1. **Pretest Review**

The pretest will consist of 20 problems, each of which is similar to one of the following 49 problems. If you can do problems like these 49 listed below, you will have no problem with the pretest.

**Values of trig. functions at reference angles**

1. Find \( \cos \left( -\frac{1}{3}\pi \right) \).
2. Find \( \csc \left( \frac{5\pi}{6} \right) \).
3. Find \( \sin \left( \frac{7\pi}{6} \right) \).
4. Find \( \tan \left( \frac{11\pi}{6} \right) \).
5. Find \( \sec \left( \frac{7\pi}{6} \right) \).
6. Find \( \cot \left( \frac{7\pi}{6} \right) \).

**Trig identities**

7. Give the formula for \( \cos(x - y) \) in terms of \( \cos x \), \( \sin x \), \( \sin y \), and \( \cos y \).
8. Give the formula for \( \cos(2x) \) in terms of \( \cos x \) and \( \sin x \).
9. Give the formula for \( \cos(x + y) \) in terms of \( \cos x \), \( \sin x \), \( \sin y \), and \( \cos y \).
10. Give the formula for \( \sin(x - y) \) in terms of \( \cos x \), \( \sin x \), \( \sin y \), and \( \cos y \).
11. Give the formula for \( \sin(x + y) \) in terms of \( \cos x \), \( \sin x \), \( \sin y \), and \( \cos y \).
12. Give the formula for \( \sin(2x) \) in terms of \( \cos x \), \( \sin x \).

**Law of cosines and sines**

13. In the picture, \( \theta = \frac{1}{3}\pi \), \( \alpha = \frac{2}{3}\pi \) and \( c = 2 \). Find \( a \).

![Diagram](image)

14. In the picture, \( a = 5 \), \( b = 3 \), and \( \theta = \frac{1}{3}\pi \). Find \( c \).

![Diagram](image)

**Inverses**

15. Let \( f(x) = \frac{3x - 7}{11x + 5} \). Find \( f^{-1}(x) \).
16. Suppose \( rx^2 + sx + t = 0 \) where \( r \neq 0 \). Then \( x = \)
17. Find all solutions to \( x^4 - 11x^3 + 30 = 0 \).
18. Find all solutions to \( x^2 + 5x + 6 = 0 \).
19. Suppose \( -2x + y = -4 \) and \( x - 4y = -4 \). Find \( x - y \).
20. For what value of \( k \) does the system of equations, \( 2x + y = 1, 12x + ky = 12 \) have no solution?

**Word problems**

21. A water tank is initially \( \frac{1}{4} \) full. After adding 14 gallons of water, it is \( \frac{7}{8} \) full. What is the capacity of the tank in gallons?
22. The perimeter of a rectangle is 9 times its width. If the length of the rectangle is 40, find its width.

**Solving inequalities**

23. Solve \( x(x + 5) (x - 4) < 0 \) for \( x \).
24. Solve \( |5x - 25| < 20 \) for \( x \).
25. Find the solution to the inequality, \( |4x - 2| < 6 \)

**Solving Equations**

26. Let \( y = \frac{7x + 5}{3x - 7} \). Solve for \( x \).
27. Solve for \( x \) in the equation \( 10(1 + 17x)^{1/2} + 85x(1 + 17x)^{-1/2} = 0 \).
28. Find all positive solutions to \( \sqrt{x^2 + 16} = 6 \).

**Simplifying expressions**

29. Simplify \( (3^4)^{-1} \).
30. Simplify \( \frac{2xy^3}{3x^2y^2} \).
31. Simplify \( \frac{1}{x^4} + \frac{2}{x^2} \).
32. Simplify \( \frac{1}{x^4} + \frac{2}{3x - 3} \).
33. Simplify \( |\sqrt{7} - 7| - |-5| \).
34. Simplify \( |\frac{1}{8} - \frac{1}{4}\sqrt{2}| - |-4| \).

**Factoring of polynomials**

35. Suppose \( f(x) = x^2 + 6x \). Simplify \( \frac{f(x + h) - f(x)}{h} \).
36. Factor the polynomial \( x^2 + 13x + 42 \).
37. Factor the polynomial \( 6x^2 + 43x + 42 \).
Composition Of Functions

38. Suppose \( f(-2) = 3, f(3) = -2, \) and \( f(1) = -1 \) while \( g(3) = 1, g(-2) = 2, \) and \( g(1) = 1. \) Find \( f(g(-2 + 3)). \)

39. Let \( f(x) = -3x^2 + 2x \) and let \( g(x) = -3x^2 \) Find \( f(g(1)). \)

Lines

40. A line having the equation \( y = mx + b \) passes through the points \((-4, -7)\) and \((9, 1)\). Find \( m + b. \)

41. Find the equation of the line through the points \((-4, 3), (5, 4)\).

42. Find the equation of the line perpendicular to \(-18x + 6y = 0\) through \((0, 6)\).

43. Find the equation of the line parallel to \(-3x + y = 3\) and passing through \((0, 8)\).

44. A line has the equation \(6x = 5y + 10.\) What is its slope?

Miscellaneous problems

45. Find the distance between the two points \((2, -3)\) and \((-5, 0)\).

46. Consider the numbers \(\frac{2056}{2055}\) and \(\frac{2057}{2058}\). Which of the following is true?

(a) \(\frac{2056}{2055} < \frac{2057}{2058}\)
(b) \(\frac{2057}{2058} < \frac{2056}{2055}\)
(c) \(\frac{2056}{2055} = \frac{2057}{2058}\)
(d) It is impossible to tell without a calculator which of these numbers is larger.
(e) None of the above

47. What is the range of the function \( f(x) = 10(x + 7)^2 + 6? \)

48. If \( z = (4x + 5y)^2 \) then \( z = \)

49. Find the domain of the function \( f(x) = \sqrt{\frac{2x+5}{3x-2}}. \)