Simplify using only positive exponents.

1. -3^{-x}

2. $-5\left(\frac{3}{2}\right)(4-9x)^{-1/2}(-9)$

3. $(2)\left(\frac{2}{(2-x)}\right)\left[\frac{-2}{(2-x)}\right]$

4. $\left(16x^2y\right)^{3/4}$

5. $-\frac{x^{1/2}}{2}\sin\sqrt{x}$

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

7. $\frac{\frac{1}{2}(2x+5)^{-3/2}}{\frac{3}{2}}$

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

Interval Notation. Complete the table

Algebraic	Interval	Graph
$-1 \leq x$		
	[5,3)	
		

Find the domain of the following functions. Make sure to use interval notation (ex: [0, 3)).

9. $y=\log(2x-12)$

10. $y=\frac{x^2-4}{2x+4}$

11. $y=\frac{x^2-5x-6}{x^2-3x-18}$

12. $y=\frac{2^{2-x}}{x}$

13. $y=\sqrt{x-3}-\sqrt{x+3}$

14. $y=\frac{\sqrt{2x-9}}{2x+9}$

15. $y=\frac{x^2+8x+12}{\sqrt[4]{x+5}}$

16. $y=\sqrt{\tan x}$

17. $y=\sqrt{x^2-5x-14}$

18. $y=\frac{3x-2}{4x+1}$

19. $y=\frac{\sqrt[3]{x-6}}{\sqrt{x^2-x-30}}$

20. $y=\frac{x}{\cos x}$

Factor completely.

21. x^5+11x^3-80x

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

23. $2x^2+50y^2-20xy$

Solve the following inequalities by factoring and making sign charts.

24. $x^2-16>0$

25. $x^2+6x-16>0$

26. $x^2-3x\le 10$

27. $2x^2+5x\le 3$

28. $x^3+4x^2-x\ge 4$

29. $2\sin^2 x\ge \sin x$

Describe, in words, the transformations that would take place to $f(x)$ ***in each of the following.***

30. $f(x)-4$

31. $f(x-4)$

32. $-f(x+2)$

33. $5f(x)+3$

34. $f(2x)$

35. $|f(x)|$

Determine if each function is even, odd, or neither. Show all work.

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

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

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

39. $f(x)=x-\dfrac{1}{x}$

Solve each equation by factoring, graphing, or using the quadratic formula.

40. $7x^2-3x=0$

41. $4x(x-2)-5x(x-1)=2$

42. $x^2+6x+4=0$

43. $2x^2-3x+3=0$

44. $2x^2-(x+2)(x-3)=12$

45. $x+\dfrac{1}{x}=\dfrac{13}{6}$

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

47. $x-10\sqrt{x}+9=0$

48. $\dfrac{1}{x^2}-\dfrac{1}{x}=6$

Find the equations of all vertical (x = ?) and horizontal (y = ?) asymptotes (if they exist).

49. $y=\dfrac{x}{x-3}$

50. $y=\dfrac{x+4}{x^2-1}$

51. $y=\dfrac{x+4}{x^2+1}$

52. $y=\dfrac{x^2-9}{x^3+3x^2-18x}$

53. $y=\dfrac{2x^3}{x^3-1}$

54. $y=\dfrac{\sqrt{x}}{2x^2-10}$

Simplify the following.

55. $\dfrac{x}{x-\frac{1}{2}}$

56. $\dfrac{\frac{1}{x}+4}{\frac{1}{x}-2}$

57. $\dfrac{x-\frac{1}{x}}{x+\frac{1}{x}}$

58. $\dfrac{\frac{x^2-y^2}{xy}}{\frac{x+y}{y}}$

59. $\dfrac{x^{-3}-x}{x^{-2}-1}$

60. $\dfrac{\frac{x}{1-x}+\frac{1+x}{x}}{\frac{1-x}{x}+\frac{x}{1+x}}$

If $f(x)=x^2$, $g(x)=2x-1$, and $h(x)=2^x$***, find the following.***

61. $f(g(2))$

62. $g(f(2))$

63. $f(h(-1))$

64. $g\left(f\left(h\left(\frac{1}{2}\right)\right)\right)$

Solve each equation.

65. $\dfrac{2}{3}-\dfrac{5}{6}=\dfrac{1}{x}$

66. $x+\dfrac{6}{x}=5$

67. $\dfrac{x+1}{3}-\dfrac{x-1}{2}=1$

68. $\dfrac{2}{x+5}+\dfrac{1}{x-5}=\dfrac{16}{x^2-25}$

69. $\dfrac{60}{x}-\dfrac{60}{x-5}=\dfrac{2}{x}$

70. $\dfrac{x-5}{x+1}=\dfrac{3}{5}$

Solve each equation on the interval $[0,2\pi)$. ***Give exact values*** $\left(\text{ex: } \frac{\pi}{3}\right)$ ***if possible.***

71. $\sin x = \frac{1}{2}$

72. $\cos^2 x = \cos x$

73. $2\cos x + \sqrt{3} = 0$

74. $4\sin^2 x = 1$

75. $2\sin^2 x + \sin x = 1$

76. $\cos^2 x + 2\cos x = 3$

77. $2\sin x \cos x + \sin x = 0$

78. $8\cos^2 x - 2\cos x = 1$

79. $\sin^2 x - \cos^2 x = 0$

Answer the following questions over a variety of topics.

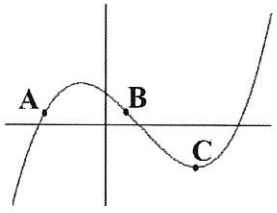
80. Let f be a linear function where $f(2) = -5$ and $f(-3) = 1$. Find $f(x)$.

81. Find an equation for the line, in point-slope form, that contains $(5,1)$ and is perpendicular to $6x - 3y = 2$.

82. Use the table to calculate the average rate of change from $t = 1$ to $t = 4$.

t	0	1	2	3	4
$x(t)$	8	7	5	1	2

83. Order the points A, B, and C, from least to greatest, by their rates of change.



84. Find the distance between the points $(8,-1)$ and $(-4,-6)$.

85. If $g(x)=\dfrac{x}{x+3}$, find $g^{-1}(x)$ (*the inverse of g*).

86. Find the points of intersection in the graphs of $y=x-1$ and $y^2=2x+6$.

87. Rewrite $\dfrac{1}{2}\ln(x-3)+\ln(x+2)-6\ln x$ as a single logarithmic expression.

88. Evaluate the following.

a) $\sin\left(\dfrac{7\pi}{6}\right)$ b) $\csc(60°)$ c) $\cos(120°)$

d) $\sec\left(-\dfrac{2\pi}{3}\right)$ e) $\tan\left(\dfrac{\pi}{2}\right)$ f) $\cot(-135°)$

89. Sketch a graph of the piecewise function $f(x)=\begin{cases} x^2-5, & x<-1 \\ 0, & x=-1 \\ 6-4x, & x>-1 \end{cases}$.

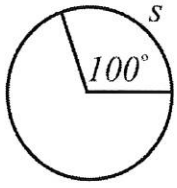
90. Describe the left and right end-behavior of the function $f(x)=-3^x$.

91. Find the domain and range of each function (without a calculator if possible).

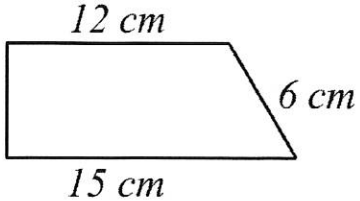
a) $f(x)=(x-3)^2+2$ b) $f(x)=2|x-4|-3$ c) $f(x)=\sqrt[3]{1-x}$

d) $f(x)=5\sin x$ e) $f(x)=\tan\left(x-\dfrac{\pi}{4}\right)$ f) $f(x)=e^{-x}$

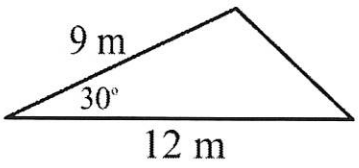
92. The circle below has a radius of 6 ft. Find the area and circumference of the circle, then find *s*.



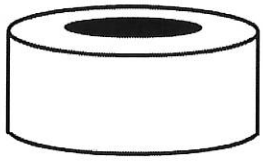
93. Find the area of the trapezoid.



94. Find the missing sides and angles of the triangle. Then find its area.

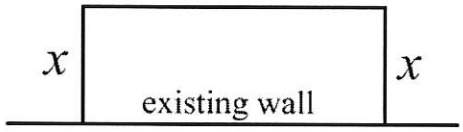


95. Find the volume of a washer with outer radius of 18 ft., inner radius of 15 ft., and height of 3 ft.



96. Rewrite $\log_5(x+3)$ into an equivalent expression using only natural logarithms.

97. Three sides of a fence and an existing wall form a rectangular enclosure. The total length of fence used for the three sides is 240 ft. Find x if the area enclosed is 5500 ft^2.



98. The number of elk after t years in a state park is modeled by the function $P(t)=\dfrac{1216}{1+75e^{-0.03t}}$.

a) What was the initial population?
b) When will the number of elk be 750?
c) What is the maximum number of elk possible in the park?

99. Simplify $\csc x - \tan x \sin x \cos x$.

100. Use long division, or synthetic division, to rewrite the expression $\dfrac{x^3-7x^2+14x-8}{x-4}$.

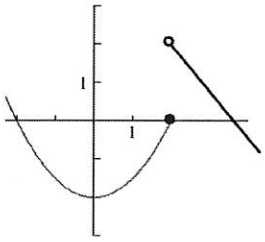
101. Rewrite $y=-3x^2-24x+11$ in vertex form $\left((x-k)^2+h\right)$ by completing the square.

102.Sketch a graph of the piecewise function $f(x)=\begin{cases}-x^2, & -2\le x<1\\ -2, & x=1\\ 3x+5, & 1<x\le 3\end{cases}$.

103.Use a graphing calculator to solve $e^{2x}=3x^2$.

104.Do the lines $-x+5y=22$ and $7x-2y=19$ intersect?

105.The function $f(x)$ is graphed below. Find the following.



a) $f(2)$ b) $f(0)$ c) $f(x)=0$