1. (10 points) Solve the following equation: \( \frac{x - 2}{x - 3} + \frac{2}{x} = \frac{-2}{x(x - 3)}. \)

Start by multiplying both sides of the equation by the common denominator, \( x(x - 3). \) Be sure to multiply every term by the common denominator. Then simplify the resulting equation.

\[
\frac{x(x - 3)(x - 2)}{x - 3} + \frac{(x - 3)2}{x} = \frac{x(x - 3)(-2)}{x(x - 3)} \Rightarrow \\
x(x - 2) + 2(x - 3) = -2 \Rightarrow \\
x^2 - 2x + 2x - 6 = -2 \Rightarrow \\
x^2 - 4 = 0 \Rightarrow \\
(x + 2)(x - 2) = 0 \Rightarrow \\
x = -2 \text{ or } x = 2.
\]

So the solution set is \( \{-2, 2\}. \)

2. (10 points) At the beginning of "the game" all of the players are located at the cornucopia which is full of weapons and supplies. Two weaker players, Rue and Foxface, decide to run away from the cornucopia as fast as they can. Rue runs South for one hour at 5 miles per hour and then East for one hour at a rate of 4 miles per hour. Foxface runs East at 7 miles per hour for two hours. How far apart are the two participants after two hours?

First we draw a sweet figure.

If you look at the picture we have a right triangle with sides of length 10 miles and 5 miles. Using the Pythagorean theorem we have the distance, \( d, \) between Rue and Foxface is

\[ d = \sqrt{10^2 + 5^2} = \sqrt{100 + 25} = \sqrt{125} = 5\sqrt{5} \]

miles apart.

OR

We can use the Cartesian coordinate system and say Rue ends up at point \( R = (4, -5) \) and Foxface ends up at point \( F = (14, 0) \) and then use the distance formula:

\[ d(R, F) = \sqrt{(4 - 14)^2 + (-5 - 0)^2} = \sqrt{100 + 25} = \sqrt{125}. \]

3. (Bonus +2) What game are Rue and Foxface playing

Rue and Foxface are participating in "The Hunger Games."