

7.1 Roots and Exponents. Evaluate each of the following, round to the *hundredth*, if necessary.

1.  $64^{\frac{2}{3}}$  16  
2.  $9^{\frac{3}{2}}$  27  
3.  $17^{\frac{3}{5}}$  5.47  
4.  $81^{\frac{3}{4}}$  27  
5.  $9^{\frac{51}{102}}$  3  
6.  $(\sqrt[3]{8})^2$  4  
7.  $25^{-\frac{3}{2}}$   $\frac{1}{125}$

Solve for X.

8.  $2x^3 = 54$  3  
9.  $6x^3 = -1296$  -6  
10.  $x^3 - 14 = 22$   $36^{\frac{1}{3}}$   
 $\approx 3.30$   
11.  $2(x-4)^2 = 162$  13

7.2 Exponents. Simplify each of the following.

12.  $x^{\frac{3}{5}} \cdot x^{\frac{1}{5}}$   $x^{\frac{4}{5}}$   
13.  $\frac{a^{\frac{3}{7}}}{a^{\frac{2}{9}}}$   $a^{\frac{13}{63}}$   
14.  $\frac{1}{e^{\frac{1}{3}}} \cdot \frac{e^{\frac{2}{3}}}{e^{\frac{2}{3}}}$   $\frac{e^{\frac{2}{3}}}{e}$   
15.  $\frac{18^x}{9^x}$   $2^x$   
16.  $y^{\frac{2}{3}} \cdot y^{\frac{1}{4}}$   $y^{\frac{11}{12}}$   
17.  $\sqrt{50} + 8\sqrt{2}$   $5\sqrt{2} + 8\sqrt{2}$   
 $13\sqrt{2}$   
18.  $\frac{3}{\sqrt[5]{2}} \cdot \frac{2^{\frac{4}{5}}}{2^{\frac{4}{5}}}$   $\frac{3 \cdot 2^{\frac{4}{5}}}{2}$   
19.  $\sqrt[4]{8} \cdot \sqrt[4]{2}$   $\sqrt[4]{16}$   
2  
20.  $\sqrt[4]{\frac{x^8}{y^{20}}}$   $\frac{x^2}{y^5}$   
21.  $\sqrt[4]{8}$  1.68  
22.  $\sqrt[4]{16a^9b^{11}c^{22}}$   $2a^2b^2c^5\sqrt[4]{ab^3c^2}$   
23.  $\sqrt{\frac{20A^3B}{5A^5B^5}}$   $\frac{2}{AB^2}$

7.3 Functions  $f(x) = 2x + 6$

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

$h(x) = \frac{8}{x-4}$

24. What is the domain for  $h(x)$ ?

All Real,  $x \neq 4$

25. What is the domain for  $f(x)$ ?

All Real

27. Find  $f(g(x))$

$2x^2 - 4$

27. Find  $g(f(x))$

$4x^2 + 24x + 35$

28. Find  $(f+g)(x)$

$x^2 + 2x + 5$

29. Find  $f(x) \times g(x)$

$2x^3 + 6x^2 - 2x - 6$

30. What is the domain for each of the following

$y = x^{\frac{7}{9}}$

$\mathbb{R}$

$y = x^{\frac{3}{4}}$

$\mathbb{R}, x \geq 0$

$y = \frac{8}{x-2}$

$\mathbb{R}, x \neq 2$

$y = \frac{x-2}{8}$

$\mathbb{R}$

$y = 3x + 2$

$\mathbb{R}$



31. If  $f(x) = x^{3/5}$  and  $g(x) = 2x^{1/3}$ , find

$$f(x) \times g(x) \\ 2x^{14/15}$$

$$f(g(x)) \\ ((2x)^{1/3})^{3/5} \\ 2^{3/5} x^{1/5}$$

$$g(f(x)) \\ 2(x^{3/5})^{1/3} \\ 2x^{1/5}$$

#### 7.4 Inverses

32. Find the inverse for the relation  $g(x) = 3\sqrt{x+7}$

$$\left(\frac{x}{3}\right)^2 - 7$$

$$x = 3\sqrt{y+7}$$

33. Find the inverse for the relation  $f(x) = 2x^{3/5} + 1$

$$\left(\frac{x-1}{2}\right)^{5/3}$$

34. Show that  $f(x) = 2x - 12$  and  $g(x) = \frac{1}{2}x + 6$  are inverses.

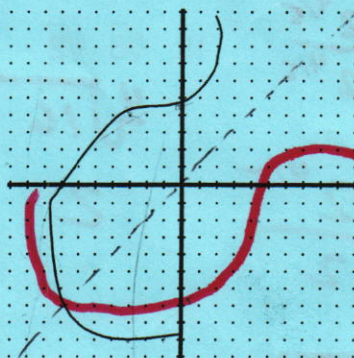
$$f(g(x)) = 2\left(\frac{1}{2}x + 6\right) - 12 \\ = x + 12 - 12 \\ = x$$

$$g(f(x)) = \frac{1}{2}(2x - 12) + 6 \\ = x - 6 + 6 \\ = x$$

35a) Sketch the inverse of the graph shown here

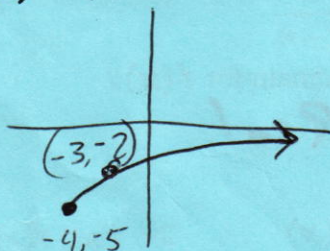
b) Is this relation a function?

c) Is the inverse a function?

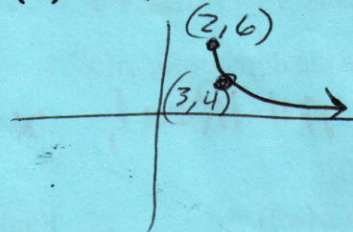


#### 7.5 Graphs of square and cube roots. Sketch the graphs of each of the following

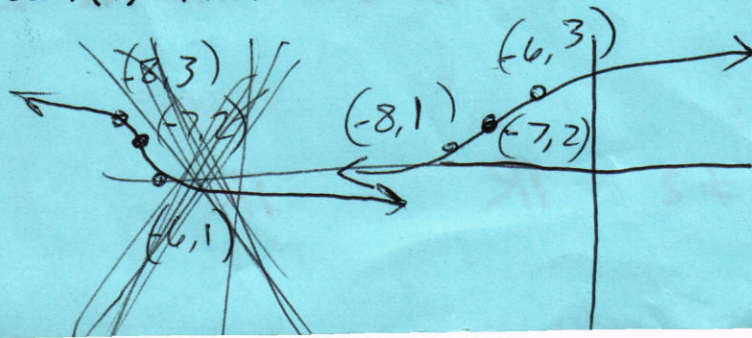
36.  $f(x) = 3\sqrt{x+4} - 5$



37.  $f(x) = -2\sqrt{x-2} + 6$



38.  $f(x) = \sqrt[3]{x+7} + 2$



39.  $f(x) = 4\sqrt[3]{x-11} - 15$

