Math 10 Common

Midterm Review Assignment Ch. 1, 3, 4

(COMPLETE ALL on a SEPARATE piece of paper)

Unit 1 – Powers and Roots

1. Estimate the value of the following roots without using a calculator.

   a. $\sqrt{18}$ b. $\sqrt{47}$ c. $\sqrt[3]{34}$ d. $\sqrt[4]{82}$

2. Write each power with positive exponents.

   a. $(x^{-4})^2$ b. $\frac{s^3}{s^{-3}}$ c. $\frac{(-2.6)^4}{(-2.6)^{-2}}$ d. $\frac{(4k)^2}{(4k)^{-3}}$

3. Evaluate each expression. Express your answers to four decimal places, if necessary.

   a. $\left(3^{-2}\right)^{-2}$ b. $\left[\frac{4.5}{\left(3^2\right)(1.5)}\right]^3$

   c. $\left[\left(1.2^3\right)\left(1.2^{-2}\right)\right]^{-4}$ d. $\left[\frac{(4x^{-2})}{(4x)^3}\right]^2$

4. A ball is dropped from a height of 3 m and allowed to bounce freely. The height, *h*, in metres, that is rebounds can be modeled using the formula $h = 3(0.7)^n$. In this formula, *n* is the number of bounces.

   a. How high does the ball reach on the third bounce? Express the answer to two decimal places.

   b. After how many bounces does the ball reach a maximum height of 0.5 m?

5. Simplify each expression. Express the answers with positive exponents.

   a. $(x^{\frac{-4}{3}})^{\frac{1}{4}}$ b. $\frac{4^{\frac{2}{5}}}{4^{-0.6}}$ c. $(16g^8)^{\frac{-3}{4}}$ d. $\left(\frac{t^2}{0.5t^{\frac{-1}{3}}}\right)^3$

6. A radioactive element has a half-life of one week. The formula for the amount of the element remaining is $A = 500\left(\frac{1}{2}\right)^n$, where *n* is the number of weeks. How much of a 500 g sample of the element

   a. remains after five weeks? b. was there four weeks ago?

7. Barb incorrectly simplified $\left(27x^4\right)^{\frac{2}{3}}$ as $18x^{\frac{8}{3}}$. What error did she make? What is the correct answer?

8. Write each power as an equivalent radical.

a. $x^{\frac{3}{5}}$ b. $\left(27t^2\right)^{\frac{2}{3}}$ c. $\left(\frac{g^3}{18}\right)^{0.5}$

9. Express each radical as a power.

a. $\sqrt{(xp)^5}$ b. $\sqrt[3]{2^5}$ c. $3\sqrt[5]{x^4}$

10. Convert each mixed radical to an equivalent entire radical.

a. $3\sqrt{12}$ b. $2\sqrt{10}$ c. $4\sqrt[3]{5}$ d. $-2\sqrt[3]{2}$

11. Express each entire radical as an equivalent mixed radical.

a. $\sqrt{180}$ b. $\sqrt{192}$ c. $\sqrt[3]{128}$ d. $\sqrt[4]{48}$

12. Identify the irrational numbers in each set. Then, order all the numbers from greatest to least.

a. $0.\overline{24}$ $\frac{\pi}{3}$ $\sqrt{0.9}$ $\sqrt[5]{96}$ b. $6.\overline{2}$ $18^{\frac{1}{2}}$ $\sqrt{36}$ $2\sqrt[3]{27}$

Unit 2 – Factors and Products

13. Add and/or subtract as required.

a. $(-7x^2 - 4x + 13) - (3x^2 - x - 4)$ b. $(3xy + 7x^3 - 3y^2) + (3y^2 - xy) - (2xy - 5x^3)$

c. $7x + 4(3x - 4) + (2x - 7)$ d. $7(3m - 4) + 7 - 3(2m + 1) - 7m$

14. Perform the following divisions.

a. $\frac{15c^2 - 21c^5 + 9c}{3c}$ b. $\frac{10x^4y^6 - 40xy^7}{-10xy^4}$

15. Determine the prime factorization of the following numbers.

a. 1470 b. 440 c. 1575

16. Determine the greatest common factor of the following sets of numbers.

a. 60, 84, 144 b. 55, 77, 99 c. 220, 440, 600

17. Determine the lowest common multiple of the following sets of numbers.

a. 8, 12, 16 b. 6, 9, 15 c. 3, 5, 20

18. A square has an area of 1764 ft^2. What are the lengths of each side?

19. A cube has a volume of 12167 cm^3. What is the length of each side?

20. Determine if each number is a perfect square or a perfect cube.

a. 289 b. 1331 c. 9261 d. 3025

21. Determine the greatest common factor for each polynomial.

a. $12m - 18m^3$ b. $18 + 12x - 24x^2$ c. $-15m^7 - 45m^5 + 30m^2$

22. A student removed the GCFs from two polynomials as shown below. Find and correct their mistakes.

a. $8x^2 - 6x + 20$
$2\left(4x^2 + 3x + 10\right)$

b. $15m^3n^5 + 25m^5n^2 - 100m^2n$
$5m^2\left(3mn^5 + 5m^3n^2 - 20n\right)$

23. Simplify the following.

a. $-5x^3(2x - 7y + 1)$

b. $(h - 5)(h + 7)$

c. $(3a - 4)^2$

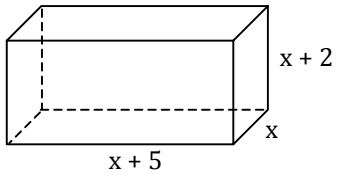
d. $(7x^2 - 3)(7x^2 + 3)$

e. $(x + 2)(x - 5) + (x + 2)^2 - (x - 3)(x + 3)$

f. $(3x^3y^5)(-5x^4y)$

24. For the rectangular prism, write and simplify an expression that represents the volume:

$V = lwh$



25. Factor completely.

a. $7x^3 - 14x$

b. $4x^2 - 81y^6$

c. $x^2 - 11x + 28$

d. $y^6 + 3y^3 - 10$

e. $6x^2 + 23x + 7$

f. $3x(a - 2b) + y(a - 2b) + 7(a - 2b)$

g. $x^2 - 16$

h. $x^4 - 25y^8$

i. $2x(2x - 5d) - 7m(2x - 5d)$

j. $15y^2 - 19y + 6$

k. $ax^2 - 10ax - 24a$

l. $3x^4 - 5x^2 - 28$

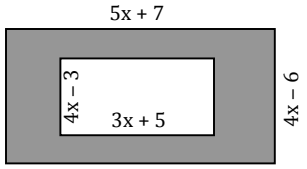
m. $14x^2 + 17x - 6$

n. $x^2 - 17x - 60$

26. Use algebra tiles to factor the following:

a. x^2+9x+8 b. $2x^2+11x+5$

27. Find the area of the shaded region.



Unit 3 – Measurement

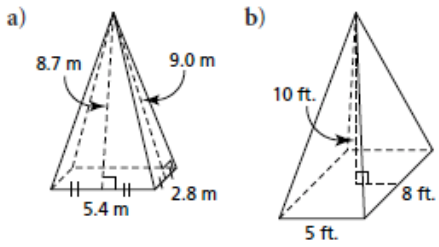
28. Alex purchased 7 yd. of ribbon to trim some napkins. The ribbon is sewn around a napkin, which is 14 in. wide and 16 in. long. How many napkins can Alex trim with this ribbon?

29. A dog trainer advises that, when walking a dog on a city street, the walker should allow the dog 42 in. of leash. Greg bought a retractable leash that extends 5 ½ yd. Greg follows the trainer's advice. What length of leash, in inches, is not used (to the nearest inch)?

30. A truck driver wants to park her 3.25 m high truck in a storage shed that is 11 ft. 6 in. high. Will the truck fit in the shed? Justify your answer.

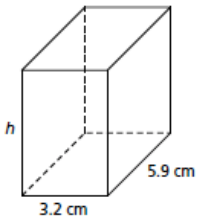
31. To qualify for the school volleyball try-outs, Rick needs to be able to jump and touch a line on the wall that is 8 ft. 2 in. off the ground. In his workouts, Rick jumped 243 cm. Will he qualify for the try-outs?

32. Calculate the surface area of the following pyramids (round to the nearest tenth)



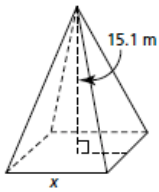
33. Calculate the dimension indicated by the variable to the nearest tenth.

a) right rectangular prism



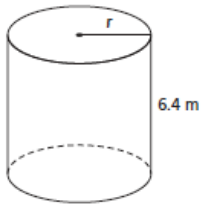
$V = 88.8 \text{ cm}^3$

b) right square pyramid



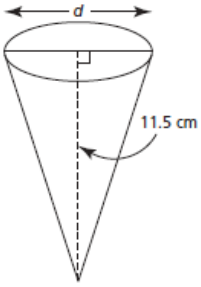
$V = 554.9 \text{ m}^3$

c) right cylinder



$V = 219.0 \text{ m}^3$

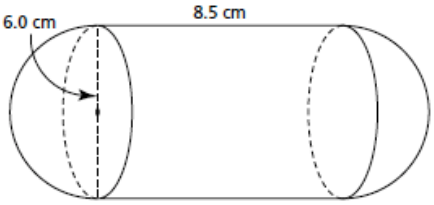
d) right cone



$V = 164.9 \text{ cm}^3$

34. Determine the surface area and volume of the composite objects to the nearest tenth.

a) right cylinder and hemispheres



b) right square prism and right square pyramid