

1. [6 points] Find all solutions to the following system of equations.

$$\begin{cases} 2x - y = 5 \\ 3x + 4y = -9 \end{cases}$$

2. [8 points] Find all solutions to the following system of equations.

$$\begin{cases} x + 2y - z = -3 \\ 2x + 3y + z = 4 \\ 3x + 2z = 12 \end{cases}$$

3. [7 points] A green house has a 70% nitrogen fertilizer and a 25% nitrogen fertilizer. How many liters of each fertilizer must be mixed to fill a custom order for 100 L of a fertilizer that is 59.2% nitrogen? **For full credit, set up and solve a system of equations.**

4. [4 points each] Simplify. Write your answer using only positive exponents.

a. $(a^{-4}b^2c)^{-3}(a^{-2}b^5c^3)$

b. $\frac{4a^8b^3}{20a^2b^{-5}}$

5. [5 points each] Perform the indicated operation, and simplify.

a. $20n - 3(6n - n^2) + 9(8n + 7)$

b. $(3y - 4)(y^2 + 5y - 2)$

c. $(2x - 5y)^2$

6. [5 points each] Factor completely.

a. $15x^2 - 8x - 16$

b. $8x^3 - y^3$

c. $x^3 + 3x^2 - 16x - 48$

7. [6 points each] Find all solutions to the following equations.

a. $x^3 - 17x^2 + 52x = 0$

b. $(y + 7)(y - 2) = 10$

8. [4 points] Simplify. $\frac{8x^2 - 28x}{35 - 10x}$

9. [6 points each] Perform the indicated operation and simplify.

a. $\frac{5}{x^2 + 11x + 24} - \frac{1}{x + 3}$

b. $\frac{7x^2 - 17x - 12}{x^2 - 9} \div \frac{5x^2 + 15x}{x^2 + 6x + 9}$

c. $\frac{\frac{1}{x+4} + 5}{\frac{1}{x} - 1}$

10. [7 points each] A panoramic picture frame holds a rectangular photo that has an area of 64 in^2 . The length of the photo is 4 in. more than five times the width. Find the dimensions of the photo. **For full credit, set up and solve an equation or system of equations.**

The following problem is extra credit.

1. [5 points] Factor completely. $9x^2 + 6xy + y^2 - y^6$

2. [5 points] Find all solutions of the following system of equations.

$$\begin{cases} \frac{1}{2}x + \frac{2}{3}y = \frac{31}{6} \\ x - \frac{2}{5}y = \frac{17}{5} \end{cases}$$

Answers for Math 103 Practice Test 2 (Winter 2015, Form 1)

1. $(1, -3)$

2. $(2, -1, 3)$

3. 76 l of 70% and 24 l of 25%

4a. $\frac{a^{10}}{b}$

4b. $\frac{a^6 b^8}{5}$

5a. $3n^2 + 74n + 63$

5b. $3y^3 + 11y^2 - 26y + 8$

5c. $4x^2 - 20xy + 25y^2$

6a. $(5x + 4)(3x - 4)$

6b. $(2x - y)(4x^2 + 2xy + y^2)$

6c. $(x + 4)(x - 4)(X + 3)$

7a. $x = 0$ or 4, or 13

7b. $y = -8$ or 3

8. $\frac{-4x}{5}$

9a. $-\frac{1}{x+8}$

9b. $\frac{7x+4}{5x}$

9c. $\frac{x(5x+21)}{(x+4)(1-x)}$

10. 20 inches by $\frac{16}{5}$ inches

EC1. $(3x + y - y^3)(3x + y + y^3)$

EC2. $(5, 4)$