

# MTH 06, Test 3, V. 3, 11/09/21

Prof. Luis Fernández

NAME: \_\_\_\_\_ SOLUTION \_\_\_\_\_

There are 22 questions. Some are multiple choice and some are free response.  
Each question is worth 5 points over 100 (so 10 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)  $5y(9x^2 - 1024y^2)$

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

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

4. Factor:

$$x^2 - x - 6 =$$

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

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)  $xy(15x + 65)$

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

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

10. Simplify the rational expression.

$$\frac{x^2 - 2x - 8}{x - 4}$$

Solution:

$x + 2$ .

11. Multiply and simplify your answer.

$$\frac{x^2 - 4}{x^2 - 3x + 2} \cdot \frac{x - 1}{x}$$

Solution:

$\frac{x + 2}{x}$

12. Solve the equation

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

Solution:  $0$  and  $7$ .

13. Divide and simplify your answer.

$$\frac{x^2 - 25}{x^2 - 11x + 30} \div \frac{x}{x - 6}$$

**Solution:**

$$\boxed{\frac{x + 5}{x}}$$

14. Divide and simplify your answer.

$$\frac{x^2 + 7x}{10} \div \frac{x + 7}{2}$$

**Solution:**

$$\boxed{\frac{x}{5}}$$

15. Simplify the expression

$$\frac{1 + \frac{4}{c - 4}}{1 - \frac{4}{c - 4}}$$

**Solution:**

$$\boxed{\frac{c}{c - 8}}$$

16. Subtract and simplify

$$\frac{7}{x + 5} - \frac{2x}{x^2 - 25}$$

**Solution:**

$$\boxed{\frac{5x - 35}{(x + 5)(x - 5)} \text{ or } \frac{5(x - 7)}{(x + 5)(x - 5)}}$$

17. Subtract and simplify

$$\frac{2x}{x^2 + 3x - 4} - \frac{1}{x - 1}$$

**Solution:**

$$\boxed{\frac{x - 4}{(x - 1)(x + 4)}}$$

18. Add and simplify

$$\frac{5}{y - 3} + \frac{3}{y + 5}$$

**Solution:**

$$\boxed{\frac{8y + 16}{(y - 3)(y + 5)} \text{ or } \frac{8(y + 2)}{(y - 3)(y + 5)}}$$

19. Add and simplify.

$$\frac{5}{7x^2} + \frac{3}{x}$$

**Solution:**

$$\boxed{\frac{21x + 5}{7x^2}}$$

20. Solve the equation

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

**Solution:**  $\boxed{-1 \text{ and } -7}$ .

21. Solve the equation:  $\frac{x}{4x-12} - \frac{x-4}{x-3} = 1$ .

Solution:  $x = 4$ .

22. Solve the following equation:

$$\frac{4}{x^2-25} + \frac{3}{x-5} = \frac{2}{x+5}$$

Solution:  $x = -29$ .