Math 1010, Exam #1, Fall 2013 Name KEY

Instructions: Show all work. Use exact answers (fractions, not decimals) unless the problem starts with decimals, or unless you are specifically asked to round to a certain number of decimal places. While you may be able to do some problems in your head, I cannot give partial credit if the answer is wrong, but there is no work.

1. Solve the equation for the variable. (3 points each)
   a. $3R + 5 - R = 7$

$2R + 5 = 7$
$-5 \quad -5$
$\frac{2R}{2} = \frac{2}{2}$

$R = 1$

   b. $2(N + 1) = 14$

$2N + 2 = 14$
$-2 \quad -2$
$\frac{2N}{2} = \frac{12}{2}$

$N = 6$

2. In the formula $I = T + D$, the letter I represents the installment price, T represents the total of installment payments and D represents the amount of down payment. Find the down payment in the installment price is \$13,846.76 and the total of installment payments is \$10,673.26. (4 points)

$13,846.76 = 10,673.26 + D$
$-10,673.26 \quad -10,673.26$

$\$3173.50 = D$

3. How many meters are in one kilometer? 1000 (2 points)

4. How many deciliters are in one liter? 10 (2 points)

5. What is the most reasonable estimate for the height of the Washington Monument? 200 m? 200 cm? 200 mm? 200 km? (Circle your choice.) (2 points)

6. How many milligrams are in 0.432 kg? (4 points)

$432{,}000\ mg$

7. How many hours are in 3.4 years? (4 points)

$3.4\ \cancel{yr} \cdot \frac{365\ \cancel{days}}{1\ \cancel{yr}} \cdot \frac{24\ hr}{1\ \cancel{day}} = 29{,}784\ hrs.$

8. The freezing point of mercury is approximately -39°C. What is this temperature in Fahrenheit degrees? (4 points)

$\frac{5}{9}(F-32) = C$

$\frac{\cancel{9}}{\cancel{5}} \cdot \frac{\cancel{5}}{\cancel{9}}(F-32) = -39 \cdot \frac{9}{5}$

$F - 32 = -70.2$

$+32 \qquad +32$

$F = -38.2°F$

9. There are 2.54 cm per 1 inch. Using that conversion factor, determine how many meters are in 16 feet. (5 points)

$16\ \cancel{ft} \cdot \frac{12\ \cancel{in}}{1\ \cancel{ft}} \cdot \frac{2.54\ \cancel{cm}}{1\ \cancel{in}} \cdot \frac{1\ m}{100\ \cancel{cm}} = 4.8768\ m$

10. How many significant digits are in the number 4.010? (2 points)

4

11. Find the distance between $15\frac{3}{4}$ in and $12\frac{1}{2}$ in. (4 points)

$15\frac{3}{4} - 12\frac{1}{2} =$ 3 1/4 in

3 1/4

12. Find the midpoint between $15\frac{3}{4}$ in and $12\frac{1}{2}$ in. (4 points)

$$\frac{15\frac{3}{4} + 12\frac{1}{2}}{2} = \frac{28\frac{1}{4}}{2} = 14\frac{1}{8} \text{ in.}$$

13. For each of the following angles, indicate whether the angle is right, acute, obtuse or straight. (2 points each)
    a. 78° acute
    b. 180° straight

14. For the angle 75° given an angle which is: (3 points each)
    a. Complementary 15°
    b. Supplementary 105°

15. Write the angle 20.6° in degree-minutes-seconds. Convert the same angle to radians. (8 points)

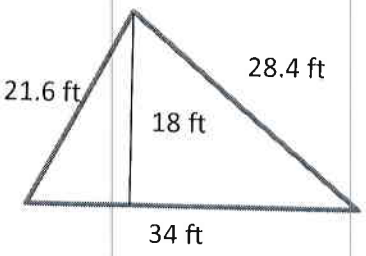
20° 36' 0"

$$20.6° \cdot \frac{\pi}{180°} = \frac{103}{900}\pi \approx .3595 \text{ radians}$$

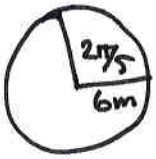
16. Find the area and perimeter of the shape below. (8 points)

$P = 21.6 + 34 + 28.4 = 84$ ft

$A = \frac{1}{2}(34)(18) = 306$ ft^2



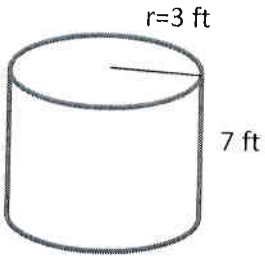
17. Find the area of the sector of a circle if the radius is 6 meters and the angle is $2\pi/5$ radians. (4 points)



$A = \frac{1}{2}\theta r^2 = \frac{1}{2}(\frac{2\pi}{5})(6)^2 =$

$\frac{36}{5}\pi \approx 22.62$ m^2

18. Find the volume and surface area of the cylinder if the radius is 3 feet, and the height is 7 feet. (8 points)



$V = \pi r^2 h = \pi(3)^2(7) = 63\pi$ ft^3

$SA = 2\pi rh + 2\pi r^2 =$

$2\pi(3)(7) + 2\pi(3)^2 =$

$42\pi + 18\pi = 60\pi$ ft^2

19. Write the following as percents. (2 points each)

a. 0.6 60%

b. $\frac{3}{8} = .375$ 37.5%

20. What is the sales tax on an item that costs $42 if the tax rate is 7.5%? (3 points)

$42 * .075 = \$3.15$

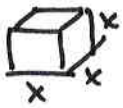
21. Byron Johnson took a pay cut of 5%. He was earnin $148,200 annually. What is his new annual salary? (4 points)

148,200 * .95 = 140,790

22. What is the conjugate percent of 22%? (2 points)

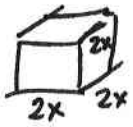
78%

23. Suppose you have a cube with a certain size x. What happens to the volume of the cube when you double the length of the sides? (4 points)



$V = x^3$

increases by a factor of 8



$V = (2x)^3 = 8x^3$

24. Give 4 items that are measured in liters. (4 points)

Soda pop, wine, gasoline, milk

25. A student has worked out a problem using the following steps. Explain the error in the problem and obtain the correct solution. What property was used incorrectly? (5 points)

$$3x + 1 = 19$$
$$-1 \quad -1$$
$$3x = 18$$
$$-3 \quad -3$$
$$x = 15$$

← student should be dividing not subtracting

multiplication/division rule should be used

$$\frac{3x}{3} = \frac{18}{3}$$

$$x = 6$$