MTH 28, Midterm 1, V. 2, 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:

 $8x^2 - 2x - 1$ **Solution:** (2x-1)(4x+1) **2.** Factor the difference of squares:

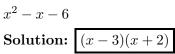
```
4x^2 - 9
```

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

- **3.** Factor completely: $45x^2y 20y^3$ Circle the answer. Solution:
 - (a) $5(9x^2y 4y^3)$
 - (b) $5y(3x-2y)^2$
 - (c) $5y(9x^2 1024y^2)$

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

4. Factor:



5. Factor:

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

6. Factor out the greatest common factor (GCF). $6x^4 - 9x^3$

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

7. Factor by grouping: $y^2 - 7y + 4y - 28$

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

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

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

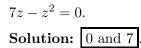
9. Factor completely: $30x^2y + 5xy - 60y$ Circle the answer. Solution:

(a) 5y(3x-4)(2x+3)(b) $y(30x^2+5x-60)$ (c) xy(15x+65)

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

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

11. Solve the equation



12. Solve the equation $n^2 + 8n + 7 = 0.$

Solution: -1 and -7

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

The leading coefficient is 1	_
------------------------------	---

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

•
$$g(x+1) = -4$$

14. Find all real number solutions for the equation

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

Solution:		
x = 6, x = 12		

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

Solution: $x = \frac{3}{2}, x = \frac{1}{3}$ **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