

Answers to Study Guide for Midterm

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

a) $x^2 - 11x + 18$ $(x-2)(x-9)$	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) $5x^5 + 45x^4 + 70x^3$ $5x^3(x+2)(x+7)$	f) $3xy^2 - 48x$ $3x(y-4)(y+4)$
g) $-x^2 - 4x - 3$ $-(x+3)(x+1)$	h) $3x^3 + x^2 + 27x + 9$ $(3x+1)(x^2+9)$

make sure you use the appropriate method for credit.

if your system has ~~ans~~ soln, check your answer by plugging in soln into both orig. equations

2. 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).

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

$(2, 4)$ ← note that the soln to systems of 2 equations are ordered pairs

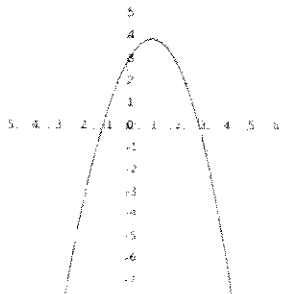
3. Solve the system by elimination. If the system is inconsistent or dependent, say so. Verify your solution by checking that it satisfies both equations in the system (if applicable).

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

should have been 5

dependent system - infinite solns.

4. Use the graph below to answer the questions that follow.



a) Find $f(3)$.

0

b) Find x when $y = -4$.

-2 and 4

c) Find the y -intercept(s).

$(0, 3)$

d) Find the x -intercept(s).

$(-1, 0)$ and $(3, 0)$

e) Find the vertex.

$(1, 4)$

Please email me if you find any mistakes.
thanks!

5. 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 & women who earned bachelor's degrees was the same. They each earned about 478,000 degrees.

6. You invested \$7000 in two accounts paying 7% and 9% annual interest, respectively. If the total interest earned for the year was \$550, how much was invested at each rate? You do NOT need to solve the problem.

a) Define each variable.

Let a = amt of money (in \$) invested in 7% account

Let b = amt of money (in \$) invested in 9% account

b) Write a system of two equations.

$$a + b = 7000$$

$$.07a + .09b = 550$$

7. A 10,000 seat amphitheater will sell tickets at \$22 and \$30 for a Sarah McLachlan concert. How many tickets should be sold at each price for a sellout performance to generate a total revenue of \$232,000? You do NOT need to solve the problem.

a) Define each variable.

Let a = # of \$22 tickets to sell

Let b = # of \$30 tickets to sell

b) Write a system of two equations.

$$a + b = 10,000$$

$$22a + 30b = 232,000$$

note: when you define variables, you describe what they mean in words. Do not assign numerical values to variables in their definition

8. Perform the indicated operations & simplify your answers. Circle your final answers.

Show all work for credit!

a) $(4p + 8q) + (4p - 9q)$ $8p - q$	b) $(3t - 5w)^2$ $9t^2 - 30tw + 25w^2$
c) $(2x - 5)(3x^2 + 4x - 2)$ $6x^3 - 7x^2 - 24x + 10$	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) $(5x - 4y)(3x - 6y)$ $15x^2 - 42xy + 24y^2$

9. Simplify. Use integers or simplified fractions only in your answers. Circle your final answers.

a) $\frac{48x^6y^4}{8x^5y^{-3}}$ $6xy^7$	b) $\frac{4^{-6}}{4^{-6}}$ $\frac{1}{16}$	c) $(4x^{-2}y)^3$ $\frac{64y^3}{x^6}$
d) $-5c^4(c^2)^5$ $-5c^{14}$	e) 7^{-2} $\frac{1}{49}$	f) $\frac{(2a^{-6}b)^{-3}}{(3cd^{-2})^2}$ $\frac{a^{18}d^4}{72b^3c^2}$

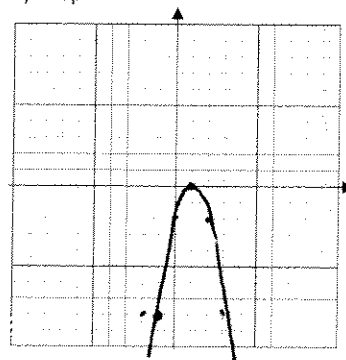
10. Graph the equation by hand. To begin, substitute the values of -3, -2, -1, 0, 1, 2, and 3 for x. Make other substitutions as necessary. Then use a graphing calculator to verify your work.

a) Complete the table below

$$y = -2x^2 + 4x - 2$$

b) Graph

x	y
-3	-32
-2	-18
-1	-8
0	-2
1	0
2	-2
3	-8



$$\begin{aligned} & \frac{(2a^{-6}b)^{-3}}{(3cd^{-2})^2} \leftarrow \text{make neg. exp. positive first by moving entire term down} \\ &= \frac{1}{(2a^{-6}b)^3(3cd^{-2})^2} \\ &= \frac{1}{8a^{-18}b^3 \cdot 9c^2d^{-4}} \\ &= \frac{a^{18}d^4}{72b^3c^2} \end{aligned}$$