

Exam ##### Study Guide

Name _____

Answer the questions in the spaces provided. Feel free to use another piece of paper for your work

1. What are the restrictions on x for the following equation:

Hint: "*The restrictions on x*", are the values x **CAN NOT** be.

(a) $\frac{-2}{x^2-4} + \frac{3}{x-2} = 4$

2. Solve for x in the the following equations:

(a) $\frac{1}{x-2} = 4 + \frac{3}{x-2}$

$$4x + 9 = \frac{1}{2} + x + 3(2x - 5)$$

(b) $\frac{x+3}{x-5} = \frac{-1}{x-5} + 2$

$$\frac{1}{m-1} = \frac{1}{m^2+3m-4} - \frac{1}{m+4}$$

3. Solve for the indicated variable:

(a) $3x^2 - 12x = 4xy - 3x$, for x

$$4y - 3x + 9 = 0, \text{ for } y$$

4. Solve the following:

- (a) While camping, Tori hikes up a near by mountain. When she returns to her campsite later that night, she finds that the trip took her 6hrs going up the mountain, and 3hrs going down. If she was traveling 3mph faster going down the mountain than she was going up it, how fast was she going in both directions? Hint: you should have two answers. One for her speed going up the mountain AND one coming back down.

5. Write a model for the following:

- (a) A dance studio offers standard lessons for \$10/hr and personal lessons for \$15/hr. Tod decides he's going to take a combination of the two types of lessons. Write a model for the cost of Tod's lessons.

6. Simplify:

(a) $i^3\sqrt{-125}$

$$\sqrt{-25}\sqrt{-80}$$

7. Compute the following:

(a) $(4+i)+(7i)$

$$(5i+1)(-6+2i)$$

(b) $(3i+4)-i(3+4i)$

$$(2i)(5+2i)-\frac{1}{-2i}$$

8. Solve using any technique:

(a) $x+9=7x-x^2$

$$10x^2+1210=0$$

(b) $x^2-25=(x-6)(x+6)$

$$x^2=15^2$$

9. Complete the square:

(a) $4x^2 - 16 + n$

$$x^2 + \frac{2}{7}x + n$$

10. Apply the Quadratic Formula to solve:

(a) $x^2 - 10x = -9$

$$2x^2 - 3x - 5 = 0$$

11. Solve:

(a) $x^3 + 5x^2 - 4x - 20 = 0$

$$2x^3 - 3x^2 = 10x - 15$$

12. Solve and graph:

(a) $x + 3 < 4x + 8$

$$|x + 3| < 8$$

13. Solve and write in interval notation:

(a) $2(x - 3) + 4 \geq 10x$

$$-3 < 3(x - 2) + 4 \leq 10$$

14. Solve:

Hints: How would you solve $4x^2 + 3x + 2 = 1$? The equation $s = \frac{-gt^2}{2} + v_o t + s_o$ is symmetric, so what does the line of symmetry tell you?

(a) A physics class studying projectile motion decides to launch a rocket. They know, the height of the rocket can be modeled by the equation, $s = \frac{-gt^2}{2} + v_o t + s_o$ where $g = 9.8m/s^2$. If the the rocket has an initial velocity $v_o = 200m/s$ and is launched from a hieght of $s_o = 2m$:

- i) At what time does the rocket land($s = 2$)?
- ii) When does the rocket reach its max height?
- iii) What is the rocket's max height?

15. Solve:

- (a) A student research group is trying to test the results of a paper. As a result they want to make sure their test has the same proportion of women to men as the original paper. According to the paper only 40% of the total sample population were men. The student group's recreation currently has 24 men to 30 women. If they can only add people to their project. How many women must they add to make sure only 40% of the sample population is men?