Test Review Sheet

1) $\sqrt[3]{\frac{125}{8}} = \frac{\sqrt[3]{125}}{\sqrt[3]{8}} = \frac{5}{2}$

2) $\sqrt[3]{100}$ → $\sqrt[3]{64}$ (4) $\sqrt[3]{125}$ (5) — No

$\sqrt[4]{16}$ → 2 — No

$\sqrt[3]{130}$ → $\sqrt[3]{125}$ (5) $\sqrt[3]{216}$ (6) — Yes

$\sqrt{89}$ → $\sqrt{81}$ (9) $\sqrt{100}$ (10) — No

3) $\sqrt{50}$ — Not in perfect square list so irrational

$\sqrt[3]{-125} = -5$ — Rational

$\sqrt{4.9} = \sqrt{\frac{49}{10}}$ can do $= \frac{\sqrt{49}}{\sqrt{10}}$ can't so irrational

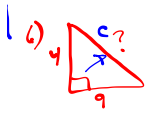
$\sqrt{\frac{81}{36}} = \frac{\sqrt{81}}{\sqrt{36}} = \frac{9}{6}$ Rational

4) $\sqrt{28}$ 5.2915, $\sqrt[3]{40}$ 3.419, $\sqrt[5]{301}$ 3.1317, $\sqrt[3]{-83}$ −4.36 least

5) a) integer but not whole? $\pm1, \pm2, \pm3$ / $0,1,2,3$ — any negative (Ex -1)

b) is a whole but not integer? $0,1,2,3$ / $\pm1, \pm2, \pm3$ — 0

c) whole but not natural? $0,1,2,3,4$ / $1,2,3,4$ — 0

6) 

$c^2 = a^2 + b^2$
$= 4^2 + 9^2$
$= 16 + 81$
$c^2 = 97$
$c = \sqrt{97}$

7) $\sqrt[3]{648}$ ← look in perfect cube list

$\sqrt[3]{216 \times 3}$
$\sqrt[3]{216}\ \sqrt[3]{3}$
$6\sqrt[3]{3}$

8) $\sqrt{605}$ ← look in perfect square list, find largest perfect square that divides into 605

$\sqrt{121} \times \sqrt{5}$
$11\sqrt{5}$

9) a) $4\sqrt[3]{7}$

$\sqrt[3]{4^3 \times 7}$
$\sqrt[3]{64 \times 7}$
$= \sqrt[3]{448}$

b) $5\sqrt{10}$
$= \sqrt{5^2 \times 10}$
$= \sqrt{25 \times 10}$
$= \sqrt{250}$

10) $71^{3/4} = \left(\sqrt[4]{71}\right)^3$ Remember $x^{\frac{m}{n}}$ ← power, ← index

11) a) $\left(\sqrt[3]{6}\right)^2$ $6^{\frac{2}{3}}$ b) $\left(\sqrt[5]{11}\right)^3$ $11^{\frac{3}{5}}$ c) $\sqrt{\left(\frac{7}{9}\right)^3}$ $\left(\frac{7}{9}\right)^{\frac{3}{2}}$ d) $\sqrt[5]{\left(\frac{5}{6}\right)^2}$ $\left(\frac{5}{6}\right)^{\frac{2}{5}}$

Review for test Sheet continued

12) $8.4^{0.75}$ as radical

$8.4^{3/4}$

$\sqrt[4]{(8.4)^3}$ or $(\sqrt[4]{8.4})^3$

b) $7.5^{1.25} = (7.5)^{\frac{125}{100}}$ change to reduced fraction

$= (7.5)^{\frac{5}{4}}$

$= (\sqrt[4]{7.5})^5$ or $\sqrt[4]{(7.5)^5}$

13) Evaluate $\left(\frac{343}{216}\right)^{\frac{2}{3}}$

$= \frac{(\sqrt[3]{343})^2}{(\sqrt[3]{216})^2}$

$= \frac{(7)^2}{(6)^2}$

$= \frac{49}{36}$

b) $\left(\frac{1024}{16807}\right)^{-\frac{3}{5}}$ ← minus flip base

$\left(\frac{16807}{1024}\right)^{\frac{3}{5}}$

$= \frac{(\sqrt[5]{16807})^3}{(\sqrt[5]{1024})^3}$

$= \frac{(7)^3}{(4)^3}$

$= \frac{343}{64}$

or $\frac{1024^{-3/5}}{16807^{-3/5}}$ ← move to bott

$= \frac{16807^{3/5}}{1024^{3/5}}$

$= \frac{\sqrt[5]{16807}^3}{\sqrt[5]{1024}^3}$

c) $125^{-\frac{2}{5}}$

$= \left(\frac{1}{125}\right)^{\frac{2}{5}}$

$= \frac{(\sqrt[5]{1})^2}{(\sqrt[5]{125})^2}$

$= \frac{1}{125^{2/5}}$

14) $\frac{1}{9} = \frac{1}{3^2} = 3^{-2}$ (a)

15) $[(-3x^4y^2)(7xy^3)]^{-2}$

simplify inside bracket first since like terms

$(-3(7)\, x^4 x\, y^2 y^3)^{-2}$

$(-21\, x^5\, y^5)^{-2}$ power of power

$= (-21)^{-2}\,(x^{-10})\,(y^{-10})$ move all neg exponents to bottom

$= \frac{1}{(-21)^2\, x^{10}\, y^{10}}$

$= \frac{1}{441\, x^{10} y^{10}}$

b) $\left(\frac{x^7 y^3 z}{x^{11} y z}\right)^2$ simplify inside bracket first

$(x^{-4}\, y^2\, z^0)^2$

this 1 so not needed

$(x^{-4} y^2)^2$ power law

$= x^{-8} y^4$ move neg power to bottom

$= \boxed{\frac{y^4}{x^8}}$

c) $\left(\frac{3x^4}{z^2}\right)^{-5}$ ← nothing simplifies in bracket so flip b+B

$\left(\frac{z^2}{3x^4}\right)^{+5}$

$\frac{z^{10}}{3^5 x^{20}}$

$= \boxed{\frac{z^{10}}{243 x^{20}}}$

OR $\left(\frac{3x^4}{z^2}\right)^{-5}$

$= \frac{3^{-5}\, x^{-20}}{z^{-10}}$

move negative exponent to opposite top/bottom

$= \frac{z^{10}}{3^5 x^{20}}$

$= \frac{z^{10}}{243 x^{20}}$

d) $\frac{(4xy^2)(3x^2y^8)^4}{12x^{-4}y^3}$

$= \frac{4xy^2\; 3^4 x^8 y^{32}}{12x^{-4}\, y^3}$

$= \frac{4(3^4)\, x^1 x^8\, y^{32} y^2}{12 x^{-4} y^3}$

reduce $= \frac{\cancel{4}(81)\, x^9\, y^{34}}{3\cancel{12}\; x^{-4}\; y^3}$

$= \frac{\cancel{81}\,27}{\cancel{3}\,1}\; x^{9-(-4)}\; y^{34-3}$

$= 27x^{9+4}\, y^{31}$

$= 27\, x^{13} y^{31}$

OR $\frac{324}{12} x^{13} y^{31}$

$27x^{13}y^{31}$

e) $\left(\frac{3}{4}\, a^{-7}\, b^5\right)^{-2}$

$= \left(\frac{3\, a^{-7} b^5}{4}\right)^{-2}$

$\left(\frac{4}{3\, a^{-7}\, b^5}\right)^2$

$= \frac{4^2}{3^2\, a^{-14}\, b^{10}}$

$\boxed{\frac{16\, a^{14}}{9\, b^{10}}}$

e) $\left(\frac{3a^{-7}b^{5}}{4}\right)^{-2} = \frac{3^{-2}a^{14}b^{-10}}{4^{-2}}$

$= \frac{4^{2}a^{14}}{3^{2}b^{10}} = \frac{16a^{14}}{9b^{10}}$

$$\frac{125^{-\frac{2}{5}}}{1}$$

$$= \frac{1}{125^{2/5}}$$

$$= \frac{1}{(\sqrt[5]{125})^2}$$ leave it