section 8.1

2-a) $\sqrt{169} = \sqrt{(13)^2} = \underline{13}$

2-b) $-\sqrt{100} = -\sqrt{(10)^2} = \underline{-10}$

for square root ($\sqrt{\ }$), we need pairs (or squared, 2nd degree) to remove radical sign

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4-a) $\sqrt{144} = \sqrt{(12)^2} = \underline{12}$

4-b) $-\sqrt{121} = -\sqrt{(11)^2} = \underline{-11}$

6-a) $\sqrt{\frac{64}{121}} = \frac{\sqrt{64}}{\sqrt{121}} = \frac{\sqrt{(8)^2}}{\sqrt{(11)^2}} = \underline{\frac{8}{11}}$

6-b) $-\sqrt{0.16} = -\sqrt{(0.4)^2} = \underline{-0.4}$

8-a) $-\sqrt{400} = -\sqrt{(20)^2} = \underline{-20}$

8-b) $\sqrt{-36}$ not a real number

note: $\sqrt{-36} = 6i$ where $i = \sqrt{-1}$ and this is complex number and not a real number. This is true for all even roots.

10-a) $\sqrt{-49}$ not a real number

10-b) $-\sqrt{256} = -\sqrt{(2)^8} = -(2)^4 = \underline{-16}$

12-a) $\sqrt[3]{27} = \sqrt[3]{(3)^3} = \underline{3}$

for cube root ($\sqrt[3]{\ }$), we need triples (or cubes, 3rd degree) to remove radical sign.

12-b) $\sqrt[4]{16} = \sqrt[4]{(2)^4} = \underline{2}$

for 4th root ($\sqrt[4]{\ }$), we need quadruplets (or 4th degree) to remove radical sign.

12-c) $\sqrt[5]{243} = \sqrt[5]{(3)^5} = \underline{3}$

for 5th root ($\sqrt[5]{\ }$), we need quintuplets (or 5th degree) to remove radical sign.

14-a) $\sqrt[3]{125} = \sqrt[3]{(5)^3} = 5$

14-b) $\sqrt[4]{1296} = \sqrt[4]{(2)^4(3)^4} = (2)(3) = 6$

14-c) $\sqrt[5]{1024} = \sqrt[5]{(2)^{10}} = (2)^2 = 4$

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

16-b) $\sqrt[4]{-16}$ even root not a real number

16-c) $\sqrt[5]{-243} = \sqrt[5]{(-3)^5} = -3$

18-a) $\sqrt[3]{-512} = \sqrt[3]{(-2)^9} = (-2)^3 = -8$

18-b) $\sqrt[4]{-81}$ even root not a real number

18-c) $\sqrt[5]{-1} = \sqrt[5]{(-1)^5} = -1$

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skip 19-26

28-a) $\sqrt[3]{a^3} = a$

28-b) $\sqrt[9]{b^9} = b$

for odd roots

30-a) $\sqrt[8]{k^8} = |k|$

30-b) $\sqrt[6]{p^6} = |p|$

for even roots

32-a) $\sqrt{a^{14}} = |a^7|$

32-b) $\sqrt{w^{24}} = |w^{12}| = w^{12}$

34-a) $\sqrt{a^{12}} = |a^6| = a^6$

34-b) $\sqrt{b^{26}} = |b^{13}|$

36-a) $\sqrt[5]{a^{10}} = a^2$

36-b) $\sqrt[3]{b^{27}} = b^9$

38-a) $\sqrt[6]{n^{12}} = |n^2| = n^2$

38-b) $\sqrt[3]{s^{30}} = s^{10}$

40-a) $\sqrt{100y^2} = |10y| = 10|y|$

40-b) $-\sqrt{100m^{32}} = -|10m^{16}| = -10m^{16}$

42-a) $\sqrt{81x^{36}} = |9x^{18}| = 9x^{18}$

42-b) $-\sqrt{25x^2} = -|5x| = -5|x|$

44-a) $\sqrt[3]{-8c^9} = -2c^3$

44-b) $\sqrt[3]{125d^{15}} = 5d^5$

46-a) $\sqrt[7]{128n^{14}} = \sqrt[7]{(2)^7 n^{14}} = 2n^2$

46-b) $\sqrt[4]{81s^{24}} = |3s^6| = 3s^6$

48-a) $\sqrt{196a^2b^2} = \sqrt{(14)^2a^2b^2} = |14ab| = 14|ab|$

48-b) $\sqrt{81p^{24}q^6} = |9p^{12}q^3| = 9p^{12}|q^3|$

48-c) $\sqrt[3]{27p^{45}q^9} = 3p^{15}q^3$

50-a) $\sqrt{225x^2y^2z^2} = \sqrt{(15)^2x^2y^2z^2} = |15xyz| = 15|xyz|$

50-b) $\sqrt{36n^6s^{10}} = |6n^3s^5| = 6|n^3s^5|$

50-c) $\sqrt[3]{125y^{18}z^{27}} = \sqrt[3]{(5)^3y^{18}z^{27}} = 5y^6z^9$