Unit 3
Assignment 2

Name:_____

1. Determine the greatest common factor of each pair.
   A) 56 and 88 B) 72 and 90

2. Determine the least common multiple.
   A) 78 and 102 B) 48, 72, and 108

3. What is the side length of the smallest square that could be tiled using a 6-cm by 15-cm tile? Assume the tiles cannot be cut.

4. A fruit grower wants to plant 64 apple seedlings and 108 pear seedlings in rows. Each row is to have the same number of each type of seedling. What is the greatest number of rows the grower can plant?

5. A cube has surface area 3750 square feet. What is its volume?

6. A cube with volume 729 m^3 is to be painted. Each can of paint covers 32 m^2. How many cans of paint are needed to paint the cube?

7. Calculate the volume of the largest possible sphere that can fit in a cube with volume 4913 cm^3. Give the volume to the nearest tenth of a cubic centimeter. Explain your steps.

8. Evaluate.

   A) $\sqrt[3]{-125}$ B) $\sqrt[3]{0.343}$ C) $\sqrt[4]{\frac{256}{625}}$ D) $\sqrt[5]{\frac{3125}{1024}}$

9. Classify the numbers below as natural, whole, integer, rational and/or irrational. Some numbers may belong to more than one set.

A) $3.\overline{12}$ B) -4 C) $\sqrt{5}$ D) $\dot{4}\dot{7}$

E) 2.4 F) $\sqrt[3]{-8}$ G) 0 H) $5\frac{1}{2}$

10. Simplify each radical. (i.e. Write as a mixed radical.)

A) $\sqrt{108}$ B) $\sqrt[3]{80}$ C) $\sqrt[4]{405}$ D) $\sqrt{98}$

E) $\sqrt[3]{1372}$ F) $\sqrt[4]{160}$

11. Change the following to an entire radical.

A) $7\sqrt{14}$ B) $16\sqrt[3]{3}$ C) $4\sqrt[5]{12}$ D) $3\sqrt[4]{2}$

12. Write each radical as an entire radical and then order them from least to greatest.
$2\sqrt{30},\ 3\sqrt{3},\ 2\sqrt{7},\ 5\sqrt{5},\ 2\sqrt{13}$

13. Order these numbers from least to greatest.

A) $\sqrt{38},\ \sqrt[3]{515},\ \frac{13}{3},\ \sqrt{2},\ \sqrt[3]{128}$

B) $12^{\frac{9}{7}},\ \sqrt[6]{12^7},\ 12^{\frac{1}{9}},\ 12^{\frac{1}{7}},\ \sqrt[7]{12^6}$

14. Write each power as a radical.

A) $42^{\frac{5}{4}}$ B) $7.5^{1.25}$ C) $\left(\frac{3}{4}\right)^{\frac{5}{6}}$

15. Write each radical as a power.

A) $\left(\sqrt[6]{0.9}\right)^{7}$ B) $\sqrt{\left(\frac{3}{4}\right)^{9}}$ C) $\sqrt[4]{5}$

16. Evaluate without a calculator. Show all steps. NOTE: CHANGE DECIMALS TO FRACTIONS FIRST.

A) $64^{\frac{1}{3}}$ B) $0.25^{\frac{1}{2}}$ C) $(-27)^{\frac{1}{3}}$ D) $\left(\frac{256}{625}\right)^{\frac{1}{4}}$

E) $0.16^{\frac{5}{2}}$. F) $(-243)^{0.6}$. G) $4^{2.5}$ H) $\left(\frac{125}{8}\right)^{\frac{4}{3}}$.

17. Evaluate without a calculator.

A) 3^{-2} B) $\left(\frac{2}{3}\right)^{-3}$. C) $64^{-\frac{4}{3}}$ D) $\left(\frac{625}{256}\right)^{-\frac{3}{4}}$

E) $(-216)^{-\frac{1}{3}}$ F) $(0.81)^{-\frac{3}{2}}$ G) $81^{-0.75}$ H) $\left(\frac{8}{27}\right)^{-\frac{2}{3}}$

18. Evaluate.

A) $\left(-\frac{8}{5}\right)^{\frac{7}{4}} \cdot \left(-\frac{8}{5}\right)^{\frac{1}{4}}$.

B) $\frac{1.2^{\frac{1}{3}}}{1.2^{\frac{4}{3}}}$.

C) $\frac{0.64^{\frac{7}{2}}}{0.64^{5}}$.

D) $(0.4)^{\frac{3}{2}} \cdot (0.4)^{\frac{1}{3}} \cdot (0.4)^{\frac{7}{6}}$.

E) $\left[\left(-\frac{16}{19}\right)^{\frac{2}{5}} \cdot \left(-\frac{16}{19}\right)^{-\frac{2}{5}}\right]^{7}$.

19. Simplify. Write answer with positive exponents.

A) $m^{-2}n^{6} \cdot m^{3}n^{-8}$

B) $\frac{12p^{3}q^{-7}}{15pq^{6}}$

C) $\left(64a^{12}b^{15}\right)^{\frac{2}{3}}$

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

E) $\frac{\left(m^{3}n^{-3}\right)^{-1}}{\left(m^{-2}n\right)^{4}}$.

F) $\frac{-3a^{-3}b^{-7}c^{-6}}{12a^{-6}b^{-3}c^{-3}}$.

G) $\left(\frac{3}{4}m^{-3}n^{-7}p^{-2}\right)^{-4}$.

H) $\left(\frac{36x^{4}y^{3}}{4x^{8}y^{-1}}\right)^{\frac{1}{2}}$.

I) $\left(\frac{w^{-15}y^{12}}{-64x^{3}}\right)^{-\frac{1}{3}}$.

20. Simplify. Write answer with positive exponents.

A) $\dfrac{\left(a^{-\frac{7}{2}}b^{\frac{10}{3}}\right)}{\left(a^{-5}b^{4}\right)}$

B) $\left(7s^{\frac{7}{4}}t^{-\frac{5}{3}}\right)\left(-6s^{-\frac{11}{4}}t^{\frac{7}{3}}\right)$

C) $\left(x^{3}y^{-\frac{3}{2}}\right)\left(x^{-1}y^{\frac{1}{2}}\right)$

D) $\dfrac{4a^{-2}b^{\frac{2}{3}}}{2a^{2}b^{\frac{1}{3}}}$

21. Suppose you want \$2000 in 3 years. The interest rate for a savings account is 2.8% c compounded annually. The money, P dollars, you must invest now is given by the formula $P = 2000(1.028)^{-3}$. How much must you invest now to have \$2000 in 3 years?

22. At a distance of 1 m from a light source, the intensity of the light is 2 mW/m^2 (milliwatts per square meter). The intensity, I, at a distance d metres from the source is given by the formula: $I = 2d^{-2}$. Determine the intensity of the light 2.5 m from the source.

23. Here is a student's solution for evaluating a power:

$$\left(\frac{8}{27}\right)^{-\frac{2}{3}} = \left(-\frac{8}{27}\right)^{\frac{2}{3}}$$
$$= \left(\sqrt{-\frac{8}{27}}\right)^{2}$$
$$= \left(-\frac{2}{3}\right)^{2}$$
$$= \frac{4}{9}$$

Identify any errors in the solution. Write a correct solution.

24. A colony of bacteria start with 100 bacteria. The population of the colony doubles each every 20 min. This equation represents the population, *N* bacteria, after *t* hours:

$$N = 100(2)^{\frac{t}{20}}$$

How would the population after 60 min compare with the population after 105 min? Write your answer as a percent.

25. A cone with equal height and radius has volume 492 cm^3. What is the height of the cone to the nearest tenth of a centimetre?

26. A tree farmer used the formula $V = 0.5d^2h$ to estimate the volume, V cubic meters, of a tree with height *h* meters and mean trunk diameter *d* meters. The height of a tree is 20 times its mean trunk diameter, and its volume is 230 m^3. What is the mean trunk diameter of this tree to the nearest meter?

27. Identify any errors in each simplification. Write a correct solution.

A) $\left(x^{-6}y^{6}\right)\left(x^{-\frac{1}{6}}y^{5}\right) = x^{-6} \cdot x^{-\frac{1}{6}} \cdot y^{6} \cdot y^{5}$

$= x^{1} \cdot y^{30}$

$= xy^{30}$

B) $\left(\frac{2m^{\frac{1}{4}}}{n^{4}}\right)^{-4} = -\frac{8m^{-1}}{n^{0}}$

$= -8m^{-1}$

$= \frac{1}{8m}$