $f(x) = 2\sqrt{x-1} + 3$

x	y
0	0
1	1
4	2
9	3

parent function →

* mult by 2
right 1
up 3

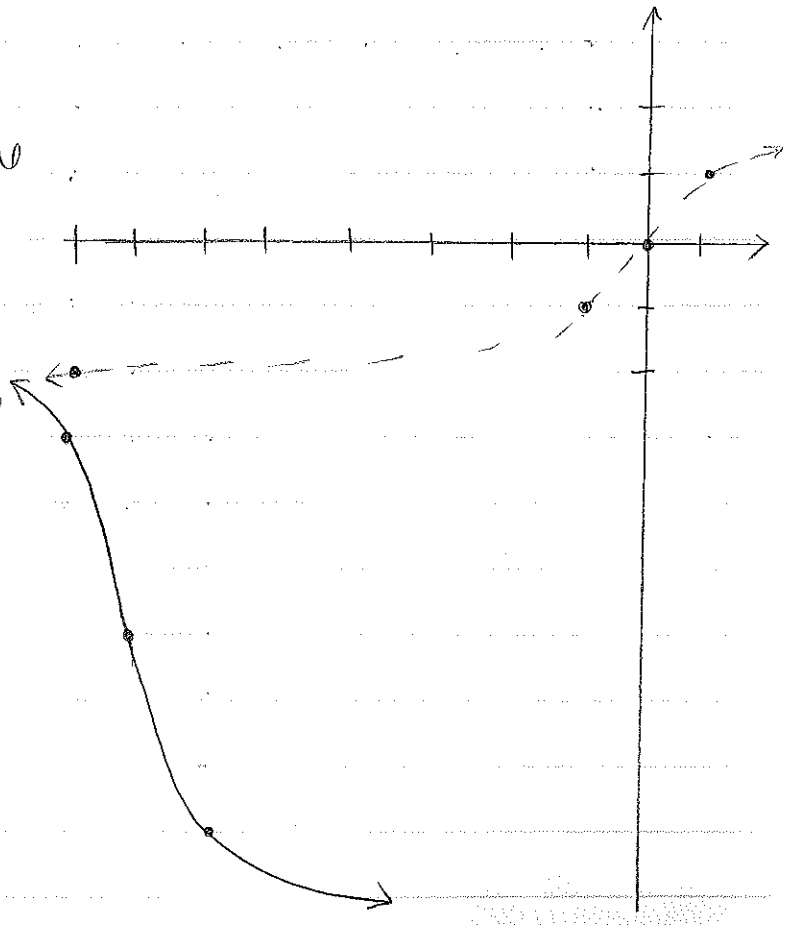


#32) $f(x) = -3\sqrt[3]{x+1} - 6$

x	y
-8	-2
-1	1
0	0
1	1
8	2

parent function →

* mult by -3
left 1
down 6



#33) $\sqrt{x-25}+3=5$

$\sqrt{x-25}=2$

$x-25=4$

$x=29$ ✓

#34) $\sqrt[3]{x-16}=2$

$x-16=8$

$x=24$ ✓

#35) $\frac{1}{7}(x+9)^{3/2}=49$

$(\sqrt{x+9})^3=343$

$\sqrt{x+9}=7$

$x+9=49$

$x=40$ ✓

#36) $2x^{3/2}=16$

$(\sqrt{x})^3=8$

$\sqrt{x}=2$

$x=4$ ✓

#37) $x-6=\sqrt{3x}$

$x^2-12x+36=3x$

$x^2-15x+36=0$

$(x-12)(x-3)=0$

$x=12$ ✓ $x=3$ ✓

#38) $\sqrt{21x+1}=x+5$

$21x+1=x^2+10x+25$

$0=x^2-11x+24$

$0=(x-8)(x-3)$

$x=8$ ✓ $x=3$ ✓

#39) $\sqrt{4x+1}=\sqrt{x+10}$

$4x+1=x+10$

$3x+1=10$

$3x=9$

$x=3$ ✓