MTH 28, Midterm 1, V. 1, 02/28/24 Prof. Luis Fernández

SOLUTION NAME:

There are 18 questions. Some are multiple choice and some are free response. Each question is worth 6 points over 100 for a total of 108 (so 8 points are extra credit). For multiple-choice questions, just circle your answer. For free-response questions, SHOW ALL WORK to receive credit.

- **1.** Factor out the greatest common factor (GCF). $6x^4 - 9x^3$
- **2.** Factor by grouping: $y^2 - 7y + 4y - 28$

Solution: $3x^3(2x-3)$

Solution: (y+4)(y-7)

3. Factor out the greatest common factor (GCF). $25x^2y^4 + 10xy - 15x$

Solution: $5x(5xy^4 + 2y - 3)$

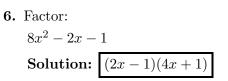
4. Factor:

$$x^2 - x - 6$$

Solution: $(x - 3)(x + 2)$

5. Factor:

$x^2 + 8x + 15$				
Solution:	(x+5)(x+3).			



7. Factor the difference of squares: $4x^2 - 9$

Solution:	(2x+3)(2x-3)
Solution.	(2x + 3)(2x - 3)

8. Factor completely: 45x²y - 20y³
Circle the answer.
Solution:
(a) 5(9x²y - 4y³)

(a)
$$5(9x \ y - 4y)$$

(b)
$$5y(9x^2 - 1024y^2)$$

(c)
$$5y(3x-2y)^2$$

(d)) 5y(3x - 2y)(3x + 2y)

9. Factor completely: $30x^2y + 5xy - 60y$ Circle the answer. Solution:

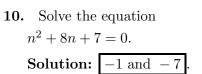
(a)
$$5y(3x-4)(2x+3)$$

(b) $xy(15x+65)$

$$(b) xy(10x + 00)$$

(c) $y(30x^2 + 5x - 60)$

(d)
$$5y(6x^2 + x - 12)$$



11. Solve the equation

 $7z - z^2 = 0.$

Solution: 0 and 7

- 12. Given the function $f(x) = 3x^2 + 5x 2$, calculate the following values: Solution:
 - f(0) = -2
 - f(2) = 20
 - f(-2) = 0
 - $f(x+1) = 3(x+1)^2 + 5(x+1) 2$
 - $f(-x) = 3x^2 5x 2$

13. For the polynomial $x^2 + x^5 - 3x - 5$,

a) Determine the coefficient and the degree of each term.

Solution:

Term	Coefficient	Degree
x^2	1	2
x^5	1	5
-3x	-3	1
-5	-5	0

b)

The degree of the polynomial is 5,

The leading term is x^5

15. Solve the equation: $6x^2 + 3 = 11x$.

Solution:

 $x = \frac{3}{2}, x = \frac{1}{3}$

14. Find all real number solutions for the equation

$$x(x-18) = -72.$$

Solution:		
x = 6, x = 12		

- 16. Evaluate the function g(x) = -4 at the given values:
 Solution:
 - g(0) = -4
 - g(2) = -4
 - g(-5) = -4
 - g(x+1) = -4

17. Solve the equation

$$3w^3 - 27w^2 + 54w = 0.$$

Solution:

w = 0, w = 3, w = 6.

18. Let
$$f(x) = \frac{x+7}{3x-3}$$
.

Compute the following values. If one is not defined, type *Undefined*. Solution:

•
$$f(0) = -\frac{7}{3}$$

•
$$f(2) = 3$$

•
$$f(1) =$$
 Undefined