

Math 099 - Spring 2011 - Test 3

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Name: UEY

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. (15pts) Gas price is \$3.50 per gallon from Monday to Thursday. What is the price of gas on Saturday if during the weekend there is a 15% rise?

$$\begin{aligned} \text{RISE} &= "15\% \text{ OF } 3.50" = .15(3.50) = .525 \\ \text{NEW PRICE} &= "OLD PRICE PLUS RISE" = 3.50 + .525 = 4.025 \end{aligned} \quad \left. \begin{array}{l} \text{OR} \\ 3.50(1+.15) \end{array} \right\}$$

PRICE ON SATURDAY IS \$ 4.03

2. (15pts) Solve the proportion $\frac{3}{x} = \frac{15}{2}$.

$$\text{CROSS MULTIPLY: } 3(2) = 15x \rightarrow 6 = \frac{15x}{15} \rightarrow x = \frac{2}{5} = .4$$

OR "FLIP"

$$\frac{x}{3} = \frac{2}{15} \rightarrow x = 3 \cdot \frac{2}{15} = \frac{2}{5}$$

3. (15pts) From our last test we have the following percents: 80, 72, 98, 65, 88, 90, 78, 77, 84. What are the median and the average percents?

YOU CAN PLOT THIS DATA IN YOUR TI: STAT, EDIT, L1

THEN IN THE CALCULATOR WINDOW (2ND, QUIT)

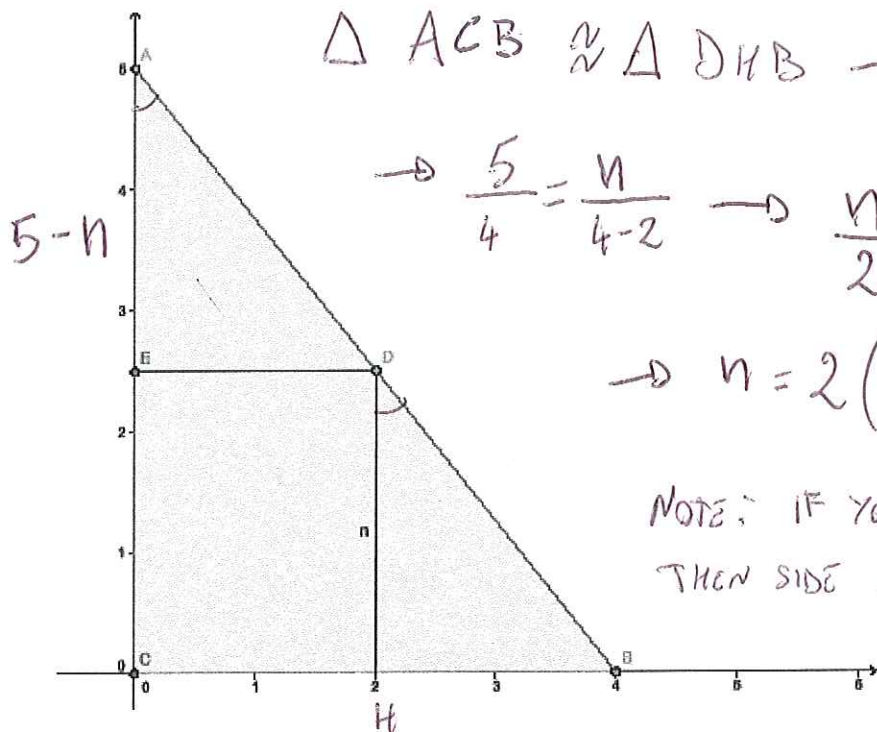
TYPE: 2ND, STAT, MATH

AND SELECT MEAN OR MEDIAN.

$$\text{BY HANDS: MEAN} = \text{AVERAGE} = \frac{80 + 72 + \dots + 84}{9} = 81\frac{1}{3}$$

$$\text{MEDIAN: } 65, \dots, 80, \dots, 98 \rightarrow \text{MEDIAN} = 80$$

4. (15pts) Use proportions to find n .



$$\text{OR } \frac{AC}{DH} = \frac{CB}{HB}$$

$$\triangle ACB \sim \triangle DHB \rightarrow \frac{AC}{CB} = \frac{DH}{HB}$$

$$\rightarrow \frac{5}{4} = \frac{n}{4-2} \rightarrow \frac{n}{2} = \frac{5}{4} \rightarrow$$

$$\rightarrow n = 2\left(\frac{5}{4}\right) = \frac{5}{2} = 2.5$$

NOTE: IF YOU USE TRIANGLE AED, THEN SIDE AE WILL MEASURE

$5-n$, THAT IS, YOU CAN'T WRITE $AE = 2.5$.

5. (18pts) Jane brakes her piggy bank. She finds 145 coins, in dimes and quarters, for a total value of \$26.5. Jane is eight and she is happy for that. How many of each coins does she have?

ITEM	Q	R	QR
QUARTERS	X	.25	.25X
DIMES	Y	.10	.10Y
TOTALS	145 = X+Y		26.5 = .25X + .10Y

$$\begin{cases} X + Y = 145 \\ .25X + .10Y = 26.5 \end{cases}$$

YOU CAN USE GRAPH, SUBS, OR ELIMIN.

ELIMINATION: $-10(X + Y = 145) \rightarrow 80 + Y = 145 \rightarrow Y = 145 - 80 = 65$

$$-10X - 10Y = -145$$

$$.25X + .10Y = 26.5$$

$$\begin{array}{r} .15X \\ \hline .15X + .10Y = 12 \\ \hline .15X \\ -15 \\ \hline \end{array}$$

$$X = 80$$

JANE HAS 80 QUARTERS AND 65 DIMES

CHECK: $.25(80) + .10(65) = 26.5 \checkmark$

6. (17pts) Solve the system of linear equations

$$\begin{cases} 3x - 5y = 1 \\ x + 2y = 4 \end{cases}$$

ELIMINATION:

$$\begin{array}{r} \textcircled{1} \quad -3(x + 2y = 4) \quad \textcircled{4} \quad x + 2(1) = 4 \rightarrow x = 4 - 2 = 2 \\ \hline -3x - 6y = -12 \\ 3x - 5y = 1 \\ \hline -11y = -11 \\ \textcircled{2} \quad \frac{-11y}{-11} = \frac{-11}{-11} \\ \textcircled{3} \quad y = 1 \end{array}$$

SOLUTION: $x = 2, y = 1$

CHECK: $3(2) - 5(1) = 6 - 5 = 1$ ✓

SUBSTITUTION:

$$\begin{cases} 3x - 5y = 1 \rightarrow 3(4 - 2y) - 5y = 1 \rightarrow 12 - 6y - 5y = 1 \\ x + 2y = 4 \rightarrow x = 4 - 2y \end{cases}$$

$$\begin{aligned} & \rightarrow 12 - 11y = 1 \\ & \rightarrow -11y = -11 \\ & \dots \text{AS ABOVE } \textcircled{3} \end{aligned}$$

GRAPH:

$$\begin{aligned} L_1: & -5y = 1 - 3x \rightarrow y = \frac{3}{5}x - \frac{1}{5} \\ L_2: & 2y = -x + 4 \rightarrow y = -\frac{1}{2}x + 2 \end{aligned}$$

