

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Solve the equations:

(a)

$$7x^2 - 18x + x^3 = 0$$

(b)

$$3x^2 - 17x - 6 = 0$$

2. (a) The base of a ski ramp forms a right triangle. One leg of the triangle is 2 meters longer than the other leg. If the hypotenuse is 10 meters, what are the lengths of the two legs?

- (b) If the square of a mystery number decreased by the (same) mystery number is 12, then what is the mystery number?

3. (a) Find ? if

$$\frac{x}{2x+1} = \frac{?}{4x^2 - 16x - 9}.$$

(b) Divide and simplify

$$\frac{9a-3}{1-9a^2} \div \frac{6}{9a^2+6a+1}.$$

4. (a) Subtract and simplify

$$\frac{8x}{2x^2 + 4x + 2} - \frac{3x - 3}{x^2 - 1}$$

(b) Simplify the complex fraction

$$\frac{\frac{1}{a-b} - \frac{3}{a+b}}{\frac{2}{b-a} + \frac{4}{b+a}}$$

5. (a) Perform the long division

$$\frac{3x^3 - 4x^2 + 7}{x - 2}$$

and write your answer in the form quotient + $\frac{\text{remainder}}{\text{divisor}}$

(b) Solve for x the equation

$$\frac{1}{x - 2} - \frac{2}{x + 3} = \frac{11}{x^2 + x - 6}.$$