1. Find the slope-intercept form of the line passing through the points. 

\((-1, 1), (4, 3)\)

2. Determine the intervals over which the function is increasing, decreasing, or constant.

\[ f(x) = x^2 + 2x - 2 \]

3. Determine algebraically whether the function is even, odd, or neither.

\[ f(x) = 7x^{3/4} \]

4. Use the graphs of \(f\) and \(g\) to evaluate the function.

\[(f \circ g)(1)\]
5. Find the inverse function of \( f \):

\[ f(x) = x^3 - 7 \]

6. Use the graphs of \( y = f(x) \) and \( y = g(x) \) to evaluate \( (g^{-1} \circ f^{-1})(2) \).

7. Write the standard form of the equation of the parabola that has a vertex at \( \left( \frac{-2}{3}, \frac{1}{9} \right) \) and passes through the point \( (2,4) \).

8. Find a third degree polynomial function of the lowest degree that has the zeros below and whose leading coefficient is one.

\[ 7, \ -6-\sqrt{5}, \ -6+\sqrt{5}, \]

9. Find a polynomial function with following characteristics.

\[
\begin{align*}
\text{Degree: 4} \\
\text{Zero: 2, \ multiplicity: 2} \\
\text{Zero: 1, \ multiplicity: 2} \\
\text{Falls to the left,} \\
\text{Falls to the right} \\
\text{Absolute value of the leading coefficient is one}
\end{align*}
\]
10. Use long division to divide.
\[ \frac{x^3 + x^2 + 36x + 36}{x + 1} \]

11. Use synthetic division to divide.
\[ \frac{x^3 - 27x + 54}{x - 3} \]

12. Using the factors \((x + 2)\) and \((x + 4)\), find the remaining factor(s) of
\[ f(x) = x^3 + 7x^2 + 14x + 8 \]
and write the polynomial in fully factored form.

13. Given \( f(x) = \frac{6x - 7}{6x^2 - 7x} \). Determine the domain of \( f(x) \) and find any vertical asymptotes.

14. Rewrite the logarithmic equation \( \log_4 \frac{1}{16} = -2 \) in exponential form.

15. Evaluate the function \( f(x) = \log_2 x \) at \( x = \frac{1}{2} \) without using a calculator.

16. Find the domain of the function below.
\[ f(x) = \ln \left( \frac{x}{x^2 + 9} \right) \]

17. Rewrite the logarithm \( \log_4 13 \) in terms of the natural logarithm.
18. Condense the expression \( \frac{1}{5} \left[ \log_5 x + \log_5 7 \right] - \left[ \log_5 y \right] \) to the logarithm of a single term.

19. Find the exact value of \( \log_4 28 - \log_4 7 \) without using a calculator.

20. Solve the logarithmic equation below.

\[
\ln (6x - 6) = 2
\]

21. Determine the quadrant in which the angle lies.

\(-245^\circ\)

22. Rewrite the given angle in radian measure as a multiple of \( \pi \). (Do not use a calculator.)

\(72^\circ\)

23. Rewrite the given angle in degree measure. (Do not use a calculator.)

\(\frac{11\pi}{6}\)

24. Find the angle, in radians, in the figure below if \( S = 11 \) and \( r = 8 \).

![Diagram of a circular sector with angle \( \theta \) and radius \( r \), and arc length \( S \).]

25. Find the radius of a circular sector with an arc length 27 feet and a central angle \( \frac{\pi}{6} \) radians. Round your answer to two decimal places.
26. Evaluate the trigonometric function using its period as an aid.
\[ \sin \left(-\frac{11\pi}{3}\right) \]

27. Evaluate \( \sec(2.4) \). Round your answer to four decimal places.

28. Solve for \( y \).

29. Factor the expression below and use the fundamental identities to simplify.
\[ \cos^4(x) - \sin^4(x) \]

30. Expand the expression below and use fundamental trigonometric identities to simplify.
\[ (\sin(\omega) + \cos(\omega))^2 \]

A) \( \sin^2(\omega) + \cos^2(\omega) \)  
B) \( 2\tan(\omega) + 1 \)  
C) \( 2\sin(\omega)\cos(\omega) + 1 \)  
D) 1  
E) \( 2\cot(\omega) + 1 \)
31. Rewrite the expression \( \frac{\sin(y)}{1 - \cos(y)} \) so that it is not in fractional form.

A) \( \sin^2 - \sin(y) \tan(y) \)  
B) \( 1 - \sin(y) \tan(y) \)  
C) \( \csc(y) + \cot(y) \)  
D) \( \sin^2 + \sin(y) \tan(y) \)  
E) \( 1 - \cos(y) \)

32. Verify the identity shown below.

\[ \frac{\sin \theta}{\cot \theta + \csc \theta} = 1 - \cos \theta \]

33. Verify the identity shown below.

\[ \frac{1}{1 - \sin \theta} = \sec^2 \theta + \tan \theta \sec \theta \]

34. Solve the given equation for \([0,360)\)?

\[ 2 \cos x - 1 = 0 \]

35. Solve the following equation.

\[ \sec x - 2 = 0 \]

36. Solve the following equation.

\[ \tan^2 x + \tan x = 0 \]
37. Solve the following equation.

\[ \tan^2 x + \tan x = 0 \]

38. Solve the multi-angle equation below for \([0,360)\).

\[ \cos \left( \frac{x}{2} \right) = \frac{\sqrt{2}}{2} \]

39. Given \( A = 60^\circ \), \( B = 70^\circ \), and \( a = 7.1 \), use the Law of Sines to solve the triangle for the value of \( b \). Round answer to two decimal places.

![Diagram of triangle with labeled sides and angles.](image)

40. Given \( a = 3 \), \( b = 6 \), and \( c = 8 \), use the Law of Cosines to solve the triangle for the value of \( B \). Round answer to two decimal places.

![Diagram of triangle with labeled sides and angles.](image)
41. Use Heron's area formula to find the area of the triangle pictured below, if \(a = 12\) inches, \(b = 14\) inches, and \(c = 6\) inches.

42. A triangular parcel of land has sides of lengths 450, 580, and 650 feet. Approximate the area of the land. Round answer to nearest foot.

43. In the figure below, \((a, b) = (5, 8)\) and \((c, d) = (6, 5)\). Find \((x, y)\) so that \(u = v\).

44. Find the component form of vector \(v\) with initial point \((-3, 1)\) and terminal point \((7, 0)\).

45. Find the magnitude and direction angle of \(v = 4i - 6j\). Round direction angle to nearest degree.
46. Find the component form of \( \mathbf{v} \) if \( \| \mathbf{v} \| = 8 \) and the angle it makes with the \( x \)-axis is \( 60^\circ \).

47. Find the sum.

\[
\sum_{k=1}^{3} \frac{1}{k^2 + 4}
\]

48. Use sigma notation to write the sum.

\[
\frac{2}{3} + \frac{3}{9} + \frac{7}{27} + \frac{25}{81} + \frac{121}{243} + \frac{721}{729}
\]

49. Find a formula for \( a_n \) for the arithmetic sequence.

\[ a_3 = 11, a_8 = 21 \]

50. Write the \( n \)th term of the arithmetic sequence as a function of \( n \).

\[ a_1 = -1, a_{k+1} = a_k + 5 \]

51. Find a formula for the \( n \)th term of the following geometric sequence, then find the 7th term of the sequence.

\[ 3, 9, 27, \ldots \]

52. Find the sum of the infinite geometric series.

\[
\sum_{n=0}^{\infty} 4 \left( -\frac{3}{4} \right)^n
\]

53. Use mathematical induction to prove the following for every positive integer \( n \).

\[ 1 + 4 + 16 + 64 + \ldots + 4^{n-1} = \frac{4^n - 1}{3} \]
54. Calculate the binomial coefficient: \( \binom{12}{6} \)

55. Use the Binomial Theorem to expand and simplify the expression.
\[ (t - 6)^5 \]

56. Find the coefficient \( a \) of the term in the expansion of the binomial.

<table>
<thead>
<tr>
<th>Binomial</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>( (x + 3y)^{11} )</td>
<td>( ax^4y^7 )</td>
</tr>
</tbody>
</table>

57. Find the number of distinguishable permutations of the group of letters.
\( C, O, R, R, E, C, T \)

58. Find the probability for the experiment of tossing a six-sided die twice such that the sum is 5.

59. Identify the center and radius of the circle below.
\[ x^2 + y^2 - 8x + 2y + 2 = 0 \]

60. Find the standard form of the parabola with the given characteristic and vertex at the origin.
directrix: \( x = 7 \)

61. Find the standard form of the parabola with the given characteristic and vertex at the origin.
vertical axis and passes through point \( (25, 5) \)
62. Which answer is a polar form of the given rectangular equation?

\[ 4xy = 36 \]

63. Which answer is a rectangular form of the given polar equation?

\[ r = -16 \cos \theta \]

64. Convert the following polar equation to rectangular form.

\[ \theta = \frac{2\pi}{3} \]

65. Which answer is a rectangular form of the given polar equation?

\[ r = \frac{1}{2 + \sin \theta} \]

A) \[ 3x^2 - 4y^2 - 2x + 1 = 0 \]

B) \[ 5x^2 + 4y^2 - 2x + 1 = 0 \]

C) \[ 3x^2 + 4y^2 + 2x - 1 = 0 \]

D) \[ 4x^2 + 3y^2 + 2y - 1 = 0 \]

E) \[ 4x^2 + 5y^2 - 2y + 1 = 0 \]

66. Find the slope of the graph of the following function at the point \((-3, 16)\).

\[ 2x^2 - 2 \]

67. Use the derivative of \[ f(x) = 7x^3 + 21x \] to determine any points on the graph of \( f(x) \) at which the tangent line is horizontal.

A) \((1, 28)\)

B) \((1, 28)\) and \((-1, -28)\)

C) \((7, 2548)\) and \((-7, 2548)\)

D) \((0, 0)\)

E) \(f(x)\) has no points with a horizontal tangent line.

68. Use the limit process to find the slope of the graph of \( 4x - 2x^2 \) at \((8, -96)\).