

Directions: Complete this summer packet by our first day of class. We will be reviewing the contents of this packet during the first week of school. There will be an assessment during the second week of school.

1. Find the slope of the line passing through the points: (8, -2) and (-1,6)
2. Find the equations of the following lines given the information, then write them in slope-intercept form:
 - a. With slope $\frac{3}{4}$ and y-intercept (0, -2).
 - b. Parallel to $y = -\frac{2}{5}x + 7$, passing through (5, -4).
 - c. Perpendicular to $3x + 4y = 16$, passing through (6,7).
 - d. With undefined slope, passing through (-1,9).

Given the following functions, evaluate the following expressions:

$$f(x) = 3x - 7$$
$$g(x) = 2x^2 + 3$$

3. $f(3) =$ _____
4. $g(x + 1) =$ _____
5. $f[g(x)] =$ _____
6. $(f + g)(3) =$ _____
7. $g \circ f(2) =$ _____
8. $\frac{f}{g}(x) =$ _____
9. $f^{-1}(x) =$ _____

Solve the following equations:

10. $3x^3 + 4x^2 - 27x - 36 = 0$
11. $8x^5 - 10x^4 - 12x^3 = 0$
12. $\frac{2}{x+5} + \frac{1}{x-5} = \frac{16}{x^2-25}$
13. $x + \frac{6}{x} = 5$

Find the domain of each of the following functions:

14. $f(x) = \sqrt{3x - 4} + 7$
15. $g(x) = \frac{3x^2 - 5x + 2}{x^2 - 7x - 8}$
16. $h(x) = 5x^3 - 4x + 2$

Find the vertical and horizontal asymptotes for the following functions:

$$17. f(x) = \frac{x^2 - 3x - 4}{2x^2 + 10x - 12}$$

$$18. g(x) = \frac{3x - 7}{x^2 - 16}$$

$$19. h(x) = \frac{4x^2 - 25x}{9x^2 + 1}$$

$$20. \text{Expand the logarithm: } \log_6 \frac{36x^5}{(x-4)^2}$$

$$21. \text{Write as a single logarithm } 3\ln(x + 6) + \frac{1}{2}\ln(x - 1) - \ln 4 - 2\ln x$$

Solve the following exponential and logarithmic equations:

$$22. 25^{3x-2} = 125^{x+4}$$

$$23. 4e^{2x+1} = 20$$

$$24. \log_3(2x - 5) = 4$$

$$25. \ln(2x + 3) - \ln(x - 2) = \ln 3$$

Evaluate the exact values of the following trigonometric functions:

$$26. \sin \frac{2\pi}{3}$$

$$27. \csc \frac{7\pi}{4}$$

$$28. \cos \pi$$

$$29. \tan\left(-\frac{\pi}{6}\right)$$

$$30. \sec \frac{3\pi}{2}$$

Evaluate the expressions containing inverse trigonometric functions:

$$31. \tan^{-1} \sqrt{3}$$

$$32. \sin^{-1}\left(-\frac{1}{2}\right)$$

$$33. \cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$$

$$34. \sin\left(\cos^{-1} \frac{5}{13}\right)$$

$$35. \cos^{-1}\left(\tan \frac{7\pi}{4}\right)$$

Solve the following trigonometric equations on the interval: $[0, 2\pi)$

$$36. 2 \sin \theta - 1 = 0$$

$$37. \cos^2 \theta = \cos \theta$$

$$38. 2 \sin \theta \cos \theta + \sin \theta = 0$$

$$39. \tan^2 \theta = 3$$

Rewrite the following expressions by dividing (use long division or synthetic division):

40. $\frac{2x^3 - 5x^2 + 1}{x - 2}$

41. $\frac{x^4 + 3x^3 - 2x^2 - x + 4}{x^2 + x - 1}$

42. Find the distance between the points: (-3,5) and (5, -1)

43. Solve the system of equations:

$$2x + 3y = 6$$

$$3x - y = -13$$

44. Find the points of intersection for:

$$y = x^2 - 5x + 3$$

$$y = 3x - 9$$

45. Solve the absolute value inequality: $|x + 6| < 4$

Factor the following expressions completely:

46. $x^5 - 11x^3 - 80x$

47. $(x - 3)^2(2x + 1)^3 + (x - 3)^3(2x + 1)^2$

Find the limit for each of the following:

48. $\lim_{x \rightarrow 3} 3x^2 - 5$

49. $\lim_{x \rightarrow 4} \frac{x^2 - 16}{x^2 - 4x}$

50. $\lim_{x \rightarrow 5} \frac{\sqrt{x+4} - 3}{x - 5}$

51. $\lim_{x \rightarrow \infty} \frac{2x - 5}{x^2 + 1}$

52. $\lim_{x \rightarrow 0} \frac{\sin 3x}{x}$

53. $\lim_{x \rightarrow 0} \frac{e^x - 1}{2x}$

Find the derivative of each of the following:

54. $f(x) = 4x^3 - 5x^2 - 1$

55. $g(x) = 3 \sin x - 2e^x$

56. $h(x) = x \cdot \ln x$

57. $f(x) = \sqrt{2x + 3}$

58. $g(x) = \frac{x^3}{x - 5}$

59. Write the first five terms of the sequence, then find the limit of the sequence:

$$a_n = \frac{n+1}{2n+3}$$

60. Find the sum of the infinite geometric sequence: $4+1+\frac{1}{4}+\frac{1}{16}+\dots$

61. Use the definition of derivative, written below, to find the derivative of the given function:

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$f(x) = x^2 - 3x$$

62. Solve for x: $xy - 4y = 3x + y^2$

63. Rewrite using partial fraction decomposition: $\frac{2}{x^2+x}$

64. Find the remaining trigonometric ratios given that: $\sin\theta = -\frac{2}{3}, \frac{3\pi}{2} < \theta < 2\pi$.