099 §6.1 #s 1–45

2|144
2|72
2|36
2|18
3|9
3

2|16
2|8
2|4
2

(1) $\sqrt{144} = 12$

(3) $\sqrt{-144} = 12i$ Not Real

$\sqrt{(-1)(144)} = \sqrt{-1}\sqrt{144} = i\sqrt{144} = i12 = 12i$ Book Ans

(5) $-\sqrt{49} = -7$

(4) $\sqrt{-49} = 7i$ Not Real

will see this later

(7) $\sqrt[3]{-27}$

3|27
3|9
3

$= \sqrt[3]{(-1)(27)}$

$= \sqrt[3]{-1}\sqrt[3]{27} = \sqrt[3]{-1}\sqrt[3]{3^3} = -1 \cdot 3 = -3$

(9) $\sqrt[4]{16} = \sqrt[4]{2 \cdot 2 \cdot 2 \cdot 2} = 2$

(11) $\sqrt[4]{-16}$ Book Ans Not real $\sqrt[4]{(-1)(16)} = \sqrt[4]{-1}\sqrt[4]{16}$

Anything to the 4th power = −1?

$i^2 = -1$ $\quad i^3 = (-1)i = -i$ $\quad i^4 = i^2 i^2 = (-1)(-1) = 1$

Nope. We don't have the tools.

(13) $\sqrt{.04} = \sqrt{\frac{4}{100}} = \frac{\sqrt{4}}{\sqrt{100}} = \frac{2}{10} = \frac{1}{5} = .2$

(15) $\sqrt[3]{.008} = \sqrt[3]{\frac{8}{1000}} = \frac{\sqrt[3]{2^3}}{\sqrt[3]{10^3}} = \frac{2}{10} = \frac{1}{5} = .2$

Day 5 6.1 #s 17-45

(17) $\sqrt{36a^8} = 6a^4$

$\sqrt{3\cdot3\cdot2\cdot2\cdot a^8} = \uparrow$

$\sqrt{a^8} = (a^8)^{\frac{1}{2}} = a^{8(\frac{1}{2})} = a^4$

$2\overline{)36}$
$2\overline{)18}$
$3\overline{)9}$
3

(19) $\sqrt[3]{27a^{12}} = \sqrt[3]{3^3 a^{12}} = (3^3 a^{12})^{\frac{1}{3}}$

$= (3^3)^{\frac{1}{3}}(a^{12})^{\frac{1}{3}} = 3^1 a^4 = \boxed{3a^4}$

(21) $\sqrt[3]{x^3y^6} = x^{\frac{3}{3}} y^{\frac{6}{3}} = \boxed{xy^2}$

$2\overline{)32}$
$2\overline{)16}$
$2\overline{)8}$
$2\overline{)4}$
2

2^5

2^2

(23) $\sqrt[5]{32x^{10}y^5} = 2^{\frac{5}{5}} x^{\frac{10}{5}} y^{\frac{5}{5}} = \boxed{2x^2y}$

(25) $\sqrt[4]{16a^{12}b^{20}} = \sqrt[4]{2^4 a^{12} b^{20}} = 2^{\frac{4}{4}} a^{\frac{12}{4}} b^{\frac{20}{4}} = \boxed{2a^3b^5}$

#s 27-40 Use Def of Rational Exponents to write as a root. Simplify.

(27) $36^{\frac{1}{2}} = \sqrt{36} = \boxed{6}$

(29) $-9^{\frac{1}{2}} = -\sqrt{9} = -3$

Note: $(-9)^{\frac{1}{2}}$ is not real, but $-9^{\frac{1}{2}}$ is.

(31) $8^{\frac{1}{3}} = \sqrt[3]{8} = \sqrt[3]{2^3} = \boxed{2}$

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

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

099 §6.1 #s 35-45

(35) $32^{\frac{1}{5}} = \sqrt[5]{32} = \sqrt[5]{2^5} = \boxed{2}$

(37) $\left(\frac{81}{25}\right)^{\frac{1}{2}} = \sqrt{\frac{81}{25}} = \frac{\sqrt{81}}{\sqrt{25}} = \boxed{\frac{9}{5}}$

(39) $\left(\frac{64}{125}\right)^{\frac{1}{3}} = \frac{\sqrt[3]{64}}{\sqrt[3]{125}} = \frac{\sqrt[3]{2^6}}{\sqrt[3]{5^3}}$

$= \frac{2^{\frac{6}{3}}}{5^{\frac{3}{3}}} = \frac{2^2}{5} = \boxed{\frac{4}{5}}$

2 | 64 | 5 | 125
2 | 32 | 5 | 25
2 | 16 | | 5
2 | 8
2 | 4
2

#s 41-46 Use Theorem 6.1 (I sort of have been)

(41) $27^{\frac{2}{3}} = \left(27^{\frac{1}{3}}\right)^2 = 3^2 = \boxed{9}$

(43) $25^{\frac{3}{2}} = 25^{\left(\frac{1}{2}\right)(3)} = \left(25^{\frac{1}{2}}\right)^3 = 5^3 = \boxed{125}$

(45) $16^{\frac{3}{4}} = 16^{\left(\frac{1}{4}\right)(3)} = \left(16^{\frac{1}{4}}\right)^3 = \left(\left(2^4\right)^{\frac{1}{4}}\right)^3$

$= \left(2^{4\left(\frac{1}{4}\right)}\right)^3 = 2^3 = \boxed{8}$