Mth 098 – Intermediate Algebra – **Practice Exam 2 Solutions**

1.

a. $6pq + p - 3q - 7pq = p - 3q - pq$

b. $2(x+y) - (x-2y) + 3x = 2x + 2y - x + 2y + 3x = 4x + 4y$

2.

a. 2
b. 4
c. 0

3.

a. $p - (p+4) = 4(p-1) + 2p$
$p - p - 4 = 4p - 4 + 2p$
$-4 = 6p - 4$
$0 = 6p$ (add 4 to both sides)
$0 = p$ (divide both sides by 6)

b. $2x + 3 + x = 9$
$3x + 3 = 9$
$3x = 6$
$x = 2$

c. $3(y+3) + 2y = 5y + 4$
$3y + 9 + 2y = 5y + 4$
$5y + 9 = 5y + 4$
$5y + 5 = 5y$ (subtract 4 from both sides)
$5 = 0$ (subtract 5y from both sides)

This obviously is not correct, so this is a contradiction.

4. $IR + Ir = E$
$IR = E - Ir$
$R = \dfrac{E - Ir}{I}$

5. $6x - 2y = 18$
$\Rightarrow \quad -2y = -6x + 18$
$\Rightarrow \quad y = 3x - 9$

6. $x = \dfrac{-b + \sqrt{b^2 - 4ac}}{2a} = \dfrac{-(-3) + \sqrt{(-3)^2 - 4(2)(-2)}}{2(2)} = \dfrac{3 + \sqrt{9+16}}{4} = \dfrac{3 + \sqrt{25}}{4} = \dfrac{3+5}{4} = \dfrac{8}{4} = 2$

7. Let p = his pace for the rest of the run. In this case, since we're looking at minutes/mile, pace = time/distance. If we multiply both sides by distance, time = (pace)(distance)

   Also note that 3 miles at 20 minutes/mile means 60 minutes walking. The general idea is: (minutes running) + (minutes walking) = (total minutes)

   or more detailed: (running pace)(running miles) + (walking pace)(walking miles) = total minutes

   Algebraically, $15p + 60 = 240$. Solving for p, we see p = 12 minutes per mile, so his pace for the rest of the run was 12 min/mile.

8. Let m = the number of minutes. The general idea is: (monthly charge) + (charge/minute) = total bill. Algebraically, that's: $5 + 0.07m = 14.38$. Solving for m, we can see that 134 minutes were used.

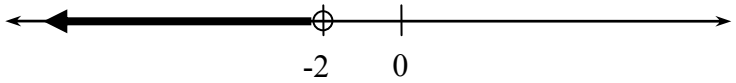
9. Let p = time for the machines to produce 1050 copies. The general idea is: (copies produced by 1st machine) + (copies produced by 2nd) = 1050. Algebraically, that's: $35m + 40m = 1050$. Solving for m, we can see that it took 14 minutes for all 1050 copies to be produced.

10. Let p = the list price of the shirt. Then list price + tax = total
    $p + 0.0725p = 31.09$

    or

    $1.0725p = 31.09$

11.
    a.



    b. $(-\infty, -2)$
    c. $\{x \mid x < -2\}$

12. Solve each inequality and give the solution in interval notation.

    a. $5 - 3x \le 11 \quad \Rightarrow \quad -3x \le 6 \quad \Rightarrow \quad x \ge -2$

    So the solution is $[-2, \infty)$.

b.

$\frac{h}{2}-\frac{5}{6}<\frac{1}{3}+h$ (LCD = 6, so multiply both sides by 6)

$6\left(\frac{h}{2}\right)-6\left(\frac{5}{6}\right)<6\left(\frac{1}{3}\right)+6(h)$

$3h-5<2+6h$

$3h<7+6h$

$-3h<7$

$h>-\frac{7}{3}$

The solution is $\left(-\frac{7}{3},\infty\right)$.

c. $14\le 2-3g<20$

$\Rightarrow \quad 12\le -3g<18$

$\Rightarrow \quad -4\ge g>-6$

$\Rightarrow \quad -6<g\le -4$

So the solution is $(-6,-4]$.

d. $|x-3|-2<3$

$\Rightarrow \quad |x-3|<5$

$\Rightarrow \quad -5<x-3<5$

$\Rightarrow \quad -2<x<8$

So the solution is $(-2,8)$.

e.

$$|2b-7|>3 \quad \Rightarrow \quad \begin{cases} 2b-7>3 \quad \Rightarrow \quad 2b>10 \quad \Rightarrow \quad b>5 \\ \text{or} \\ 2b-7<-3 \quad \Rightarrow \quad 2b<4 \quad \Rightarrow \quad b<2 \end{cases}$$

The solution is $(-\infty,2)\cup(5,\infty)$.

13. $|2x+3|=7 \quad \Rightarrow \quad \begin{cases} 2x+3=7 \quad \Rightarrow \quad 2x=4 \quad \Rightarrow \quad x=2 \\ 2x+3=-7 \quad \Rightarrow \quad 2x=-10 \quad \Rightarrow \quad x=-5 \end{cases}$

The solution set is $\{2,-5\}$.