

Quiz #2 Solutions

The following solutions represent one possible way of doing each problem. There may be, of course, other ways to do these problems.

1. We have $-3t < 6$. We divide both sides by -3 to get $t > -2$ (remember, when you divide by a negative, you flip the inequality). This corresponds to $(-2, \infty)$.
2. If x represents the amount of money Fredia invests in mutual funds, then we can represent her investment as follows:

$$\begin{aligned} (12\% \text{ of } x \text{ dollars}) + (5\% \text{ of } (1000 - x) \text{ dollars}) &= (8\% \text{ of } \$1000) \\ .12x + .05(1000 - x) &= .08(1000) \end{aligned} \tag{1}$$

3. We can use the discriminant to determine the number of real solutions. We have

$$b^2 - 4ac = 6^2 - 4 \cdot 3 \cdot 3 = 36 - 36 = 0.$$

Thus, there is **one** real solution.

4. Rewrite

$$x^2 - 4x + y^2 + 6y = 12.$$

Then we can complete the square twice (once for x , once for y) to get

$$x^2 - 4x + 4 + y^2 + 6y + 9 = 12 + 4 + 9$$

(since $(4/2)^2 = 4$ and $(6/2)^2 = 9$). Then we consolidate both sides to get

$$(x - 2)^2 + (y + 3)^2 = 25 = 5^2.$$

Thus, the equation is for a circle with its center at $(2, -3)$ and a radius of 5.

5. Remember, the absolute value of any number is never negative. Thus, there is no solution.
6. First, get the equation in slope-intercept form to find the slope of the original line. We solve for y to get $y = \frac{1}{2}x - 2$. Thus, the slope of the original line is $m_1 = \frac{1}{2}$. To find the slope of the new line, solve $m_1 m_2 = -1$, i.e., $m_2 \frac{1}{2} = -1$. Then $m_2 = -2$. Now, you can use point-slope form to get $y - 1 = -2(x - 1)$. If you wish to get into slope-intercept form, you could solve for y to get $y = -2x + 3$.
7. The distance formula gives us $10 = \sqrt{(8 - 2)^2 + (t - 0)^2} = \sqrt{6^2 + t^2}$. Now, square both sides to get $100 = 36 + t^2$. Then we have $t^2 = 64$, which yields $t = 8$ or $t = -8$.