1. Completely factor $168x^9 - 32x^8 - 8x^7$. One of the factors is:
   a) $7x + 1$  b) $8x^9$  c) $3x + 1$  d) $7x - 1$  e) $21x^2 - 4x$

2. Factor $x^2 - 2x - 3$ and $x^2 + 4x - 5$.
   Which of the following is NOT a factor of either polynomial?
   a) $x + 5$  b) $x - 3$  c) $x - 1$  d) $x - 5$  e) $x + 1$

3. What is the greatest common factor of $18x^8y^2 - 48x^3y^5$?
   a) $864x^{11}y^7$  b) $6x^5y^3$  c) $6x^{11}y^7$  d) $6x^3y^2$  e) $6x^3y^5$

4. Factor $21x^2 - 41x + 10$. One of the factors is:
   a) $7x + 2$  b) $7x - 2$  c) $7x - 10$  d) $3x + 5$  e) $21x - 1$

5. Completely factor $4x^6 - 36x^4$. Which is NOT a factor?
   a) $x - 9$  b) $x^4$  c) $x - 3$  d) $4$  e) $x + 3$

6. Solve $10x^2 - 7 = -33x$. The solutions are:
   a) $-13/5$  b) $-7/5$ and $1/2$  c) $-7/2$ and $1/5$
   d) $7/5$ and $-1/2$  e) $7/2$ and $-1/5$

7. Given the function $f(x) = 3x^2 - 8x + 2$, find $f(-7)$.
   a) $93$  b) $205$  c) $-89$  d) $499$  e) $-201$

8. Find the least common denominator for: $t^2 + 14t + 33$ and $t^2 - 9$.
   a) $(t + 3)^2(t - 3)(t + 11)$  b) $(t + 3)(t - 3)(t + 11)$
   c) $1$  d) $(t - 3)(t + 11)$  e) $(t + 3)$

Continued on Page 2
9. Multiply and write your answer in lowest terms: \( \frac{y^2 - 10y - 11}{y^2 - 4y - 5} \) y + 11
   \[ \frac{a)}{25} \quad b) \quad \frac{25(-10y - 11)}{121(-4y - 5)} \]
   \[ c) \quad \frac{5}{11} \quad d) \quad \frac{(y - 11)(y - 11)(y + 11)}{(y - 5)(y - 5)(y + 5)} \]
   \[ e) \quad \frac{y + 5}{y + 11} \]

10. Simplify (write in lowest terms; reduce): \( \frac{33x - 55}{55 - 4x} \)
   \[ a) \quad \frac{3}{4} \quad b) \quad \frac{3x - 1}{1 - 4x} \quad c) \quad \frac{-3}{4} \quad d) \quad \frac{3x - 5}{5 - 4x} \quad e) \quad \frac{33x - 1}{1 - 44x} \]

11. Solve: \( \frac{6}{7y} - \frac{3}{4y} = \frac{5}{28} \)
   \[ a) \quad 5/28 \quad b) \quad 3/5 \quad c) \quad -3/5 \quad d) \quad 28/5 \quad e) \quad 5/3 \]

12. Find the least common denominator for \( \frac{1}{20u^{12}} \) and \( \frac{1}{25u^{30}} \)
   \[ a) \quad 100u^{30} \quad b) \quad 5u^{12} \quad c) \quad 100u^{12} \quad d) \quad 100u^{30} \quad e) \quad 500u^{30} \]

13. Divide and write your answer in lowest terms: \( \frac{2x + 24}{8x + 24} + \frac{x + 72}{24x + 72} \)
   \[ a) \quad \frac{(x + 81)(x + 72)}{64(x + 3)(x + 3)} \quad b) \quad \frac{9(x + 8)}{x + 72} \quad c) \quad 9 \]
   \[ d) \quad \frac{18x}{x + 3} \quad e) \quad \frac{(3x + 1)(x + 72)}{(8x + 1)(x + 3)} \]

14. Add and write your answer in lowest terms: \( \frac{8}{u^2 - 4u - 5} + \frac{3}{u^2 - 6u - 7} \)
   \[ a) \quad \frac{11u - 71}{(u + 1)^2(u - 5)(u - 7)} \quad b) \quad \frac{11u^2 - 60u - 71}{11u - 71} \quad c) \quad \frac{11u - 71}{(u + 1)(u - 5)(u - 7)} \]
   \[ d) \quad \frac{11u - 71}{2u^2 - 10u - 12} \]

Continued on Page 3
15. Simplify the complex fraction: \( \frac{9n + 72}{5n^4} \div \frac{5n + 40}{n^8} \)

a) \( \frac{8n^4}{5} \)

b) \( \frac{72n^5}{5n + 40} \)

c) \( \frac{5(n + 8)^2}{n^{12}} \)

d) \( \frac{n^4}{5} \)

e) \( \frac{n^4(n + 72)}{5n + 40} \)

16. Find the \( x \)-intercept of the straight line \( 3x + 11y = 2 \).

a) 2/11  

b) -3/11  

c) 3  

d) 11  

e) 2/11

17. Find the equation of the straight line passing through the origin whose slope is 3/13.

a) 13x + 3y = 0  

b) 3x = 13y  

c) 3x + 13y = 0  

d) 13x = 3y  

e) 3x + 13y = 1

18. Find the slope of \( 7x - 13y = 2 \).

a) 7  

b) -7  

c) 7/13  

d) -2/13  

e) 13/7

19. Find the slope of the straight line \( y = 4 - 7x \).

a) 4  

b) -7/4  

c) 7  

d) -7  

e) -4

20. Find the slope of the straight line which passes through \((-12,17)\) and \((7,-4)\).

a) 13/19  

b) -21/19  

c) 21/5  

d) -13/5  

e) -29/11

21. Find the equation of the straight line which passes through \((2,8)\) and has a slope of 6.

a) \( 8x + 2y = 6 \)  

b) \( 6x + y = -4 \)  

c) \( -6x + y = -4 \)  

d) \( -6x + y = 6 \)  

e) \( 2x + 8y = 6 \)

22. The length of a rectangle is 2 more than its width. If the area of the rectangle is 80, write down an equation that can be used to find its width, \( x \).

a) \( x(x + 80) = 2 \)  

b) \( (x - 2)x = 80 \)  

c) \( x(x + 2) = 80 \)  

d) \( 2(x + 2) + 2x = 80 \)  

e) \( (x - 80)x = 2 \)

Continued on Page 4
23. The current in a river moves at the rate of 7 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 133 miles downstream.

\[ \begin{align*}
\text{a) } & \frac{133}{x} \quad \text{b) } \frac{133}{x-7} \\
\text{c) } & \frac{133}{x+7} \\
\text{d) } & \frac{133}{7} \\
\text{e) } & \frac{133}{7-x}
\end{align*} \]

24. Sofas cost 396 dollars to produce and 73 hours to make. Stoves take 61 hours to make and 265 dollars to produce. A total of 13607 dollars were spent and 2642 hours were used producing x sofas and y stoves. Find a system of equations which can be used to solve for \( x \) and \( y \).

\[ \begin{align*}
\text{a) } & 73x + 396y = 2642 \\
& 61x + 265y = 13607 \\
\text{b) } & 73x + 396y = 13607 \\
& 61x + 265y = 2642 \\
\text{c) } & 61x + 73y = 2642 \\
& 265x + 396y = 13607 \\
\text{d) } & 73x + 61y = 2642 \\
& 396x + 265y = 13607 \\
\text{e) } & 73x + 265y = 2642 \\
& 396x + 61y = 13607
\end{align*} \]

PART II: Do all your work in the front of the blue booklet. Leave your answer there. Partial credit is allowed.

25. Solve the system by using the addition method: \( 2x - 3y = 8 \) (the method of elimination) \( 5x + 7y = -9 \) (7 points)

26. Solve by substitution: \( 9x + y = -49 \) \( 5x + 8y = -57 \) (7 points)

27. Graph: \( 14x + 9y = 21 \) (5 points)

28. Graph: \( 4x = -12 \) (3 points)

29. Graph: \( 2x + 5y \geq 0 \) (6 points)

HAND IN THIS EXAM WITH THE BLUE BOOKLET