

AP Calculus
Summer Assignment
Answer Sheet

Name _____
Pd _____

1a) _____

1b) _____

1c) _____

1d) _____

1e) _____

1f) _____

2a) _____

2b) _____

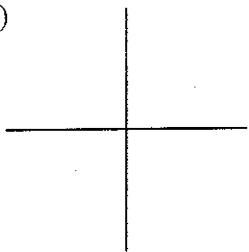
2c) _____

3) _____

4) _____

5) _____

6) _____



6a) _____

6b) _____

6c) _____

6d) _____

6e) _____

7) _____

8) _____

9) _____

10) _____

11) _____

12) _____

13a) _____

13b) _____

13c) _____

13d) _____

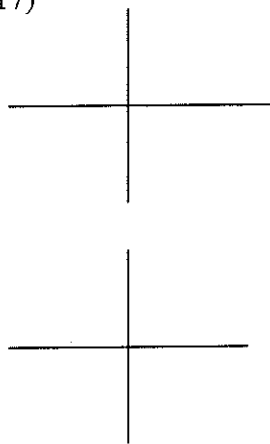
13e) _____

14) _____

15) _____

16) _____

17) _____



18a) _____

18b) _____

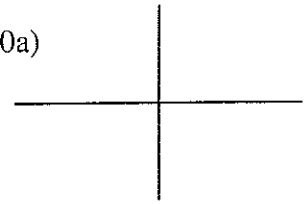
18c) _____

19a) _____

19b) _____

19c) _____

20a) _____



20b) _____

20c) _____

20d) _____

21a) _____

21b) _____

22) _____



22) domain _____

range _____

23a) _____

23b) _____

23c) _____

24) _____

25) _____

26a) _____

26b) _____

26c) _____

26d) _____

26e) _____

26f) _____

26g) _____

26h) _____

27) _____

28) _____

29) _____

30) _____

31) _____

32a) _____

32b) _____

32c) _____

32d) _____

32e) _____

32f) _____

32g) _____

32h) _____

33) _____

34) _____

35) _____

36) _____

37) _____

38) _____

39) _____

40) _____

41a) _____

41b) _____

41c) _____

42a) _____

42b) _____

42c) _____

43a) _____

43b) _____

43c) _____

44a) _____

44b) _____

44c) _____

45a) _____

45b) _____

45c) _____

46a) _____

46b) _____

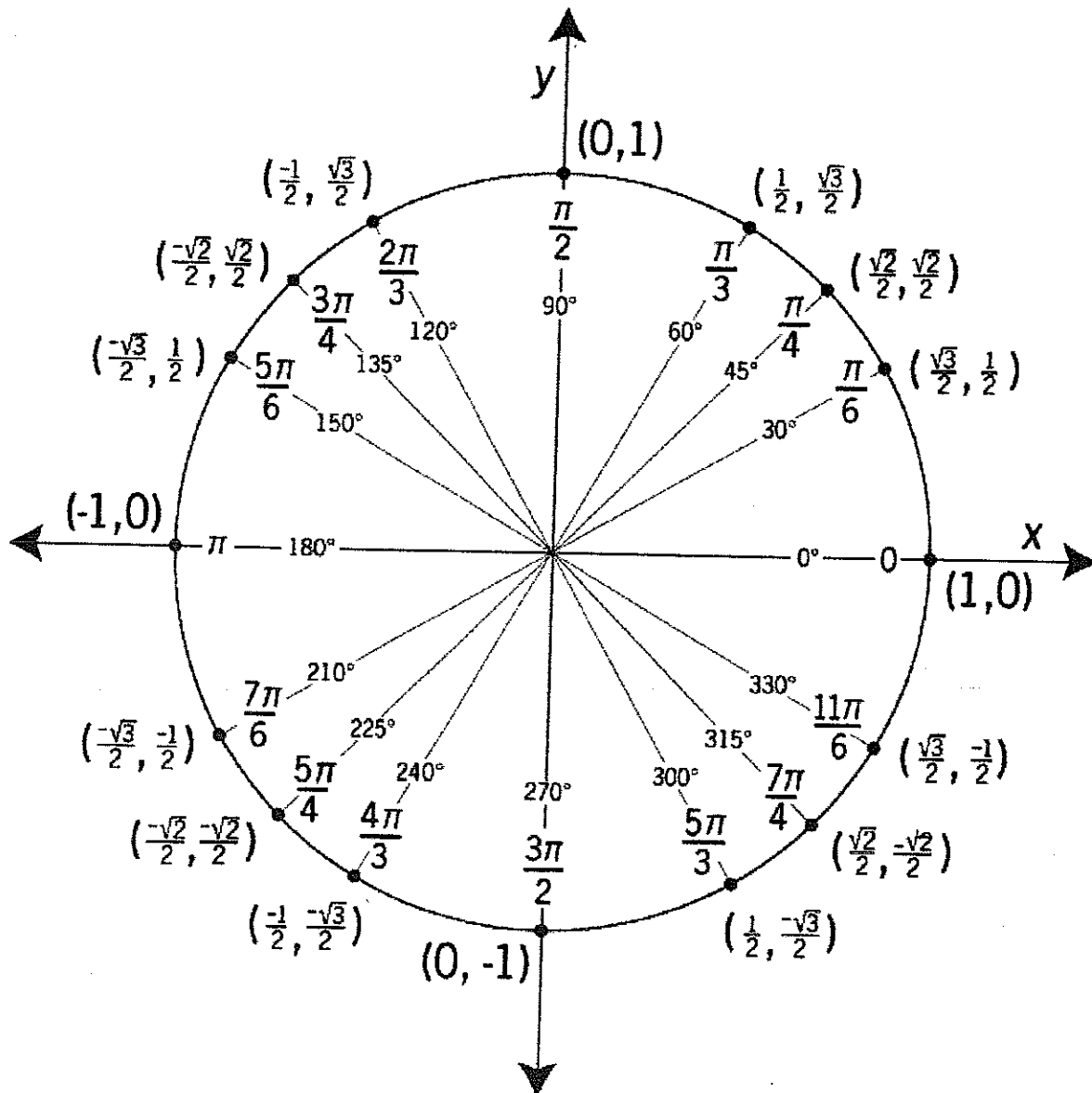
46c) _____

The following Trigonometric Identities **MUST** be memorized

Reciprocal Identities	Quotient Identities	Pythagorean Identities										
$\sin x = \frac{1}{\csc x} \quad \csc x = \frac{1}{\sin x}$ $\cos x = \frac{1}{\sec x} \quad \sec x = \frac{1}{\cos x}$ $\tan x = \frac{1}{\cot x} \quad \cot x = \frac{1}{\tan x}$	$\tan x = \frac{\sin x}{\cos x}$ $\cot x = \frac{\cos x}{\sin x}$	$\sin^2 x + \cos^2 x = 1$ $\tan^2 x + 1 = \sec^2 x$ $1 + \cot^2 x = \csc^2 x$										
Co-Function Identities	Odd/Even Identities											
$\sin\left(\frac{\pi}{2} - \theta\right) = \cos \theta \quad \cos\left(\frac{\pi}{2} - \theta\right) = \sin \theta$ $\csc\left(\frac{\pi}{2} - \theta\right) = \sec \theta \quad \sec\left(\frac{\pi}{2} - \theta\right) = \csc \theta$ $\tan\left(\frac{\pi}{2} - \theta\right) = \cot \theta \quad \cot\left(\frac{\pi}{2} - \theta\right) = \tan \theta$	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 50%;"><u>Odd</u></td> <td style="text-align: center; width: 50%;"><u>Even</u></td> </tr> <tr> <td>$\sin(-\theta) = -\sin \theta$</td> <td>$\cos(-\theta) = \cos \theta$</td> </tr> <tr> <td>$\csc(-\theta) = -\csc \theta$</td> <td>$\sec(-\theta) = \sec \theta$</td> </tr> <tr> <td>$\tan(-\theta) = -\tan \theta$</td> <td></td> </tr> <tr> <td>$\cot(-\theta) = -\cot \theta$</td> <td></td> </tr> </table>		<u>Odd</u>	<u>Even</u>	$\sin(-\theta) = -\sin \theta$	$\cos(-\theta) = \cos \theta$	$\csc(-\theta) = -\csc \theta$	$\sec(-\theta) = \sec \theta$	$\tan(-\theta) = -\tan \theta$		$\cot(-\theta) = -\cot \theta$	
<u>Odd</u>	<u>Even</u>											
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$\tan(-\theta) = -\tan \theta$												
$\cot(-\theta) = -\cot \theta$												
Double Angle Identities	Half Angle Identities											
$\sin 2x = 2 \sin x \cos x$ $\cos 2x = \cos^2 x - \sin^2 x$ $\cos 2x = 2 \cos^2 x - 1$ $\cos 2x = 1 - 2 \sin^2 x$	$\sin^2 x = \frac{1 - \cos 2x}{2}$ $\cos^2 x = \frac{1 + \cos 2x}{2}$											

The Radian Measures and Coordinates **MUST** be memorized

Remember: $\sin \theta = \frac{y}{r} = y\text{-coordinate}$, $\cos \theta = \frac{x}{r} = x\text{-coordinate}$, and $\tan \theta = \frac{y}{x} = \frac{y\text{-coordinate}}{x\text{-coordinate}}$



WESTFIELD HIGH SCHOOL
AP CALCULUS AB SUMMER ASSIGNMENT

Name _____

Complete the following. Show and attach all work in a clear manner. Do NOT do any work on this sheet – all work must be separate. Clearly indicate your final answer on the answer sheet provided. Have this assignment completed and ready to turn in on the first day of school.

1. Are the following statements true? If not, why not?

a) $\frac{2k}{2x+h} = \frac{k}{x+h}$

b) $\frac{1}{p+q} = \frac{1}{p} + \frac{1}{q}$

c) $\frac{x+y}{2} = \frac{x}{2} + \frac{y}{2}$

d) $3\frac{a}{b} = \frac{3a}{3b}$

e) $3\frac{a}{b} = \frac{3a}{b}$

f) $3\frac{a+b}{c} = \frac{3a+b}{c}$

2. Simplify: a) $\frac{\frac{x}{2}}{\frac{x}{4}}$

b) $h \div \frac{(x+h)}{h}$

c) $\frac{\sqrt{x-2} + \frac{5}{\sqrt{x-2}}}{x-2}$

3. Solve $xy' + y = 1 + y'$ for y'

4. Solve the quadratic equation: $4x^2 - 21x - 18 = 0$

5. Solve: $\frac{7x^2 + 5x}{x^2 + 1} - \frac{5x}{x^2 - 6} = 0$

6. Graph the equation $y = x^3 - x$ and answer the following questions.

- Is the point (3, 2) on the graph?
- Is the point (2, 6) on the graph?
- Is the function even, odd, or neither?
- What is the y intercept?
- Find the x intercepts.

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

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

9. 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?

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

11. Given $f(x) = |x - 3| - 5$ find $f(1) - f(5)$

12. Given $f(x) = x^2 - 3x + 4$ find $f(x+2) - f(2)$

13. Find the domain for each of the following functions.

a) $f(x) = x^{20}$ b) $g(x) = \frac{1}{x-3}$ c) $h(x) = \frac{1}{4x^2 - 21x - 18}$ d) $k(x) = \sqrt{4x^2 - 21x - 18}$
e) $p(x) = \frac{1}{\sqrt{4x^2 - 21x - 18}}$

14. Find $f(x + \Delta x)$ for $f(x) = x^2 - 2x - 3$.

15. Find $\frac{f(x + \Delta x) - f(x)}{\Delta x}$ if $f(x) = 8x^2 + 1$

16. Given $f(x) = \frac{1}{x}$ Find: $\frac{f(x+h) - f(x)}{h}$

17. Sketch the graph of each function

$$f(x) = \begin{cases} 1 & x \leq 0 \\ -1 & x > 0 \end{cases} \quad f(x) = \begin{cases} 2x & (-\infty, -1) \\ 2x^2 & [-1, 2) \\ -x+3 & (2, \infty) \end{cases}$$

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

a) $f(g(x)) =$ b) $g(f(x)) =$ c) $f(f(x)) =$

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

a) $f(g(7)) =$ b) $g(f(s)) =$ c) $g(g(x)) =$

20. Let $f(x) = 2x - 2$. Complete the following: A) Sketch the graph of $f(x)$. B) Determine whether f has an inverse function. C) Sketch the graph of $f^{-1}(x)$ D) Give the equation for $f^{-1}(x)$

21. Rewrite with fractional exponents: A) $\sqrt{1+x^2}$ B) $\frac{1}{\sqrt{(1+z^2)^3}}$

22. Sketch the graph of $y = 2^x$ and give its domain and range.

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

- A) The box is closed
- B) The box has an open top
- C) The box has an open top and a square base.

24. 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.

25. 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 .

26. Evaluate:

- A) $\cos 0$ B) $\sin 0$ C) $\tan \frac{\pi}{2}$ D) $\cos \frac{\pi}{4}$ E) $\sin \frac{\pi}{2}$
 F) $\sin \pi$ G) $\arccos \frac{\sqrt{3}}{2}$ H) $\arctan 1$

27-29. Find the solution of the equations for $0 \leq x \leq 2\pi$

27. $2\sin^2 \theta = 1 - \sin \theta$ 28. $2\tan \theta - \sec^2 \theta = 0$ 29. $\sin 2\theta + \sin \theta = 0$

30. Which of the following expressions are identical? A) $\cos^2 x$ B) $(\cos x)^2$ C) $\cos x^2$

31. Which of the following expressions are identical?

- A) $(\sin x)^{-1}$ B) $\arcsin x$ C) $\sin x^{-1}$ D) $\frac{1}{\sin x}$

32. Solve for x, round to 3 decimal places.

- A. $\log_2 x = 3$ B. $\log_{\frac{1}{2}} x = 4$ C. $\log_3 81 = x$
 D. $\log_3(-9) = x$ E. $\log_x 16 = -4$ F. $2^x = 3$
 G. $2.43 \cdot 10^x = 184$ H. $\ln(x+5) = \ln(x-1) - \ln(x+1)$

33. $\lim_{x \rightarrow 3} (x^2 + 2)$ 34. $\lim_{x \rightarrow -3} \frac{(x+3)(x-4)}{(x+3)(x+1)}$ 35. $\lim_{x \rightarrow 25} \frac{\sqrt{x}-5}{x-25}$
 36. $\lim_{x \rightarrow -2} \frac{x-4}{x^2-2x-8}$ 37. $\lim_{x \rightarrow -3} \frac{x^2+2x-3}{x^2+7x+12}$ 38. $\lim_{x \rightarrow -2} \frac{x^3+8}{x+2}$
 39. $\lim_{x \rightarrow 5} \frac{x-5}{|x-5|}$ 40. $\lim_{x \rightarrow 8} \frac{1}{x-8}$

41-46 For each of the following determine a) $\lim_{x \rightarrow 1^-} f(x)$ b) $\lim_{x \rightarrow 1^+} f(x)$ and c) $\lim_{x \rightarrow 1} f(x)$

41. $f(x) = \begin{cases} x^2 - 1 & x < 1 \\ 4 - x & x \geq 1 \end{cases}$

42. $f(x) = \begin{cases} 3x - 1 & x \leq 1 \\ 3 - x & x > 1 \end{cases}$

43. $f(x) = \begin{cases} -x^2 & x < 1 \\ 2 & x = 1 \\ x - 2 & x > 1 \end{cases}$

