

## Section 2.2 – Practice Problems

Simplify

1.  $-\sqrt{16}$

$$-\sqrt{4 \cdot 4}$$

$$\boxed{-4}$$

2.  $\sqrt{\frac{1}{4}}$

$$\frac{\sqrt{1}}{\sqrt{4}} = \boxed{\frac{1}{2}}$$

3.  $\sqrt{0.16}$

$$\sqrt{\frac{16}{100}} = \frac{4}{10}$$

$$\boxed{0.4}$$

4.  $-\sqrt{144}$

$$\boxed{-12}$$

5.  $\sqrt[3]{-8}$

$$\boxed{-2}$$

6.  $\sqrt[5]{32}$

$$\boxed{2}$$

7.  $\sqrt{169}$

$$\boxed{13}$$

8.  $\sqrt[6]{0.000064}$

$$\sqrt[6]{\frac{64}{1000000}} = \frac{2}{10} = \frac{1}{5}$$

$$\boxed{0.2}$$

Solve for  $x$ 

9.  $x^2 = 25$

$$\boxed{\pm 5}$$

10.  $x^2 = 81$

$$\boxed{\pm 9}$$

11.  $x^2 = 0.04$

$$\sqrt{\frac{4}{100}} = \frac{2}{10}$$

$$\boxed{\pm 0.2}$$

12.  $x^2 = 121$

$$\boxed{\pm 11}$$

13.  $x^3 = -8$

$$\boxed{-2}$$

14.  $x^3 = -64$

$$\boxed{-4}$$

15.  $x^4 = 16$

$\pm 2$

16.  $x^4 = -16$

$\emptyset$  DNE

17.  $x^5 = -32$

$-2$

18.  $x^6 = 64$

$\pm 2$

Change to simplest radical form

19.  $\sqrt{32} \rightarrow \sqrt{16} \cdot \sqrt{2}$

$4\sqrt{2}$

20.  $\sqrt{80} \rightarrow \sqrt{4} \sqrt{20} \rightarrow \sqrt{4} \sqrt{4} \sqrt{5}$

$4\sqrt{5}$

21.  $\sqrt{75} \rightarrow \sqrt{5} \sqrt{15} \rightarrow \sqrt{5} \sqrt{5} \sqrt{3}$

$5\sqrt{3}$

22.  $\sqrt[3]{54} \rightarrow \sqrt[3]{6} \sqrt[3]{9} \rightarrow \sqrt[3]{2} \sqrt[3]{3} \sqrt[3]{3} \sqrt[3]{3}$

$3\sqrt[3]{2}$

23.  $\sqrt[3]{16} \rightarrow \sqrt[3]{2} \sqrt[3]{8} \rightarrow \sqrt[3]{2} \sqrt[3]{2} \sqrt[3]{4}$

$\sqrt[3]{2} \sqrt[3]{2} \sqrt[3]{2} \sqrt[3]{2} \rightarrow 2\sqrt[3]{2}$

24.  $\sqrt[3]{-72} \rightarrow \sqrt[3]{-8} \sqrt[3]{9}$

$-2\sqrt[3]{9}$

25.  $3\sqrt{45} \rightarrow 3\sqrt{9} \sqrt{5}$

$9\sqrt{5}$

26.  $-2\sqrt[3]{162}$

$-2\sqrt[3]{2} \sqrt[3]{81} \rightarrow -2\sqrt[3]{2} \sqrt[3]{3} \sqrt[3]{27}$

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

Express in simplest radical form

27.  $\sqrt{x^3 y^2}$

$xy\sqrt{x}$

28.  $\sqrt{49x^3 y^5}$

$7xy^2\sqrt{xy}$

29.  $\sqrt{18x^6} \rightarrow \sqrt{9} \sqrt{2} \sqrt{x^2} \sqrt{x^2} \sqrt{x^2}$

$3x \cdot x \cdot x \sqrt{2}$   
 $3x^3\sqrt{2}$

30.  $\sqrt{25x^6 y^{11}}$

$5x^3 y^5 \sqrt{y}$

31.  $\sqrt{5t^4}$

$$t^2\sqrt{5}$$

32.  $\sqrt{32r^5t^7}$

$$\sqrt{16}\sqrt{2}\sqrt{r^4}\sqrt{t^6}$$

$$4r^2t^3\sqrt{2rt}$$

33.  $\sqrt[3]{40x^3}$

$$\sqrt[3]{8}\sqrt[3]{5}\sqrt[3]{x^3}$$

$$2x\sqrt[3]{5}$$

34.  $\sqrt[3]{-8x^9z^3}$

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

35.  $\sqrt[3]{216h^5}$

$$\sqrt[3]{6 \cdot 6 \cdot 6 \cdot h^3} \Rightarrow 6h\sqrt[3]{h^2}$$

36.  $\sqrt[3]{-64x^3y^6}$

$$-4xy^2$$

Write as an entire radical

37.  $2\sqrt{5}$

$$\sqrt{2 \cdot 2 \cdot 5}$$
  
$$\sqrt{20}$$

38.  $-4\sqrt{3}$

$$-\sqrt{4 \cdot 4 \cdot 3} = -\sqrt{48}$$

39.  $3\sqrt{4}$

$$\sqrt{9 \cdot 4} = \sqrt{36}$$

40.  $2\sqrt[3]{3}$

$$\sqrt[3]{2 \cdot 2 \cdot 2 \cdot 3} = \sqrt[3]{24}$$

41.  $3\sqrt[3]{4}$

$$\sqrt[3]{3 \cdot 3 \cdot 3 \cdot 4}$$

$$\sqrt[3]{108}$$

42.  $-4\sqrt[3]{5}$

$$\sqrt[3]{-4 \cdot -4 \cdot -4 \cdot 5}$$

$$\sqrt[3]{-320}$$

43.  $2\sqrt[4]{3}$

$$\sqrt[4]{2^4 \cdot 3}$$

$$\sqrt[4]{48}$$

44.  $2\sqrt[6]{3}$

$$\sqrt[6]{2^6 \cdot 3}$$

$$\sqrt[6]{192}$$

45. Express the following in simplest radical form.

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

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

$$2x^3 \cdot x^2 \sqrt{2y^4} \cdot \sqrt[3]{4y^2} \rightarrow 2x^5 \sqrt[3]{8y^6}$$

$$= 2x^5 \cdot 2 \cdot y^2 \rightarrow$$

$$\boxed{4x^5y^2}$$

46. A rectangular solid has a volume of  $192\text{cm}^3$ . If the height is twice the width and the length is three times the width, what are the dimensions of the rectangular solid?

$$l \cdot w \cdot h = 192$$

$$\downarrow$$

$$h = 2w$$

$$l = 3w$$

$$3w \cdot w \cdot 2w = 192$$

$$6w^3 = 192$$

$$w^3 = \frac{192}{6}$$

$$w^3 = 32$$

$$w = \sqrt[3]{32}$$

$$w = \sqrt[3]{8} \sqrt[3]{4}$$

$$\boxed{w = 2\sqrt[3]{4}}$$

$$l = 3(2\sqrt[3]{4})$$

$$\boxed{l = 6\sqrt[3]{4}}$$

$$h = 2 \cdot 2\sqrt[3]{4}$$

$$\boxed{h = 4\sqrt[3]{4}}$$