

Math 099 - Summer 2014 - Test 1

Instructor: Dr. Francesco Strazzullo

Name _____

Instructions. Only calculators are allowed on this examination. Point values of each problem are indicated. Always use the appropriate wording and units of measure in your answers (when applicable). **SHOW YOUR WORK NEATLY, PLEASE (no work, no credit).**

1. Translate each phrase into an algebraic expression.

- (a) (5pts) A fifth of the difference between four and a number.

$$\frac{1}{5} \cdot (4 - x) \quad \text{OR} \quad \frac{1}{5}(4 - x)$$

- (b) (5pts) 20 more than 2.3% of a number.

$$20 + \frac{2.3}{100} \cdot x \quad \text{OR} \quad 20 + .023x$$

- (c) (5pts) The opposite of sixteen.

$$-16$$

2. Combine like terms in the following expressions:

$$(a) (5pts) \underline{5} + \underline{4x^3} - \underline{2y} - \underline{9x^3} - \underline{6} + \underline{4y}$$

$$(5-6) + (4-9)x^3 + (-2+4)y$$

$$-1 - 5x^3 + 2y$$

$$(b) (5pts) 4x - 3x^2 + x(2-x) + 5 \rightarrow 4x - 3x^2 + 2x - x^2 + 5$$

$$(4+2)x + (-3-1)x^2 + 5$$

$$\text{IN DESCENDING ORDER OF POWERS: } -4x^2 + 6x + 5$$

$$(c) (5pts) (14pts) \underline{x} - \underline{2.05y} + \underline{2.5y} + \underline{\frac{5}{39}} - \underline{\frac{7}{26}} \rightarrow \text{LCD: } 3 \cdot 13 \cdot 2 = 78$$

$$x + (-2.05 + 2.5)y + \frac{5 \cdot 2 - 7 \cdot 3}{78}$$

$$x + .45y - \frac{11}{78} \rightarrow x + \frac{9}{20}y - \frac{11}{78}$$

$$\text{OR} \quad x + .45y - \frac{1410256}{1410256}$$

3. (17pts) Solve the equation $6(2+5x)+4 = 2+27x$.

$$\begin{aligned}
 12 + 30x + 4 &= 2 + 27x \\
 30x + 16 &= 27x + 2 \\
 -27x - 16 &\quad -27x - 16 \\
 \hline
 \frac{3x}{3} &= \frac{-14}{3} \\
 x &= -\frac{14}{3}
 \end{aligned}$$

CALC.

CHECK:

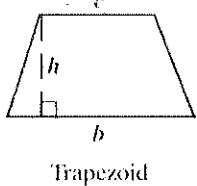
$$\begin{aligned}
 \text{L.H.S.} &= 6\left(2+5\left(-\frac{14}{3}\right)\right) + 4 = -124 \\
 &= 6\left(\frac{2+3-70}{3}\right) + 4 \rightarrow \\
 \text{R.H.S.} &= 2 + 27\left(-\frac{14}{3}\right) = -124
 \end{aligned}$$

$$\text{L.H.S.} = \text{R.H.S.}$$

✓

4. The formula for the area of a trapezoid is in the picture below.

- (a) (9pts) Solve the following formula for c .



$$A = \frac{1}{2}h(b+c)$$

$$\begin{aligned}
 \frac{\frac{1}{2}h(b+c)}{\frac{1}{2}h} &= \frac{A}{\frac{1}{2}h} \rightarrow b+c = \frac{2A}{h} \\
 -b &\quad -b \quad \rightarrow b+c = \frac{2A}{h} - b
 \end{aligned}$$

$$\begin{aligned}
 \rightarrow c &= \frac{2A}{h} - b \quad \rightarrow c = \frac{2A - bh}{h}
 \end{aligned}$$

- (b) (9pts) A trapezoid has area 105 square feet (ft^2), height 10 ft, and one of the parallel sides of 8.5 ft. Compute the length of the other parallel side.

DATA (UNITS OF MEASURE ARE HOMOGENEOUS): $A = 105$; $h = 10$; $b = 8.5$

PLUG DATA (IN FORMULA ABOVE OR) IN PART (a):

$$c = \frac{2(105) - 8.5(10)}{10} = 12.5 \text{ FT.}$$

5. (17pts) Give the interval which is the solution set for the inequality $3x - 2 \leq 9x + 4$.

$$\begin{aligned}
 3x - 2 &\leq 9x + 4 \\
 -9x + 2 &\quad -9x + 2 \\
 \hline
 -6x &\leq 6 \\
 \frac{-6}{-6} &\geq \frac{6}{-6} \\
 x &\geq -1
 \end{aligned}$$

GRAPH



INTERVAL NOTATION

$$[-1, \infty)$$

6. (18pts) Computers are on sale at 30% discount. If you know that you will pay 6.5% in sales taxes, what will you pay for a computer that is priced at \$680?

$$\begin{aligned}
 \text{"DISCOUNT"} &= \text{"SALE PRICE"} \cdot \text{"DISCOUNT RATE"} \\
 d &= S \cdot r
 \end{aligned}$$

$$\text{"DISCOUNTED SALE PRICE"} = \text{"SALE PRICE"} - \text{"DISCOUNT"}$$

$$S = S - S \cdot r = (1 - r)S$$

$$\text{"COST"} = \text{"DIS. SALE PRICE"} + \text{"TAX"} \quad] \rightarrow$$

$$\text{"TAX"} = \text{"DIS. SALE PRICE"} \cdot \text{"TAX RATE"} \quad] \rightarrow$$

$$\begin{aligned}
 \rightarrow \text{"COST"} &= (1 + \text{"TAX RATE"}) \cdot \text{"DIS. SALE PRICE"} \\
 &= (1 + t) \cdot S
 \end{aligned}$$

$$\rightarrow \text{"COST"} = (1 + t) \cdot (1 - r)S = (1 + \frac{6.5}{100})(1 - \frac{30}{100}) \cdot 680$$

PLUG DATA

$$= \$ \frac{25347}{50} = \$ 506.94$$