PART I: Do all your work in the back of the blue booklet. Write your answer on the line to the right of each problem. No partial credit allowed. 3 points each.

1. What is the greatest common factor of $81x^7y^3 - 63x^4y^5$?
   a) $9x^7y^5$  b) $9x^{11}y^8$  c) $9x^4y^3$  d) $5103x^{11}y^8$
   e) $9x^3y^2$

2. Factor $21x^2 + 37x - 10$. One of the factors is:
   a) $3x - 5$  b) $21x - 5$  c) $3x + 2$  d) $3x + 5$  e) $3x - 2$

3. Factor $x^2 - 49x$ and $x^2 - 81$.
   Which of the following is NOT a factor of either polynomial?
   a) $x$  b) $x - 9$  c) $x - 49$  d) $x + 9$  e) $x - 7$

4. Factor $x^2 + x - 2$ and $x^2 - 2x - 3$.
   Which of the following is NOT a factor of either polynomial?
   a) $x + 2$  b) $x - 3$  c) $x + 3$  d) $x - 1$  e) $x + 1$

5. Completely factor: $3x^6 - 30x^5 + 63x^4$.
   Which of the following is NOT a factor?
   a) $t - 3$  b) $t - 7$  c) $t + 7$  d) 3  e) $t^4$

6. Solve $35x^2 - 2 = 3x$. The solutions are:
   a) $2/7$ and $-1/5$  b) $1/7$  c) $-2/7$ and $1/5$
   d) $2/5$ and $-1/7$  e) $-2/5$ and $1/7$

7. Given the function $f(x) = 7x^2 - 9x + 3$, find $f(-8)$.
   a) $-373$  b) $3211$  c) $379$  d) $-517$  e) 523

8. Find the least common denominator for:
   $\frac{1}{t^2 + 9t - 22}$  $\frac{1}{t^2 - 4}$
   a) $(t - 2)(t + 2)(t + 11)$  b) $(t - 2)^2(t + 2)(t + 11)$
   c) $(t - 2)$  d) 1
e) $(t + 2)(t + 11)$
9. Multiply and write your answer in lowest terms: \[ \frac{m^2 + 6m + 5 \cdot m^2 - 4}{m^2 + 3m + 2 \cdot m^2 - 25} \]
   a) \[ \frac{2}{5} \]  
   b) \[ \frac{(m + 5)(m + 5)(m - 5)}{(m + 2)(m + 2)(m - 2)} \]
   c) \[ \frac{4}{5} \]  
   d) \[ \frac{4(m + 5)}{25(3m + 2)} \]
   e) \[ \frac{m - 2}{m - 5} \]

10. Subtract and write your answer in lowest terms: \[ \frac{8x^3 - \frac{7}{8x^3}}{y^4} \]
   a) \[ \frac{x^3 - 7}{y^4} \]  
   b) \[ \frac{8x^6 - 7}{y^4} \]  
   c) \[ \frac{64x^9 - 7y^4}{8x^4y^3} \]  
   d) \[ \frac{64x^9 - 7y^4}{8x^4y^3} \]  
   e) \[ \frac{x^3 - 7y^4}{y^4} \]

11. For what values of \( x \) is \( x - 11 \) undefined? \( x^2 - 4x - 5 \)
   a) 5  
   b) 11  
   c) -1 or 5  
   d) -4  
   e) -11

12. Solve: \[ \frac{4}{7r} - \frac{2}{5r} = \frac{19}{35} \]
   a) 19/35  
   b) -6/19  
   c) 35/19  
   d) 6/19  
   e) 19/6

13. Divide and write your answer in lowest terms: \[ \frac{5n + 10 \cdot n + 50}{n + 5} \]
   a) \[ \frac{50n}{2n + 10 \cdot 10n + 50} \]  
   b) \[ \frac{(5n + 1)(n + 50)}{(2n + 1)(n + 5)} \]  
   c) \[ \frac{25}{4(n + 5)} \]  
   d) \[ \frac{25(n + 2)}{(n + 5)(n + 50)} \]  
   e) \[ \frac{(n + 2)(n + 50)}{4(n + 5)} \]

14. Add and write your answer in lowest terms: \[ \frac{4}{28r - 35} + \frac{6r + 5}{12r - 15} \]
   a) \[ \frac{42r + 47}{21(4r - 5)} \]  
   b) \[ \frac{6r + 9}{40r - 50} \]  
   c) \[ \frac{42r + 47}{21} \]  
   d) \[ \frac{168r^2 - 22r - 235}{21} \]  

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15. Simplify the complex fraction: \[ \frac{7 + \frac{6}{x}}{2 - \frac{7}{y}} \]
   a) \( \frac{2xy + 6y}{2x - 7} \)  b) \( \frac{7 + 6y}{2 - 7x} \)  c) \( \frac{7y + 6}{2 - 7} \)  d) \( \frac{7 + 6x}{2 - 7y} \)  e) \( \frac{7x + 6}{2y - 7} \)

16. Find the equation of the horizontal straight line which passes through the point (4,6).
   a) \( y = 4 \)  b) \( 4x + 6y = 0 \)  c) \( x = 6 \)  d) \( 3x = 12 \)  e) \( 3y = 18 \)

17. Find the slope of the straight line which passes through (-1,3) and (5,-18).
   a) \( -\frac{4}{23} \)  b) \( -\frac{5}{2} \)  c) \( -\frac{7}{2} \)  d) \( -\frac{15}{4} \)  e) \( -\frac{21}{4} \)

18. Find the slope of \( 11x - 7y = 13 \).
   a) \( \frac{7}{11} \)  b) \( -\frac{13}{7} \)  c) \( 11 \)  d) \( -11 \)  e) \( \frac{11}{7} \)

19. Find the equation of the straight line which passes through (4,8) and has a slope of 6.
   a) \( 8x + 4y = 6 \)  b) \( -6x + y = -16 \)  c) \( 6x + y = -16 \)  d) \( -6x + y = 4 \)  e) \( 4x + 8y = 6 \)

20. Find the slope of the straight line \( y = -2 - 6x \).
   a) \( 6 \)  b) \( -2 \)  c) \( -6 \)  d) \( 2 \)  e) \( 3 \)

21. Find the \( y \)-intercept of the straight line \( 13x + 5y = 3 \).
   a) \( 5 \)  b) \( -13/5 \)  c) \( 13 \)  d) \( 3/5 \)  e) \( 3/13 \)

22. The product of two integers is 91. The larger is 8 less than 3 times the smaller. Write down an equation that can be used to solve for the smaller integer, \( x \).
   a) \( (8 - 3x)x = 91 \)  b) \( x = 91(8 - 3x) \)  c) \( (3x - 8)x = 91 \)  d) \( 3x^2 - 8 = 91x \)  e) \( 3x - 8 = 91x \)

Continued on Page 4
23. The current in a river moves at the rate of 14 miles per hour. If \( x \) represents the speed of a boat in still water, write down an expression which represents the time it takes for the boat to travel 168 miles upstream.
   a) \( \frac{168}{x - 14} \)  
   b) \( \frac{12}{x} \)  
   c) \( \frac{182}{x + 14} \)  
   d) \( \frac{168}{14 - x} \)  
   e) \( \frac{168}{x} \)  

24. Luis invested a total of $71,300 in two accounts. One paid interest at the rate of 6% per year while the other paid interest at the rate of 5% per year. If the total interest that Luis received after one year was $3916, then find a system of equations that can be used to determine how much was invested at each rate by Luis.
   (Use interest = principal \times \text{rate} \times \text{time}.)
   a) \( 6x + 5y = 71,300 \)  
   \( x + y = 3916 \)  
   b) \( x + y = 71,300 \)  
   \( 6x + 5y = 3916 \)  
   c) \( 0.06x + 0.05y = 71,300 \)  
   \( x + y = 3916 \)  
   d) \( y = 71,300 + x \)  
   \( 0.06x + 0.05y = 3916 \)  
   e) \( x + y = 71,300 \)  
   \( 0.06x + 0.05y = 3916 \)  

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25. Solve the system by using the addition method: \( 2x + 9y = -37 \)  
   \( 5x - 7y = 55 \)  
   (the method of elimination)  
   (7 points)

26. Solve by substitution: \( 9x - 4y = -70 \)  
   \( 6x + y = -32 \)  
   (7 points)

27. Graph: \( 3x + 4y \leq 0 \)  
   (6 points)

28. Graph: \( 4x = 8 \)  
   (3 points)

29. Graph: \( 9x - 14y = 21 \)  
   (5 points)

HAND IN THIS EXAM WITH THE BLUE BOOKLET