EXAM 3 - MATH 102 Friday, November 10

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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 following equations:

   (a) $(x-8)(x-2) = -5$

   (b) $|x^2 - x - 21| = 9$

2. Perform the following operations and simplify:

(a) $\dfrac{9x-3}{x^2-7x} \div \dfrac{3x^2+20x-7}{x^2-49}$

(b) $\dfrac{3x}{3x^2-27} + \dfrac{3x-3}{x^2-4x+3}$.

3. Solve the rational equation

$$\frac{x}{x-5} + \frac{2}{x-3} = \frac{20}{x^2-8x+15}.$$

4. A group of close friends from downstate arranged a daily visit to the Soo at a total cost of $2,000. At the last minute, three of the friends in the group dropped out and, as a result the cost per person increased by $150. We would like to find how many friends were in the original group.

   (a) Introduce variable(s) and state precisely their meaning.

   (b) Write an equation reflecting the data and solve it to find how many friends were in the original group.

5. (a) Find the domain of $f(x) = \sqrt[6]{5 - 13x}$ and leave your answer in interval notation.

(b) Simplify the following fraction:

$$\frac{(16a^8b^4)^{1/4}}{(27a^{-12})^{1/3}}.$$

(c) Compute the value:

$$\left(-\frac{8}{27}\right)^{-2/3}$$