

# MTH 28, Midterm 1, V. 1, 09/25/24

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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:

$$y^2 - 7y + 4y - 28$$

3. Factor out the greatest common factor (GCF).

$$25x^2y^4 + 10xy - 15x$$

4. Factor:

$$x^2 - x - 6$$

5. Factor:

$$x^2 + 8x + 15$$

6. Factor:

$$8x^2 - 2x - 1$$

7. Factor the difference of squares:

$$4x^2 - 9$$

8. Factor completely:  $45x^2y - 20y^3$

**Circle the answer.**

(a)  $5(9x^2y - 4y^3)$

(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.**

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

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

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

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

10. Solve the equation

$$n^2 + 8n + 7 = 0.$$

11. Solve the equation

$$7z - z^2 = 0.$$

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

•  $f(0) = \underline{\hspace{2cm}}$

•  $f(2) = \underline{\hspace{2cm}}$

•  $f(-2) = \underline{\hspace{2cm}}$

•  $f(x + 1) = \underline{\hspace{2cm}}$

•  $f(-x) = \underline{\hspace{2cm}}$

13. For the polynomial  $x^2 + x^5 - 3x - 5$ ,  
a) Determine the coefficient and the degree of each term.

Term	Coefficient	Degree
$x^2$		
$x^5$		
$-3x$		
$-5$		

- b)  
The degree of the polynomial is \_\_\_\_\_,  
The leading term is \_\_\_\_\_ ,  
The leading coefficient is \_\_\_\_\_ .

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

14. Find all real number solutions for the equation

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

16. Evaluate the function  $g(x) = -4$  at the given values:

- $g(0) =$  \_\_\_\_\_
- $g(2) =$  \_\_\_\_\_
- $g(-5) =$  \_\_\_\_\_
- $g(x + 1) =$  \_\_\_\_\_

17. Solve the equation

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

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

Compute the following values.

If one is not defined, type *Undefined*.

•  $f(0) =$  \_\_\_\_\_

•  $f(2) =$  \_\_\_\_\_

•  $f(1) =$  \_\_\_\_\_

