

MATH 1314

Test 2 Review

19 Multiple Choice Questions

Example 1: The length of a rectangle is twice its width. If the perimeter of the rectangle is 180 feet, find the dimensions of the rectangle.

$$l = 2w$$

$$P = 2l + 2w$$

$$180 = 2(2w) + 2w$$

$$180 = 4w + 2w$$

$$\frac{180}{6} = \frac{6w}{6}$$

$$l = 2(30) = 60$$

$$30 = w$$

$$\boxed{60' \times 30'}$$

Example 2: Solve the following system of equations for y:

$$2 \times (4x + y = 47) \times 2 \rightarrow \begin{array}{r} 8x + \cancel{2y} = 94 \\ 6x - 2\cancel{y} = -10 \\ \hline \end{array}$$

$$6x - 2y = -10$$

$$\begin{array}{r} 8x + \cancel{2y} = 94 \\ 6x - 2\cancel{y} = -10 \\ \hline \end{array}$$

Special Cases:

$0 = 0 \rightarrow$ Infinitely
Many
Solutions

$2 = 0 \rightarrow$ No
Solutions

$$\begin{array}{r} \cancel{14}x = 84 \\ \hline \cancel{14} \quad \quad 14 \\ \hline \end{array}$$

$$x = 6$$

$$4(6) + y = 47$$

$$\begin{array}{r} \cancel{24} + y = 47 \\ -\cancel{24} \quad \quad -24 \\ \hline \end{array}$$

$$\boxed{y = 23}$$

Example 3: State all solutions to the equation:

$$x^2 + 40 = 0$$

$$\sqrt{x^2} = \sqrt{-40}$$

$$x = \pm i\sqrt{40}$$

$$x = \pm 2i\sqrt{10}$$

Example 4: Solve the following equation:

$$x^2 + 5x - 7 = 0$$

$$a = 1 \quad b = 5 \quad c = -7$$

$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \leftarrow \text{Must Memorize}$$

$$X = \frac{-5 \pm \sqrt{5^2 - 4(1)(-7)}}{2(1)}$$

$$X = \frac{-5 \pm \sqrt{25 + 28}}{2} = \frac{-5 \pm \sqrt{53}}{2}$$

$$X = \frac{-5}{2} + \frac{\sqrt{53}}{2}, \quad \frac{-5}{2} - \frac{\sqrt{53}}{2}$$

Example 5: Solve the following by completing the square:

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$$x^2 - 8x + 20 = 0$$

~~20~~ ~~-20~~

$$x^2 - 8x = -20 \rightarrow x^2 - 8x + 16 = -20 + 16$$

$$b = -8$$

$$\frac{b}{2} = -4$$

$$\left(\frac{b}{2}\right)^2 = 16$$

$$\sqrt{(x-4)^2} = \sqrt{-4}$$

$$\begin{array}{r} x + 4 = \pm 2i \\ | \\ +4 \quad \quad +4 \\ \hline \end{array}$$

$$x = 4 \pm 2i$$

Example 6: Solve:

$$\frac{3}{10x} - \frac{1}{6x} = 1$$

$$\text{LCD} = 30x$$

$$\frac{3}{10x} \cdot \frac{3}{3} - \frac{1}{6x} \cdot \frac{5}{5} = 1 \cdot \frac{30x}{30x}$$

$$\frac{9}{30x} - \frac{5}{30x} = \frac{30x}{30x}$$

$$9 - 5 = 30x$$

$$\frac{4}{30} = \frac{30x}{30}$$

$$\boxed{\frac{2}{15} = x}$$

Example 7: Simplify $\frac{3-2i}{2+i}$

$$\boxed{i^2 = -1}$$

$$\frac{(3-2i)}{(2+i)} \cdot \frac{(2-i)}{(2-i)} = \frac{6-3i-4i+2i^2}{4-2i+2i-i^2} = \frac{4-7i}{5}$$

$$\frac{4}{5} - \frac{7}{5}i$$

$a + bi$ form

Example 8: Simplify

A. $(5 - 4i)(-1 - 2i)$ FOIL

$$-5 - 10i + 4i + 8i^2 = \boxed{-13 - 6i}$$

$\underbrace{\hspace{10em}}_{\rightarrow -8}$

B. $(2 - 3i) - (-1 + 5i)$

$$2 - 3i + 1 - 5i$$

$$\boxed{3 - 8i}$$

Example 9: Solve the following inequality and express your answer in interval notation.

$$\begin{array}{r} -2 < 3 - 4x \leq 7 \\ \hline -3 \quad -3 \quad -3 \\ \hline -5 < -4x \leq 4 \\ \hline -4 \quad -4 \quad -4 \\ \hline \frac{5}{4} > x \geq -1 \\ \curvearrowright \\ -1 \leq x < \frac{5}{4} \\ [-1, \frac{5}{4}) \end{array}$$

Never: $-1 \geq x < \frac{5}{4}$

Popper 7:

Question # 1 – 5....Fill out answer choice A.