

NAME: \_\_\_\_\_ Score \_\_\_\_\_/15  
Please **print** your name **SHOW YOUR WORK!** **State reasons in words when appropriate.**

1. Solve the equation  $\frac{1}{x-1} = \frac{2}{x+1}$ .

$$\frac{1}{x-1} = \frac{2}{x+1}$$

$$x+1 = 2x-2$$

$$x = 3$$

The solution set for  $x+1 = 2x-2$  is  $\{3\}$

Since 3 does not cause a 0 in any denominator, 3 is a solution of the original equation.

The solution set for  $\frac{1}{x-1} = \frac{2}{x+1}$  is  $\{3\}$

2. Solve the equation  $\frac{x^2+1}{2x^2+3} = -5$ .

The square of an expression is non-negative.

Therefore the numerator and denominator are both positive.

The quotient of two positives is positive and cannot be negative.

Therefore the solution set for the equation is the empty set  $\emptyset$ .

3. Solve the equation  $\sqrt{x-1} = x-7$ .

$$\sqrt{x-1} = x-7$$

$$x-1 = x^2 - 14x + 49$$

$$x^2 - 15x + 50 = 0$$

$$(x-5)(x-10) = 0$$

By the Zero Factor Property

$$x-5 = 0 \text{ OR } x-10 = 0$$

$$x = 5 \text{ OR } x = 10$$

$\{5\} \cup \{10\} = \{5, 10\}$  is the solution set for  $x-1 = x^2 - 14x + 49$

TEST5:  $\sqrt{5-1} = 5-7$  is FALSE so 5 is not a solution of the original equation.

TEST10:  $\sqrt{10-1} = 10-7$  is TRUE so 10 is a solution of the original equation.

The solution set for the equation  $\sqrt{x-1} = x-7$  is  $\{10\}$ .