

Complete the following. Show and attach all work in a clear manner. Clearly indicate your final answer. Have this assignment completed and ready to turn in the second week of school. There will be an exam the second week of school on this material.

Important Reminders:

1) Please pick up a CALCULUS book from the library during the following days and times – be sure to bring your ID:

Library Hours for AP book pick up are:

June 8 & 9, 15 & 16, 22 & 23 (9am-12pm)

Or call 661-222-122- x132 for an appointment

2) Please get (buy or borrow) a graphing calculator. Get acquainted with it over the summer so that you can use it this August.

Simplify:

1. $\frac{\frac{x}{2}}{\frac{x}{4}}$

2. $h \div \frac{(x+h)}{h}$

3. $\frac{\sqrt{x-2} + \frac{5}{\sqrt{x-2}}}{x-2}$

4. $\frac{(x-4)^{1/2} - \frac{x}{2}(x-4)^{-1/2}}{x-4}$

5. $\frac{7x^2 + 5x}{x^2 + 1} - \frac{5x}{x^2 - 6}$

6. Solve for y' .

$$xy' + y = 1 + y'$$

7. Solve for $\frac{dy}{dx}$

$$2x + 2\left(x \frac{dy}{dx} + y\right) + 6y \frac{dy}{dx} = 0$$

Solve each equation.

8. $4x^2 - 21x - 18 = 0$

9. $2x^2 - 3x + 3 = 0$

10. $x^4 - 9x^2 + 8 = 0$

11. $\frac{x+1}{3(x-2)} = \frac{5x}{6} + \frac{1}{x-2}$

12. $\ln e^3 = x$

13. $\ln e^x = 4$

14. $\ln x + \ln x = 0$

15. $e^{\ln 5} = x$

16. $\ln 1 - \ln e = x$

17. $\ln 6 + \ln x - \ln 2 = 3$

18. $e^x = 5$

19. $5 = 2e^{3x} + 1$

20. $\ln(x+5) = \ln(x-1) - \ln(x+1)$

21. $2^{2x+5} = \frac{1}{2048}$ (don't use log's)

22. $\frac{1}{81} = \frac{1}{3^{x-1}}$ (don't use log's)

Show work to determine if the relation is even, odd, or neither.

23. $f(x) = 2x^2 - 7$

24. $f(x) = -4x^3 - 2x$

25. $f(x) = 4x^2 - 4x + 4$

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

$$27. f(x) = \frac{3x}{2x-5}$$

$$28. f(x) = x \sin x$$

29. Find the equation of the straight line that passes through the point $(2, 4)$ and is parallel to the line $2x + 3y - 8 = 0$.

30. Find the equation of the line that is perpendicular to the line $2x + 3y - 8 = 0$ at the point $(1, 2)$.

31. The line with the slope 5 that passes through the point $(-1, 3)$ intersects the x axis at a point. What are the coordinates of this point?

32. What are the coordinates of the point at which the line passing through the points $(1, -3)$ and $(-2, 4)$ intersects the y-axis?

33. Given $f(x) = |x - 3| - 5$, find the average rate of change of the function on $[1, 5]$.

34. Given $g(x) = \frac{3x+6}{2x-5}$, find $g^{-1}(3)$.

Find the domain for each of the following functions.

$$35. h(x) = \frac{1}{4x^2 - 21x - 18}$$

$$36. k(x) = \sqrt{x^2 - 5x - 14}$$

$$37. p(x) = \frac{\sqrt[3]{x-6}}{\sqrt{x^2 - x - 30}}$$

$$38. y = \ln(x^2 - x - 12)$$

Find the difference quotient, $\frac{f(x+h) - f(x)}{h}$ for the following:

39. $f(x) = 8x^2 + 1$

40. $f(x) = \frac{1}{x}$

41. $f(x) = 2x^2 + 5x - 3$

42. $f(x) = \sqrt{x-3}$

You should know the graphs of the following functions:

- a.** $f(x) = |x|$ **b.** $f(x) = \frac{1}{x^2 + a^2}$ **c.** $f(x) = \frac{1}{x}$ **d.** $f(x) = x^2$ **e.** $f(x) = \sqrt{x}$ **f.** $f(x) = [x]$
g. $f(x) = \frac{1}{x^2}$ **h.** $f(x) = e^x$ **i.** $f(x) = \ln x$ **j.** $f(x) = a^x$ **k.** $x^2 + y^2 = r^2$ **l.** $f(x) = \sin x$
m. $f(x) = \cos x$ **n.** $f(x) = \tan x$ **o.** $f(x) = \sec x$ **p.** $f(x) = \cot x$ **q.** $f(x) = \csc x$ **r.** $f(x) = \sin^{-1} x$
s. $f(x) = \cos^{-1} x$ **t.** $f(x) = \tan^{-1} x$ **u.** $f(x) = \sqrt{a^2 - x^2}$

Sketch the graph of each function on graph paper.

- 43.** $f(x) = |x+2| - 3$ **44.** $f(x) = \frac{1}{x^2 + 9}$ **45.** $f(x) = \frac{1}{x-2}$ **46.** $f(x) = 2(x+1)^2 - 2$
47. $f(x) = 2\sqrt{x+4}$ **48.** $f(x) = 2[x]$ **49.** $f(x) = \frac{1}{x^2} - 2$ **50.** $f(x) = e^x - 3$
51. $f(x) = \ln(x-3)$ **52.** $f(x) = 2^x - 1$ **53.** $x^2 + y^2 = 25$ **54.** $f(x) = \sin\left(x - \frac{\pi}{2}\right) - 2$
55. $f(x) = 2\cos(x+\pi)$ **56.** $f(x) = \tan(2x)$ **57.** $f(x) = \sec\left(\frac{1}{2}x\right)$ **58.** $f(x) = 3\cot x - 1$
59. $f(x) = \csc x + 2$ **60.** $f(x) = \sin^{-1} x - \frac{\pi}{2}$ **61.** $f(x) = \cos^{-1} x - \pi$ **62.** $f(x) = \tan^{-1} x + \frac{\pi}{2}$
63. $f(x) = \sqrt{16 - x^2}$ **64.** $f(x) = \begin{cases} -2, & x < -2 \\ -(x+1)^2 - 1, & -2 \leq x \leq 1 \\ 3, & x > 1 \end{cases}$ **65.** $f(x) = \begin{cases} 2x & (-\infty, -1) \\ 2x^2 & [-1, 2) \\ -x+3 & (2, \infty) \end{cases}$

Re-write each function as a piecewise function and graph.

66. $f(x) = |x+2|$

67. $f(x) = \frac{|x-1|}{x-1}$

68. $f(x) = \frac{|x-3|}{3-x}$

Given $f(x) = x-3$ and $g(x) = \sqrt{x}$ complete the following

69. $f(g(x)) =$

70. $g(f(x)) =$

71. $f(f(x)) =$

72. $4f(4) - 2g(9)$

Given $f(x) = \frac{1}{x-5}$ and $g(x) = x^2 - 5$ complete the following

73. $f(g(7)) =$

74. $g(f(v)) =$

75. $g(g(x)) =$

76. $2f(4) - 2g(2)$

Simplify using only positive exponents. Do not rationalize the denominator.

77. $\frac{\sqrt{4x-16}}{\sqrt[4]{(x-4)^3}}$

78. $\left(\frac{1}{x^{-2}} + \frac{4}{x^{-1}y^{-1}} + \frac{1}{y^{-2}}\right)^{\frac{1}{2}}$

79. $\left(\frac{x^{\frac{3}{4}}y^{\frac{1}{2}}}{x^{-\frac{1}{4}}}\right)^{-8}$

Find the surface area of a box of height h whose base dimensions are p and q , and that satisfies the following condition:

80. The box is closed.

81. The box has an open top.

82. The box has an open top and a square base with side length p .

83. A seven foot ladder, leaning against a wall, touches the wall x feet above the ground. Write an expression (in terms of x) for the distance from the foot of the ladder to the base of the wall.

84. A piece of wire 5 inches long is to be cut into two pieces. One piece is x inches long and is to be bent into the shape of a square. The other piece is to be bent into the shape of a circle. Find an expression for the total area made up by the square and the circle as a function of x .

Evaluate without a calculator.

85. $\cos 0$

86. $\sin 0$

87. $\tan \frac{\pi}{2}$

88. $\cos \frac{\pi}{4}$

89. $\sin \frac{\pi}{2}$

90. $\sin \pi$

91. $\arccos \frac{\sqrt{3}}{2}$

92. $\arctan 1$

93. $\arcsin \left(-\frac{1}{2} \right)$

94. $\tan^{-1}(-\sqrt{3})$

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

96. $\cot \frac{\pi}{2}$

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

98. $\cos \left(\frac{5\pi}{6} \right)$

99. $\cot \left(\arcsin \frac{5}{13} \right)$

Find the solutions for each equation on $[0, 2\pi)$:

100. $2 \sin^2 \theta = 1 - \sin \theta$

101. $2 \tan \theta - \sec^2 \theta = 0$

102. $\sin 2\theta + \sin \theta = 0$