

Name: _____ Date: _____ Period: _____

Calculus 1

Summer work 2019

Show all work (when appropriate) on a separate sheet of paper. Simplification is implied for all problems. Leave answers in fractional form when appropriate (improper fractions are preferred to mixed numbers). Problems are to be returned on the first Friday of classes. A test reviewing the prerequisite skills (reviewed in this packet) will be conducted the following week of classes.

NO CALCULATORS ALLOWED

Be able to complete a multiplication table similar to the one shown below in 2 minutes 30 seconds or less

	1	6	9	5	2	7	4	3	8
2									
4									
1									
6									
3									
8									
5									
7									
9									

Time taken: _____

Be able to complete a trig values table similar to the one shown below in 2 minutes 30 seconds or less

	$\sin x$	$\tan x$	$\cot x$	$\cos x$	$\sec x$	$\csc x$
0						
$\frac{\pi}{3}$						
$\frac{\pi}{2}$						
$\frac{\pi}{6}$						
$\frac{\pi}{4}$						

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

2. $\tan^{-1}(\sqrt{3})$
3. $\sec^{-1}(1)$
4. Write in interval notation
 - a. $x > -6$
 - b. $-9 \leq x < 2$
5. Determine the equations of the following lines. Give your answer in point-slope form.
 - a. the line through $(-2,5)$ and $(3,-4)$;
 - b. the line through $(0, 3)$ and the midpoint of the line segment from $(-1, 4)$ to $(3, 2)$.
6. Is $y = \sqrt{5x-12}$ a function?
7. Is $x = y^4$ a function?
8. Which quadrant is the point $(-31,-2)$ in?
9. Let $f(x) = 3x^2 + 2x - 1$. Find
 - a. $f(-1) =$
 - b. $f(-x) =$
10. Suppose the point $(-7,2)$ is on the graph of $y = f(x)$. Find a point on the graph of
 - a. $y = f(x+1)$
 - b. $y = f(x) - 3$

Evaluate:

11. $2^3 \cdot 5 \cdot 8^0 =$
12. $(-1)^{52}$
13. -1^{52}
14. 3^4
15. $24 \div 3 \cdot 2 - 5 \cdot 7$
16. $\frac{9}{2} \div \left(2\frac{3}{8}\right)$

Simplify:

17. $20 \div 4 \times 5$
18. $3(1-8) - 6 + 7$
19. $\frac{12}{54}$
20. $\frac{4}{5} \div \frac{2}{15}$
21. $3\frac{2}{3} - 2\frac{1}{2}$
22. $\frac{2xy^4}{5xy^2} \cdot \frac{-30xy}{2x^2y}$
23. $\frac{3x}{6x^2 + 3x}$
24. $\frac{x^2 - 2x - 8}{x^2 - 16}$
25. $\sqrt{17} + 5\sqrt{17}$
26. $3\sqrt{8} - 3\sqrt{32}$
27. $\sqrt{5} \cdot \sqrt{15}$
28. $\frac{2}{\sqrt{12}}$
29. $\sqrt{72}$
30. $(8+x)(8-x) =$
31. $(1+7y)^2 =$
32. Simplify: $\frac{3x^2y^3}{9xy^5}$

11. Simplify $\frac{\frac{1}{3} - \frac{1}{x}}{\frac{1}{9} - \frac{1}{x^2}}$

33. Simplify: $\frac{1}{1 + \frac{2}{3 - \frac{1}{2}}}$

34. Simplify: $20 \div 4 \times 5$

40. Find the slope of the line $y = 4x - 2$

41. Graph $y = -2x + 2$

42. Graph $y > x - 4$

43. Graph $y = x^2$

44. Graph $y = \frac{1}{-2x + 2}$

45. Graph $x - 2y > 4$

50. Factor $x^2 - 4x$

51. Factor $a^2 - 16$

52. Factor $x^2 - 4x + 4$

53. Factor $s^2 + 5s + 4$

54. Factor $x^2 - 9x - 10$

55. Factor $x^2 - 10x - 24$

56. Factor $x^2 - 10x + 24$

57. Factor $x^2 - 10x - 25$

58. Factor $2x^2 - 3x - 9$

35. Simplify: $3(x-5)^2 - 6x^2 + 7x$

36. Simplify: $\frac{x^2 - 4x}{x^2 - 16}$

37. Simplify: i^3

38. Simplify: $\frac{1}{3 - \sqrt{2}}$

39. Simplify: i^{100}

46. Graph $y = (x-3)^2$

47. Graph $x^2 + y^2 = 25$

48. Graph $\frac{x^2}{36} + \frac{y^2}{4} = 1$

49. Graph $x = -2$

59. Factor $4x^2 + 12x + 9$

60. Factor $8x^2 - 14x + 5$

61. Factor $2y^2 + 10y - 12$

62. Factor $x^2 + 64$

63. Factor $x^2 - 81$

64. Factor $3x^3 - 6x^2 - 4x + 8$

65. Factor $x^4 - 1$

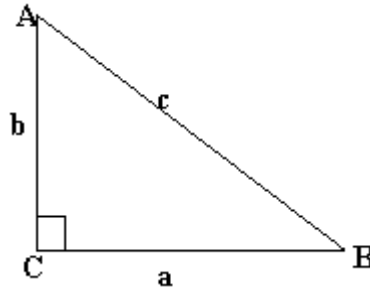
66. Factor $4x^3 - 8x^2 - 25x + 50$

67. Is -4 a root of $P(x) = x^3 + 6x^2 - x - 30$?

68. The vertex of the graph of $y = (x+3)^2 + 2$ is at _____

69. Given the triangle shown, find:

- a. $\sin A =$
- b. $\cos B =$
- c. $\tan A =$
- d. $\sec A =$
- e. $\cot B =$



70. Find the slope of the line passing through the points $(-4,5)$ and $(-3,8)$
71. Find the slope and y-intercept of the line $y = \frac{5}{6}x - 1$
72. Write the equation of the line in slope-intercept form of the line that contains the point $(8, -6)$ and has slope of $\frac{-3}{4}$
73. Which is larger, 2^5 or 5^2
74. Evaluate: $\ln e^{14}$
75. Evaluate: $10^{\log 7}$
76. Evaluate: $\sum_{n=1}^3 2n - 2$
77. Divide: $(x^3 + 3x^2 + 3x + 1) \div (x + 1)$
78. Solve the equation for x : $(7^3)^5 = 7^x$
79. Rewrite the expression using positive exponents. $(-2x)^{-3}$

Let $f(x) = 2x + 3$ and $g(x) = x^2$

80. Evaluate $g(-3)$
81. Evaluate $f(1)$
82. Evaluate $f(g(10))$
83. Solve $4 - 2(y + 6) = 11 - 3y$
84. Solve $\frac{x}{2} + 4 = 3x$
85. Solve $|x + 1| = 5$
86. Solve $x^2 = 16$
87. Solve $\frac{1}{3} + \frac{1}{x} = \frac{1}{2}$
88. Solve $\begin{cases} x + y = 6 \\ 3x - y = 30 \end{cases}$
89. Solve $\frac{x}{4x - 8} = \frac{2}{x}$
90. Solve $\sqrt{x} + 5 = 3$
91. Solve $2 = \sqrt{3x + 1} - 3$
92. Solve by completing the square: $x^2 + 10x = 6$
93. Solve $x^2 - 6x + 4 = 20$
94. Solve $\frac{10}{x - 2} + 3 = \frac{5x}{x - 2}$

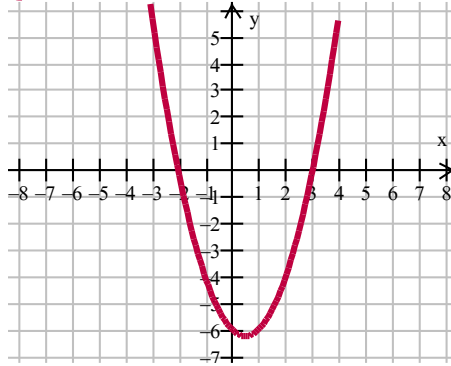
95. Use the quadratic formula to solve the equation $0 = x^2 - 2x - 5$

96. Find the x-intercepts of the graph of the equation. $y = x^2 - 5x + 6$

97. What is one fact about an even function?

98. What is one fact about an odd function?

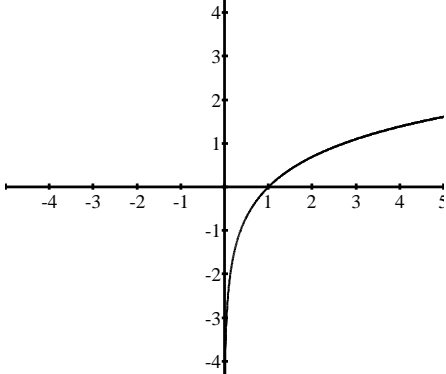
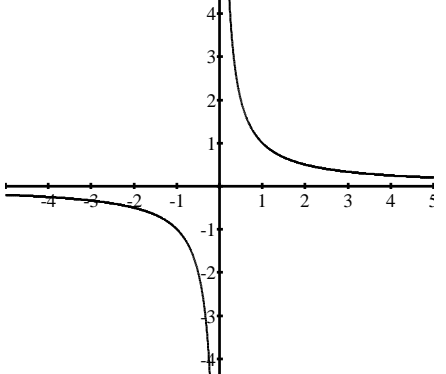
99. Use the graph to estimate the roots of the equation.



Formulas to memorize

100		Quadratic formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
101		$(a+b)^2 =$	$a^2 + 2ab + b^2$
102		$(a-b)^2 =$	$a^2 - 2ab + b^2$
103		$(a+b)(a-b) =$	$a^2 - b^2$
104		$(a+b)^3$	$a^3 + 3a^2b + 3ab^2 + b^3$
105		$a^2 - b^2 =$	$(a+b)(a-b)$
106		$a^3 + b^3 =$	$(a+b)(a^2 - ab + b^2)$
107		$a^3 - b^3 =$	$(a-b)(a^2 + ab + b^2)$
108		Distance formula	$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
109		Point-slope form of a line	$y - y_1 = m(x - x_1)$
110		Slope-intercept form of a line	$y = mx + b$
111		Circle formula	$(x - h)^2 + (y - k)^2 = r^2$ Center (h,k); r = radius
112	695	Parabola formula	$(x - h)^2 = 4p(y - k)$ vertex (h,k); focus (h,k+p) or (h+p,k)
113	697	Ellipse formula	$\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1$ $c = \sqrt{a^2 - b^2}$ Center (h,k); x-radius a; y-radius b; foci c units from (h,k)
114	701	Hyperbola formula	$\frac{(x - h)^2}{a^2} - \frac{(y - k)^2}{b^2} = 1$ $c = \sqrt{a^2 + b^2}$ Center (h,k); x-radius a; y-radius b; foci c units from (h,k)
115		Area of a circle	$A = \pi r^2$
116		Area of a trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$
117		Volume of a Cube	s^3
118		Volume of a cone or pyramid	$\frac{1}{3}A_{base}h$
119		Volume of a sphere	$\frac{4}{3}\pi r^3$
120		$\sin^2 x + \cos^2 x =$	1
121		$1 + \tan^2 x =$	$\sec^2 x$
122		$1 + \cot^2 x =$	$\csc^2 x$

123	$\sin(A \pm B) =$	$\sin A \cdot \cos B \pm \cos A \cdot \sin B$
124	$\cos(A \pm B) =$	$\cos A \cdot \cos B \mp \sin A \cdot \sin B$
125	$\tan(A \pm B) =$	$\frac{\tan A \pm \tan B}{1 \mp \tan A \cdot \tan B}$
126	$\sin(2u) =$	$2 \sin u \cdot \cos u$
127	$\cos(2u) =$	$\cos^2 u - \sin^2 u$
128	$\tan(2u) =$	$\frac{2 \tan u}{1 - \tan^2 u}$
129	$\sin^2 u =$	$\frac{1 - \cos 2u}{2}$
130	$\cos^2 u =$	$\frac{1 + \cos 2u}{2}$
131	$\tan^2 u =$	$\frac{1 - \cos 2u}{1 + \cos 2u}$
132	general equation for a sinusoid	$y = D + A \cos B(x - C)$ sinusoidal axis is $y = D$, amplitude = $ A $, period = $2\pi \cdot \frac{1}{ B }$, C is horizontal translation/phase shift
133	$\log_b(c^d) =$	$d \log_b(c)$
134	$\log_b(cd) =$	$\log_b(c) + \log_b(d)$
135	$\log_b\left(\frac{c}{d}\right) =$	$\log_b(c) - \log_b(d)$
136	Change of base rule for logs	$\log_a x = \frac{\ln x}{\ln a}$
137	$\ln 1 =$	0
138	$e^{\ln x} =$	x
139	$\ln e^x =$	x
140	$y = e^x$ (graph)	

141	$y = \ln x$ (graph)	
142	$f(x) = \frac{1}{x}$ (graph)	
143	$ x $ = (as a piecewise function)	$\begin{cases} -x, & x < 0 \\ x, & x \geq 0 \end{cases}$