1. State the quadratic formula.

\[ x = \]

2. Simplify the following by performing the given operation – do not factor.
   a) \( 3 - 2x (3 + 2x) = \) _______________
   b) \((3x + 2)(3x - 5) = \) _______________
   c) \((4 - 2x)^2 = \) _______________

3. Factor each of the following polynomials.
   a) \(4x^3 - 32 = \) __________________
   b) \(x^2 + 10x - 200 = \) __________________
   c) \(1 - 8x^3 = \) __________________

4. Find the solution of each of the following inequalities.
   a) \(4 - 3(x - 2) > x + 2 \) \(\rightarrow\) ____________________________
      graph of your solution \(\rightarrow\) \\
   b) \(3 - \frac{x + 2}{2} < \frac{x}{4} \) \(\rightarrow\) ____________________________
      graph of your solution \(\rightarrow\) \\
   c) \(4 < x - 3 < 8 \) \(\rightarrow\) ____________________________
      graph of your solution \(\rightarrow\) \\
   d) \(\frac{2 - x}{x + 3} \geq 0 \) \(\rightarrow\) ____________________________
      graph of your solution \(\rightarrow\)
5. Find the solution of each of the following equations.

a) \(|x - 2| \geq -4\) → __________________________

b) \(|3 - 2x| < 2\) → __________________________

c) \(\frac{3 + 4x}{2} = 4\) → __________________________

d) \(|2 - 3x| \geq 2\) → __________________________

6. Which of these represent functions and which represent only relations.

a) \(x + 2y = 3\)  
b) \(x = -3\)

c) \(y = 4\)  
d) \(y = 2^x\)

e) \(y = \log_3 x\)  
f) \(y^2 = 2 - 4x\)

g) circle with radius 2 and center at \((4, -1)\)  
h) \(y = x^2 - 2\)
7. Find the domain of each of the equations in #6 except for 6f).

a) ___________________________  b) ________________________

c) ___________________________  d) __________________________

e) ___________________________  f) \( f(x) = \frac{x + 2}{x^2 + 2x - 3} \)

g) ___________________________  h) ___________________________

8) What is the range of

a) \( y = 2x - 3 \)  b) \( x = 3 \)

__________________________________  ______________________________

c) \( y = x^2 + 4x \)  d) \( y = 4^{-x} \)

→ _______________________________  → _______________________________

9. Given \( f(x) = \frac{2x}{2-x} \) and \( g(x) = x + 3 \) find

a) \( f(2) \). __________  b) \( g(-2) = \) __________

c) the x-intercept of \( f(x) = \) __________  d) the y-intercept of \( g(x) \) __________

10. Use \( f(x) \) and \( g(x) \) from #9 above to find

a) \( (f + g)(x) = \) _______________ (simplest form)

b) \( \frac{f}{g}(x) = \) _______________ (simplest form)
10c) \((f \circ g)(x) = \) ___________________________ (simplest form)

11. Use the functions from above ( #9 and #10 ).

find

a) \((f + g)(2)\). ______________

b) \(\frac{f}{g}(-2)\). ______________

c) \((f \circ g)(2)\). ______________

d) \(g \circ f(2)\) = ______________

14. Sketch the graph of each of the following functions

a) \(f(x) = 2^x\)

b) \(g(x) = \log_3 x\)

15. Find the domain of

\[ y = \log_4 (x^2 - 2x - 3) \]

16. What is the range of \(f(x) = |2 - 3x|\)? What is the x-intercept? ______ The y-intercept? ______

17. What is the domain of the function \(\sqrt{1 - x^2}\)?

18. Find x

a) if \(3^{\log_5 x} = x\), \(x = \) ____________

b) \(\log_2 8^3 = x \rightarrow x = \) ____________

c) if \(\log_b 8 = 0.42\), then find \(\log_b 4\). ______________
19. Find the value of x if
   a) \[ \log_3 x + \log_3 (x + 2) = 1 \]
   x = ________________

   b) \[ \log (2x + 4) - \log (x - 2) = 1 \]
   x = ________________

19. Use long-hand division to find \[ (x^2 + 2x - 2) \div (x + 2) = \] ________________

20. What is the remainder of \[ (x^4 + 2x + 1) \div (x - 1) \to \text{remainder} = \] ________________

21. Is \[ x + 2 \] a factor of \[ x^4 + 7x - 2 \] ? ________________

22. Use synthetic division to find
   \[ (x^3 + 2x - 1) \div (x + 2) = \] ________________

23. What are the values that should be tested to find all of the rational roots of \[ 4x^3 + x - 4 = 0 \] ?
   ________________

24. Explain why \[ 3x^5 + 2x + 5 = 0 \] has no positive roots.

25. How many solutions does the polynomials equation \[ x^5 + 2x - 1 = 0 \] have? ________________
   Could all of them be imaginary? Why or why not?

26. If \[ 2 + 3i, 3i, 6, \text{ and } 1 + \sqrt{2} \] were solutions of an equations \to the polynomial would have to be at least of what degree? You must be accurate.

27. How many terms are in the expansion of \[ (3 - 2x)^{40} \] ? ________________

28. What are the first and last terms of the expansion of the polynomial \[ (3 - 2x)^{40} \]? Write in simplest form.
   first: ________________ last: ________________

29. Find the third term of the expansion \[ (x - 1/x)^{25} \]. Write in simplest form.
   ________________
30. Construct the 7th line of Pascal’s triangle.

31. Find all of the roots of the equations $3x^3 + 2x + 5 = 0$, assume that $x + 1$ is a factor.

32. Factor the polynomial $x^4 - 2x - 3 = 0$.

33. Find the solution of
   a) $x - 2y < 6$
   b) $3x + 2y \geq 12$
   c) $x \leq 4$

34-40: Word PROBLEMS