

Answers to Study Guide for Final Exam

1. Solve the system by substitution. If the system is inconsistent or dependent, say so. Verify your solution by checking that it satisfies both equations in the system (if applicable).

$$\begin{aligned} 6x - 5y &= -8 \\ x + 3y &= 14 \end{aligned}$$

(2, 4) ← The soln is an ordered pair

2. Solve the system by elimination. If the system is inconsistent or dependent, say so. Verify your solution by checking that it satisfies both equations in the system (if applicable).

$$\begin{aligned} 6x - 9y &= -3 \\ -10x + 15y &= 5 \end{aligned}$$

← should be 5 dependent system w/ infinite solns

3. Factor. If the polynomial is prime, say so. Show all work for full credit. Circle your final answers.

a) $x^2 - 11x + 18$ $(x-9)(x-2)$	b) $2x^2 + 20x + 42$ $2(x+3)(x+7)$
c) $25x^2 - 16$ $(5x-4)(5x+4)$	d) $x^2 - 4xy - 21y^2$ $(x-7y)(x+3y)$
e) $5x^5 + 45x^4 + 70x^3$ $5x^3(x+7)(x+2)$	f) $3xy^2 - 48x$ $3x(y-4)(y+4)$
g) $-x^2 - 4x - 3$ $-(x+3)(x+1)$	h) $3x^3 + x^2 + 27x + 9$ $(x^2+9)(3x+1)$

4. Solve. Write your answers as integers or simplified fractions. Show all work & circle your answers.

a) $\frac{5}{x} + \frac{3}{x-2} = \frac{7}{x}$ $x = -4$	b) $\frac{w}{w+2} + \frac{7}{w-5} = \frac{14}{w^2-3w-10}$ $w = 0$ only!
c) $-x^2 - x + 3 = -9$ $x = -4$ or $x = 3$	d) $(x+1)(x-2) = 4$ $x = 3$ or $x = -2$
e) $-\frac{1}{2}x^2 + \frac{7}{2}x + 12 = 3$ mult both sides by -2 first! $x = 9$ or $x = 2$	f) $2x^3 - 3x^2 - 50x + 75 = 0$ $x = \frac{3}{2}, 5,$ or -5

5. Perform the indicated operations. Write your answers using integers or simplified fractions. Show all work and simplify your answers. You may leave your answers in factored form, as appropriate.

a) $(4p + 8q) + (4p - 9q)$ $8p - q$	b) $(3t - 5w)^2$ $9t^2 - 30tw + 25w^2$
c) $\frac{5}{x} + \frac{3}{x-2} - \frac{7}{x}$ $\frac{x+4}{x(x-2)}$	d) $-5xy(3x^2 - 7xy + 9y^2)$ $-15x^3y + 35x^2y^2 - 45xy^3$
e) $2(x+3)^2 - 4$ $2x^2 + 12x + 14$	f) $5p^3t(-6p^3t)$ $-30p^6t^2$
g) $(11x - 7) - (5x + 8)$ $6x - 15$	h) $(5x - 4y)(3x - 6y)$ $15x^2 - 42xy + 24y^2$
i) $\frac{-6x+36}{x^2+7x+12} \cdot \frac{x^2-16}{-3x+19}$ $\frac{2(x-4)}{x+3}$ should be 18	j) $\frac{x^2-64}{x^2-9x+20} \div \frac{x^2-15x+56}{x^2-4x-5}$ $\frac{(x+8)(x+1)}{(x-4)(x-7)}$

6. Simplify. Use integers or simplified fractions in your answers. Show all work & circle your answers.

a) $\frac{48x^6y^4}{8x^5y^{-3}}$ $6x^7$	b) $\frac{\frac{3}{x^2-16}}{\frac{4}{x+4}}$ $\frac{3}{4(x-4)}$	c) $(4x^{-2}y)^3$ $\frac{64y^3}{x^6}$
d) $-5c^4(c^2)^5$ $-5c^{14}$	e) $\frac{5-\frac{3}{x}}{4-\frac{1}{x}}$ $\frac{5x-3}{4x-1}$	f) $\frac{(2a^{-6}b)^{-3}}{(3cd^{-2})^2}$ $\frac{a^{18}d^4}{72b^3c^2}$

7. A batter hits a baseball ball into the air. The height h (in feet) of the baseball after t seconds is given by $h = -16t^2 + 80t + 4$.

a) Predict when the baseball is at a height of 68 feet. Show all work and write your answer in a complete sentence in the context of the problem.

$t=1$ or $t=4$ At 1 second & 4 seconds after the batter hits the ball into the air, it is at a height of 68 ft.

b) How high is the baseball after 2 seconds? Show all work and write your answer in a complete sentence in the context of the problem.

Two seconds after the baseball is hit, it is 26 ft high.

8. In 2003, Americans consumed an average of 16.3 pounds of fish and shellfish per year. What is this average in ounces per day?

Equivalent Units

Length

- 1 inch = 2.54 centimeters
- 1 foot = 12 inches
- 1 yard = 3 feet
- 1 mile = 5280 feet
- 1 mile = 1.61 kilometers

Volume

- 1 cup = 8 ounces
- 1 quart = 4 cups
- 1 quart = 0.946 liter
- 1 gallon = 4 quarts

Weight

- 1 gram = 1000 milligrams
- 1 pound = 16 ounces

a) Translate and solve.

$$\frac{16.3 \text{ lb}}{1 \text{ yr}} \cdot \frac{1 \text{ yr}}{365 \text{ days}} \cdot \frac{16 \text{ oz}}{1 \text{ lb}} = \frac{2608 \text{ oz}}{365 \text{ day}}$$

$$= 0.71 \text{ oz/day}$$

b) Write your answer in a complete sentence.

In 2003, Americans consumed an average of .71 oz of fish & shellfish per day.

9. The weight of an object on Planet A and the weight of the same object on the Planet B are proportional. An astronaut who weighs 180 pounds on Planet A weighs 22.5 pounds on the Planet B. What is the weight of a person on Planet A if they weigh 28.9 pounds on the Planet B? Round your answer to the nearest integer as needed.

The weight of a person on Planet A if they weigh 28.9 pounds on Planet B is 231.2 pounds.

10. The numbers of men and women who earned a bachelor's degree are listed in the table below for various years. Let n be the number of people (in thousands) who earned a bachelor's degree in the year that is t years since 1980.

Year	Number of People Who Earned a Bachelor's Degree (thousands)	
	Women	Men
1980	456	474
1985	497	483
1990	560	492
1995	634	526
2000	708	530
2002	742	550

Reasonable models for the women and men are

$n = 13.28t + 440.09$	Women
$n = 3.42t + 468.14$	Men

Use substitution or elimination to estimate when the number of women who earned a bachelor's degree was equal to the number of men who earned a bachelor's degree. What was the number of people?

Remember to show all work and answer the question in a complete sentence for full credit.

Round your intermediate answers to two decimal places and final answers to the nearest counting numbers.

Actual Soln:

(2.84, 477.81)

Rounds to

(3, 478)

In 1983, the number of men and women who earned bachelors degrees was the same. They each earned about 478,000 bachelors degrees.