In all non-multiple choice problems you are required to show all your work and provide the necessary explanations everywhere to get full credit. In all multiple choice problems you don’t have to show your work.
1. Evaluate \( \frac{1/3}{2/3} \).

A 1/3  
B 2/3  
C 3/2  
D 1/2  
E 3

2. Evaluate \( -\frac{5}{9} + \frac{1}{4} \).

A -4/36  
B -11/36  
C -29/36  
D 29/36  
E None of the above

3. Evaluate \( -|2 - 3| \).

A -1  
B 1  
C -5  
D 5  
E None of the above

4. Evaluate \( \left( \frac{1}{2} \right)^{-1} \).

A 2  
B 1/2  
C -2  
D -1/2  
E None of the above
5. Evaluate $-2^2 + (-2)^2 + (-2)^3 - 2^3$.
   A 0
   B $-8$
   C 8
   D $-16$
   E 16

6. True or false: $\sqrt{2011 + 2012} = \sqrt{2011} + \sqrt{2012}$
   A True
   B False

7. True or false: $\sqrt{2011 \cdot 2012} = \sqrt{2011} \sqrt{2012}$
   A True
   B False

8. True or false: $(2011 + 2012)^2 = 2011^2 + 2012^2$
   A True
   B False

9. True or false: $2011^0 = 0$
   A True
   B False

10. If $A = \{1, 2, 3, 4, 5\}$ and $B = \{2, 3, 4, 5, 6, 7\}$, then $(A \cap B) \cup B$ is
    A $\{1, 2, 3, 4, 5\}$
    B $\{2, 3, 4, 5, 6, 7\}$
    C $\{2, 3, 4, 5\}$
    D $\emptyset$
    E $\{1, 2, 3, 4, 5, 6, 7\}$
11. Simplify

(a) \( \left( \frac{x^4 z^{-7}}{4y^5} \right)^{-1} \left( \frac{x^3}{4y^3 z^{-2}} \right) \)

(b) \( \frac{x - 1}{x^2 - 1} \div \frac{x^2 - 4x}{x^2 - 3x - 4} \)
12. Factor as completely as possible $x^9y - x^3y^7$.

13. Solve the equation $x = \frac{1}{2}\sqrt{1-x} + 1$. 
14. You invested a total of $10,000 at 4% and 5% simple interest. During 1 year, the two accounts earned $460. How much did you invest in each account?

15. Solve the inequality \( \frac{x + 1}{5 - 2x} \geq 2 \) and sketch the solution set.
16. Show that the equation \( x^2 + y^2 - 2x - 4y + 3 = 0 \) represents a circle, and find the center and radius of the circle.

17. Find an equation of the line through the point \((-1, 2)\) that is perpendicular to the line \(2x - 3y + 4 = 0\).
18. Use transformations to sketch the graph of the function \( f(x) = 1 - \sqrt{1 - x} \). Find the domain and the range of \( f \).

19. Sketch the graph of the function

\[
f(x) = \begin{cases} 
|x| & \text{if } x \leq 2 \\
x^2 & \text{if } x > 2
\end{cases}
\]
20. True or False: The average rate of change of the function \( f(x) = 1234x - 5678 \) between the points \( x = 2010 \) and \( x = 2011 \) is equal to the average rate of change of \( f \) between the points \( x = 1 \) and \( x = 2011 \)?
   
   A  True  
   B  False

21. True or False: The function \( f(x) = x^3 + x^2 \) is odd.
   
   A  True  
   B  False

22. True or False: The function \( f(x) = x^4 \) is invertible.
   
   A  True  
   B  False

23. If \( f \) has an inverse function \( f^{-1} \), then the graphs of \( y = f(x) \) and \( y = f^{-1}(x) \) are reflections of one another about
   
   A  the line \( x \)-axis  
   B  the line \( y \)-axis  
   C  the line \( y = x \)  
   D  the origin  
   E  none of the above

24. Let \( f(x) = \sqrt{x + 5} + 1 \). Find \( f^{-1}(x) \).