MAT 099
January 27, 2012

Show all work. You may collaborate on this first homework/quiz. Henceforth, Quizzes will be in-class and on your own. Homework will be accessed thru the website.

1. $(10.3 - 6x = -2.3)(10)$

$$103 - 60x = -23$$
$$-103 \qquad = -103$$
$$\overline{\qquad -60x = -126}$$

$$x = -\frac{126}{-60} = \frac{63}{30} = \boxed{\frac{21}{10}}$$

2. $-4(3n - 2) - n = -11(n - 1)$

$$-12n + 8 - n = -11n + 11$$
$$-13n + 8 = -11n + 11$$
$$\underline{\quad -8 = \qquad -8}$$
$$-13n = -11n + 3$$
$$2n = 3 \implies n = \frac{3}{2}$$

3. $\dfrac{3}{8} + \dfrac{b}{3} = \dfrac{5}{12}$

$8 = 2 \cdot 2 \cdot 2$
$3 = 3$
$12 = 2 \cdot 2 \cdot 3$

$LCD = 2 \cdot 2 \cdot 2 \cdot 3$

$$\frac{3}{2 \cdot 2 \cdot 2} \cdot \frac{3}{3} + \frac{b}{3} \cdot \frac{2 \cdot 2 \cdot 2}{2 \cdot 2 \cdot 2} = \frac{5}{2 \cdot 2 \cdot 3} \cdot \frac{2}{2}$$

$$\frac{9 + 8b}{2 \cdot 2 \cdot 2 \cdot 3} = \frac{10}{2 \cdot 2 \cdot 2 \cdot 3}$$

$$9 + 8b = 10$$

$$8b = 1$$

$$\boxed{b = \frac{1}{8}}$$

4. A book costs $8 with tax. If the sales tax rate is 5%, what was the price of the book *before* sales tax?

$x = $ price of book B4 tax ($)

$$x + .05x = 8$$
$$1.05x = 8$$
$$x = \frac{8}{1.05} \approx \boxed{\$7.62}$$

check:

$7.62 + .05(7.62) = 8.001$ OR

5. Suppose a book store gives every item a **17% discount at the checkout counter.** **What's the discount price of a book** whose original price (*before* the discount) is $8?

$x = $ price AFTER Discount ($)

$$8 - .17(8) = x$$
$$\$6.64 = x$$

Check:

$8 - .17(8) = 6.64$ duh

6. A second number is five times a first number. A third number is 100 more than the first number. If the sum of the three numbers is 415, find the numbers.

Let $x = $ the 1st number
$y = $ " 2nd "
$z = $ " 3rd "

Then $x + y + z = 415$ and so

$$x + 5x + x + 100 = 415$$
$$7x + 100 = 415$$
$$7x = 315 \implies x = \frac{315}{17} \approx 18.53$$

7. In a recent survey, 15% of online shoppers in the U.S. say that they prefer to do business only with large, well-known companies. In a group of 1500 online shoppers, how many are willing to do business with any size business?

$x =$ the # of shoppers who aren't picky

That's $100\% - 15\% = 85\%$ of online shoppers, so

$x = .85(1500) = \boxed{1275 \text{ people}}$

8. Use the diagram to find the unknown angle measure:
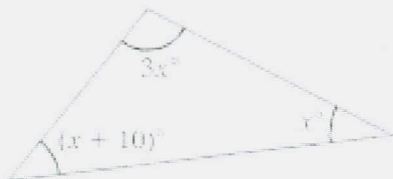
$x + 3x + x + 10 = 180$

$5x + 10 = 180$

$5x = 170$

$x = \dfrac{170}{5} = \boxed{34^\circ}$

$x + 10 = \boxed{44^\circ} \qquad 3x = \boxed{102^\circ}$

9. The sum of three consecutive odd integers is 327. Find the integers. (Let $x =$ the first odd integer)

$x + x+2 + x+4 = 327$

$3x + 6 = 327$

$3x = 321$

$\boxed{x = 107}$

$\boxed{x + 2 = 109, \; x+4 = 111}$

10. Solve for L.
   $P = 2W + 2L$

$2W + 2L = P$

$2L = P - 2W$

$\boxed{L = \dfrac{P - 2W}{2}}$

11. Find the balance A if \$3500 is invested at an annual percentage rate of 3% for 10 years, if interest is compounded daily.

$A = P\left(1 + \dfrac{r}{n}\right)^{nt}$

$= 3500\left(1 + \dfrac{.03}{365}\right)^{365 \cdot 10}$

$\approx \boxed{\$4724.45}$

12. One-foot-square ceiling tiles are sold in packages of 50. Find how many packages must be bought for a rectangular ceiling 18 feet by 12 feet.

$x =$ # of packages needed

Square footage = Square footage

$\left(\dfrac{50 \text{ tiles}}{\text{pack}}\right)\left(\dfrac{1 \text{ ft}^2}{\text{tile}}\right) x = (18 \text{ ft})(12 \text{ ft})$

$50 x = 216$

$x = \dfrac{216}{50} = 4.32.$

$\boxed{\text{So you need } 5 \text{ packs}}$