Math 099 - Summer 2015 - Test 1

Instructor: Dr. Francesco Strazzullo   Name_____ KEY _____

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*) The sum of six and 15% of a number.

   $$6 + \frac{15}{100}X \qquad OR \qquad 6 + .15X$$

   (b) (*5pts*) 15 less than a third of a number. $\frac{1}{3}X$

   $$\frac{1}{3}X - 15$$

   (c) (*5pts*) The inverse of three quarters.

   $$\frac{1}{\frac{3}{4}} \qquad OR \qquad \frac{4}{3}$$

2. Combine like terms in the following expressions:

   (a) (*5pts*) $4z - 3 - 2w^2 + 9 + 5z + 7w^2$

   $$4z + 5z - 3 + 9 - 2w^2 + 7w^2$$
   $$9z + 6 + 5w^2$$

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

   $$4x - 3x^2 + 2x - x^2 + 5$$
   $$-4x^2 + 6x + 5$$

   (c) (*5pts*) $z + 3.25 - \frac{3y}{35} - 1.75 + \frac{2y}{14}$

   $$z + 1.50 + \left(-\frac{3}{35} + \frac{1}{7}\right)y \;\mapsto\; z + 1.50 + \frac{2}{35}y$$

   $$z + \frac{3}{2} + \frac{2}{35}y \qquad OR \qquad z + 1.5 + 0.0571428y$$

1
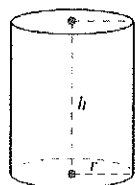
3. (17pts) Solve the equation $3 + 5x - 2 + x = 2(x - 4)$.

$$1 + 6x = 2x - 8 \longrightarrow \frac{4x}{4} = \frac{-9}{4} \longrightarrow x = -\frac{9}{4}$$
$$-1 \quad -2x \quad -2x \quad -1$$

CHECK: $L.H.S. = 3 + 5 \cdot \left(-\frac{9}{4}\right) - 2 - \frac{9}{4} = -\frac{25}{2}$

$R.H.S. = 2\left(-\frac{9}{4} - 4\right) = -\frac{25}{2}$ ✓

4. The formula for the volume of a right circular cylinder is given in the picture below.

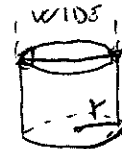(a) (9pts) Solve the formula for the hight h.

Right circular cylinder
$V = \pi r^2 h$

$$V = \pi r^2 h \longrightarrow \frac{\pi r^2 h}{\pi r^2} = \frac{V}{\pi r^2} \longrightarrow$$

$$\longrightarrow h = \frac{V}{\pi r^2}$$

(b) (9pts) A swimming pool shaped like a right circular cylinder can hold 200 cubic feet (cuft) of water. If the pool is 8 ft wide, how tall is this pool? You can approximate to the nearest foot.

PLUG DATA IN PART (a): $V = 200$, $\quad$ wide $\quad$ $r = \frac{8}{2} = 4$

THEN $h = \frac{200}{\pi \, 4^2} = \frac{25}{2\pi} \approx 3.97 \longrightarrow$ 4 FT TALL.

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5. (17*pts*) Give the interval which is the solution set for the inequality $10 < 4 - 3x \leq 15$.

$$10 < 4 - 3x \leq 15 \quad \to \quad \frac{6}{-3} < \frac{-3x}{-3} \leq \frac{11}{-3} \quad \to$$
$$-4 \quad -4 \quad -4$$

$$\to \quad -2 > x \geq -\frac{11}{3} \quad OR \quad -\frac{11}{3} \leq x < -2$$

$$INTERVAL: \quad \left[-\frac{11}{3}, -2\right)$$

6. (18*pts*) Your monthly income is about $1800 and you budget to spend a third of it for your rent while you plan to spend about 8% of it for leisure activities (like going to the cinema). Altogether, how much are you planning to spend on rent and leisure?

"A THIRD OF A NUMBER" $= \frac{1}{3}X$

"8% OF A NUMBER" $= .08X$

THIS NUMBER IS YOUR INCOME: $X = 1800$

$\to$ EXPENDITURE $= \frac{1}{3}(1800) + .08(1800) = 744$ DOLLARS

3

35)