

Quiz 3A (Modules 5,6)

Be sure to show all your work for full credit!

1. (2 points) Determine whether the equation is an identity, a conditional equation, or a contradiction. Give the solution set.

$$-4(3x - 2) + 11x = 8 - x$$

$$-12x + 8 + 11x = 8 - x$$

$$-x + 8 = 8 - x$$

$$8 - 8 = -x + x$$

$$0 = 0 \leftarrow \text{Always true}$$

Type of equation: IdentitySolution set: { All real numbers }

2. (3 points) You have \$5000 to invest and two funds that you'd like to invest in. The first fund yields 10% interest and the second fund yields 5% interest. If you earn \$400 in interest income this year, how much should you put into each fund?

	P	r	t	I = Prt
1st Fund	x	0.10	1	0.10x
2nd Fund	5000 - x	0.05	1	0.05(5000 - x)

$$0.10x + 0.05(5000 - x) = 400$$

$$0.10x + 250 - 0.05x = 400$$

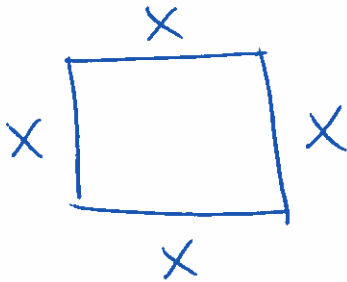
$$0.05x = 150$$

$$x = \frac{150 \times 100}{0.05 \times 100} = \frac{15000}{5} = 3000 \quad \text{(1st fund)}$$

$$\text{And } 5000 - x = 5000 - 3000 = 2000 \quad \text{(2nd fund)}$$

Amount invested in first fund: \$3000Amount invested in second fund: \$2000

3. (2 points) What is the length of the side of a square if its area is twice the perimeter.



↳ all sides have equal length

let $A = \text{area}$ and $P = \text{perimeter}$.

Then $A = 2P$

$$x^2 = 2(4x)$$

$$x^2 = 8x$$

$$x^2 - 8x = 0$$

$$x(x-8) = 0$$

$$x = 0 \quad \boxed{x = 8}$$

Length of the side of the square: 8

4. (3 points) Solve the equation by completing the square or by using the quadratic formula.

Quadratic Formula :

$$a = 2, b = -1, c = -15$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{1 \pm \sqrt{(-1)^2 - 4(2)(-15)}}{2(2)}$$

$$x = \frac{1 \pm \sqrt{1 + 120}}{4}$$

$$x = \frac{1 \pm \sqrt{121}}{4} = \frac{1 \pm 11}{4}$$

$$x = \frac{1+11}{4}, \frac{1-11}{4} \Rightarrow x = \frac{12}{4}, \frac{-10}{4}$$

$$x = \underline{3, -\frac{5}{2}}$$

$$2x^2 - x - 15 = 0$$

Complete The Square :

$$\frac{2x^2}{2} - \frac{x}{2} - \frac{15}{2} = 0$$

$$x^2 - \frac{1}{2}x - \frac{15}{2} = 0$$

$$x^2 - \frac{1}{2}x = \frac{15}{2}$$

$$x^2 - \frac{1}{2}x + \frac{1}{16} = \frac{15}{2} + \frac{1}{16}$$

$$(x - \frac{1}{4})^2 = \frac{120}{16} + \frac{1}{16}$$

$$(x - \frac{1}{4})^2 = \frac{121}{16}$$

$$\sqrt{(x - \frac{1}{4})^2} = \pm \sqrt{\frac{121}{16}}$$

$$x - \frac{1}{4} = \pm \frac{11}{4}$$

$$x = \frac{\pm 11}{4} + \frac{1}{4}$$

$$x = \frac{11+1}{4}, \frac{-11+1}{4}$$

$$\begin{aligned} & \left(\frac{-1}{2} \cdot \frac{1}{2}\right)^2 \\ &= \left(\frac{-1}{4}\right)^2 \\ &= \frac{1}{16} \end{aligned}$$