MTH 28, Midterm 2, V. 1, 10/23/24 Prof. Luis Fernández

NAME:_____

There are 19 questions. Some are multiple choice and some are free response.
Each question is worth 6 points over 100 (so 14 points are extra credit).
For multiple-choice questions, just circle your answer.
For free-response questions, SHOW ALL WORK to receive credit.

1. Simplify the expression

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

2. Simplify the rational expression.

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

3. Multiply and simplify your answer.

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

4. Multiply and simplify your answer.

$$\frac{x-4}{x}\cdot\frac{x^2+3x}{x^2-x-12}$$

5. Multiply and simplify

$$\frac{x^2 - x - 30}{x^2 - 10x + 24} \cdot \frac{x^2 - 16}{x^2 + 8x + 16}$$

6. Divide and simplify your answer.

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

7. Divide and simplify your answer.

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

8. Add and simplify.

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

9. Add and simplify

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

10. Add and simplify

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

11. Subtract and simplify

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

12. Subtract and simplify

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

13. Match the expressions below with the letters labeling their equivalent expressions.

☐ 1. $\dfrac{1}{x-3}+\dfrac{1}{x^2-9}$

☐ 2. $\dfrac{1}{x+3}+\dfrac{1}{x^2+9}$

☐ 3. $\dfrac{1}{x-3}+\dfrac{1}{x^2+9}$

A. $\dfrac{x+4}{x^2-9}$

B. $\dfrac{x^2+x+6}{(x-3)(x^2+9)}$

C. $\dfrac{x^2+x+12}{(x+3)(x^2+9)}$

14. Simplify the expresion

$$\frac{\dfrac{x^3}{x-7}}{\dfrac{x^7}{x^2-2x-35}}$$

15. Simplify the expression

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

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

17. Solve the following equation:

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

18. Solve the following equation:

$$x + \frac{1}{x} = 2$$

19. Solve the following equation:

$$\frac{x+1}{x-1} = \frac{-10}{x+3} + \frac{8}{x^2+2x-3}$$