

MTH 06, Test 3, V. 2, 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) $5y(3x - 2y)^2$

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

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

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

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

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

10. Multiply and simplify your answer.

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

Solution:

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

11. Solve the equation

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

Solution: 0 and 7 .

12. Solve the equation

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

Solution: -1 and -7 .

13. Simplify the rational expression.

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

Solution:

$$\boxed{x + 2}$$

14. Divide and simplify your answer.

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

Solution:

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

15. Add and simplify.

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

Solution:

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

16. Divide and simplify your answer.

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

Solution:

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

17. Add and simplify

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

Solution:

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

18. Subtract and simplify

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

Solution:

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

19. Simplify the expression

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

Solution:

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

20. Subtract and simplify

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

Solution:

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

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: $x = -29$.