Unit 3 lesson 1

Pg 106 #107 ~~1-9 (odd)~~. 1-4, 18, 20.

1a) $\sqrt{12} = \sqrt{4\times3} = 2\sqrt{3}$

c) $\sqrt{45} = \sqrt{9\times5} = 3\sqrt{5}$

e) $\sqrt{24} = \sqrt{4\times6} = 2\sqrt{6}$

g) $\sqrt{200} = \sqrt{100\times2} = 10\sqrt{2}$

i) $\sqrt{44} = \sqrt{4\times11} = 2\sqrt{11}$

k) $\sqrt{18} = \sqrt{9\times2} = 3\sqrt{2}$

m) $\sqrt{128} = \sqrt{64\times2} = 8\sqrt{2}$

o) $\sqrt{125} = \sqrt{25\times5} = 5\sqrt{5}$

2a) $\frac{\sqrt{14}}{\sqrt{7}} = \sqrt{\frac{14}{7}} = \sqrt{2}$

b) $\frac{\sqrt{10}}{\sqrt{2}} = \sqrt{\frac{10}{2}} = \sqrt{5}$

c) $\frac{\sqrt{60}}{\sqrt{3}} = \sqrt{\frac{60}{3}} = \sqrt{20} = 2\sqrt{5}$

d) $\frac{\sqrt{40}}{\sqrt{5}} = \sqrt{\frac{40}{5}} = \sqrt{8} = 2\sqrt{2}$

e) $\frac{\sqrt{33}}{\sqrt{3}} = \sqrt{\frac{33}{3}} = \sqrt{11}$

f) $\frac{\sqrt{7}}{\sqrt{14}} = \frac{\sqrt{7}}{2}$

g) $\frac{\sqrt{20}}{\sqrt{9}} = \frac{2\sqrt{5}}{3}$

h) $\frac{3\sqrt{8}}{\sqrt{2}} = 3\sqrt{\frac{8}{2}} = 3\sqrt{4} = 3(2) = 6$

OR $\frac{3\sqrt{8}}{\sqrt{2}} = \frac{3(2\sqrt{2})}{\sqrt{2}} = 6$

i) $\frac{27\sqrt{15}}{3\sqrt{5}} = \frac{27}{3}\sqrt{\frac{15}{5}} = 9\sqrt{3}$

j) $\frac{12\sqrt{75}}{4\sqrt{3}} = 3\sqrt{25} = 15$

k) $\frac{4\sqrt{2}}{\sqrt{8}} = \frac{4}{\sqrt{4}} = \frac{4}{2} = 2$

l) $\frac{2\sqrt{2}}{\sqrt{18}} = 2\sqrt{\frac{2}{18}} = \frac{2}{\sqrt{9}} = \frac{2}{3}$

OR $\frac{2\sqrt{2}}{3\sqrt{2}} = \frac{2}{3}$

3a) $\sqrt{2}\times\sqrt{10} = \sqrt{2\times10} = \sqrt{20} = \sqrt{4\times5} = 2\sqrt{5}$

c) $\sqrt{15}\times\sqrt{5} = \sqrt{15\times5} = \sqrt{3\times5\times5} = 5\sqrt{3}$

e) $4\sqrt{3}\times\sqrt{7} = 4\sqrt{3\times7} = 4\sqrt{21}$

g) $2\sqrt{2}\times3\sqrt{6} = 6\sqrt{2\times6} = 6\sqrt{12} = 6\sqrt{4\times3} = 12\sqrt{3}$

i) $3\sqrt{3}\times4\sqrt{15} = 12\sqrt{3\times15} = 12\sqrt{3\times3\times5} = 36\sqrt{5}$

k) $\sqrt{6}\times\sqrt{3}\times\sqrt{2} = \sqrt{36} = 6$

4a) $\frac{10+15\sqrt{5}}{5} = \frac{5(2+3\sqrt{5})}{5} = 2+3\sqrt{5}$

c) $\frac{6+\sqrt{8}}{2} = \frac{6+2\sqrt{2}}{2} = \frac{2(3+\sqrt{2})}{2} = 3+\sqrt{2}$

e) $\frac{-10-\sqrt{50}}{5} = \frac{-10-5\sqrt{2}}{5} = \frac{-5(2+\sqrt{2})}{5} = -(2+\sqrt{2})$

see next pg for 3bdfhjs 4bdf

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3b) $\sqrt{3}\times\sqrt{6}$
$=\sqrt{18}$
$=\sqrt{9\times2}$
$=3\sqrt{2}$

d) $\sqrt{7}\times\sqrt{11}$
$=\sqrt{77}$

f) $3\sqrt{6}\times3\sqrt{6}$
$=9(6)$
$=54$

not $\sqrt{6}\times\sqrt{6}$
$=6$

h) $2\sqrt{5}\times3\sqrt{10}$
$=6\sqrt{50}$

j) $4\sqrt{7}\times2\sqrt{14}$
$=8\sqrt{98}$
$=8\sqrt{49\times2}$
$=8\times7\sqrt{2}$
$=56\sqrt{2}$

l) $2\sqrt{7}\times3\sqrt{7}\times\sqrt{7}$
$=2\times3\times\sqrt{7}\times\sqrt{7}$
$=6(7)$
$=42.$

note $\sqrt{1}=1$.

4b) $\frac{21-7\sqrt{6}}{7}$
$=\frac{7(3-\sqrt{6})}{7}$
$=3-\sqrt{6}$

OR $\frac{21}{7}-\frac{7\sqrt{6}}{7}$
$=3-\sqrt{6}$

d) $\frac{12-\sqrt{27}}{3}$
$=\frac{12-\sqrt{9\times3}}{3}$
$=\frac{12-3\sqrt{3}}{3}$
$=\frac{3(4-\sqrt{3})}{3}$
$=4-\sqrt{3}$

OR $\frac{12}{3}-\frac{\sqrt{27}}{3}$
$=4-\frac{3\sqrt{3}}{3}$
$=4-\sqrt{3}.$

f) $\frac{-12+\sqrt{48}}{4}$
$=\frac{-12+\sqrt{16\times3}}{4}$
$=\frac{-12+4\sqrt{3}}{4}$
$=\frac{4(-3+\sqrt{3})}{4}$
$=-3+\sqrt{3}$

OR $\frac{-12}{4}+\frac{\sqrt{48}}{4}$
$=-3+\frac{\sqrt{16\times3}}{4}$
$=-3+\frac{4\sqrt{3}}{4}$
$=-3+\sqrt{3}.$

18a) $\sqrt[3]{16}$
$=\sqrt[3]{8\times2}$
$=2\sqrt[3]{2}$

b) $\sqrt[3]{32}$
$=\sqrt[3]{8\times4}$
$=2\sqrt[3]{4}$

c) $\sqrt[3]{54}$
$=\sqrt[3]{27\times2}$
$=3\sqrt[3]{2}$

d) $\sqrt[3]{81}$
$=\sqrt[3]{27\times3}$
$=3\sqrt[3]{3}$

20.a) You cannot take the square root of a negative number when working with the set of real numbers. So, a and b must not be negative. You can take the root of 0 ∴ $\sqrt{0}=0$ so a, b can be zero ∴ $a\geq0$ and $b\geq0$.

b) Since b is in the denominator of a fraction and we may not divide by 0 ... b may not be zero. It is okay to have 0 in the numerator (as long as the denominator is not 0). ∴ $a\geq0$, $b>0$.