

Part I – Multiple Choices (5 pts each)

1. Factored completely, the expression $12x^4 + 10x^3 - 12x^2$ is equivalent to

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|------------------------------|---------------------------|
| 1) $x^2(4x + 6)(3x - 2)$ | 3) $2x^2(2x - 3)(3x + 2)$ |
| 2) $2(2x^2 + 3x)(3x^2 - 2x)$ | 4) $2x^2(2x + 3)(3x - 2)$ |

2. The expression $x^2(x + 2) - (x + 2)$ is equivalent to

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|--------------|----------------------------|
| 1) x^2 | 3) $x^3 + 2x^2 - x + 2$ |
| 2) $x^2 - 1$ | 4) $(x + 1)(x - 1)(x + 2)$ |

3. When $\frac{3-x}{x-3}$, where $x \neq 3$, is simplified, it is equal to

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|-------|------|
| 1) 1 | 3) 0 |
| 2) -1 | 4) 2 |

4. The expression $\frac{x^2 + 9x - 22}{x^2 - 121} \div (2 - x)$ is equivalent to

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|-----------------------|-----------------------|
| 1) $x - 11$ | 3) $11 - x$ |
| 2) $\frac{1}{x - 11}$ | 4) $\frac{1}{11 - x}$ |

5. What is the sum of $\frac{3}{x-3}$ and $\frac{x}{3-x}$?

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|-------|----------------------|
| 1) 1 | 3) $\frac{x+3}{x-3}$ |
| 2) -1 | 4) 0 |

6. Expressed as a single fraction, what is $\frac{1}{x+1} + \frac{1}{x}$, $x \neq 0, -1$?

1) $\frac{2x+3}{x^2+x}$

3) $\frac{2}{2x+1}$

2) $\frac{2x+1}{x^2+x}$

4) $\frac{3}{x^2}$

Part II – Free Response (10 pts each)

7. Factor: $3x^2 + x - 2$

8. Factor: $a^4 - 1$

9. Factor: $ab - 3a - 2b + 6$

10. What is the sum of $(y - 5) + \frac{3}{y+2}$?

11. Express in simplest form: $\frac{3a+1}{a^2-1} - \frac{1}{a+1}$

12. Express in simplest form:

$$\frac{4x+8}{x+1} \cdot \frac{2-x}{3x-15} \div \frac{x^2-4}{2x^2-8x-10}$$

13. Simplify:

$$\frac{m}{mn-n^2} - \frac{1}{m-n} - \frac{1}{n}$$