

AP Calculus
1.1 Worksheet

All work must be shown in this course for full credit. Unsupported answers may receive NO credit.

1. Write the equation of the line that goes through the points $(-3, 7)$ and $(4, 5)$ in

a) point-slope form

b) slope-intercept form

c) standard form

2. Write an equation of the line that passes through the point $(12, 15)$ and

a) is parallel to the x -axis

b) is parallel to the y -axis

3. Find an equation of the line tangent to a circle with radius 5 and center $(0,0)$ at the point $(3, 4)$.

Hint: A Tangent Line to a circle is always perpendicular to the radius at the point of tangency.

4. For what value of k are the two lines $2x + ky = 3$ and $x + y = 1$

a) parallel

b) perpendicular

5. The relationship between Fahrenheit and Celsius temperatures is linear.

a) Using the fact that water freezes at 0°C or 32°F , and water boils at 100°C or 212°F (not your recollection of temperature formulas) find a linear equation that relates Celsius and Fahrenheit.

b) *Using your equation*, find the Celsius equivalent of 80°F and the Fahrenheit equivalent of -10°C .

c) Is there a temperature at which a Fahrenheit and a Celsius thermometer give the same reading? If so, what is it?

6. The pressure p experienced by a diver under water is related to the diver's depth d by an equation of the form $p = kd + 1$, where k is a constant. When $d = 0$ meters, the pressure is 1 atmosphere. The pressure at 100 meters is 10.94 atmospheres. Find the pressure at 50 meters.

7. Consider the point $P(-2, 1)$ and the line $L: 3x + 5y = 2$.

a) Find the slope of L .

b) Write an equation for the line through P and parallel to L .

c) Write an equation for the line through P and perpendicular to L .

d) What is the x -intercept of L ?

AP Calculus
1.2 Worksheet

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1. Find the domain and range of the following parent functions: (write your answers in interval notation)

a) linear

b) quadratic

c) logarithmic

d) sine

e) inverse sine

f) inverse cosine

g) inverse tangent

h) inverse linear ($1/x$)

i) inverse quadratic ($1/x^2$)

2. What is the domain of $f(x) = \frac{\sqrt{9-x^2}}{x}$?

3. A student begins saving money by hiding \$50 they received for their birthday in an envelope in their bedroom. After forgetting about the envelope for 3 months, the student starts putting \$10 a month into the envelope for the next 3 months. The student then gets a job and decides to increase the amount to \$30 per month for the next 6 months. Write a piecewise function that models the amount of money in the envelope as a function of the number of months since their birthday, m .

4. Write the equation of the following:

a) the area A of a circle as a function of its diameter d .

b) the area A of an equilateral triangle as a function of its side length s .

c) the area A of a rectangle as a function of its width W , where the length L is twice as long as its width W .

5. Prove whether the following functions are even, odd, or neither.

a) $y = 3 - x^2$

b) $g(x) = \frac{x^2 - 1}{x^3}$

c) $f(x) = 2x - 5x^3$

6. Complete the following textbook problems: page 20 #46, 49, 51, 53, 54, and 56.

AP Calculus
1.3 Worksheet

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1. You buy a brand new car for \$35,000 and find out it depreciates at 12.5% per year. Write an exponential equation modeling this situation. How much will your car be worth in 5 years?

2. The half – life of Ra – 226 is 1,620 years. If there are 10g initially, how much Ra – 226 is left after 1,000 years?

3. The number of United States citizens y (in millions) who traveled to foreign countries in the years 1988 through 1996 are shown in the table below., where $t = 8$ represents the year 1988.

t	8	9	10	11	12	13	14	15	16
y	40.7	41.1	44.6	41.6	43.9	44.4	46.5	50.8	52.3

a) Use the regression capabilities of your graphing calculator to find an exponential model that fits the data.

b) According to the model, is the number of travelers increasing or decreasing? At what rate?

c) Using your model, how many travelers were there in 1980? 1974? 2006?

d) Why is it important to let $t = 8$ represent the year 1988? [Try answering question c using the actual year.]

4. Without a calculator, evaluate the expression $6x - \frac{2x^{3/2}}{3/2}$ when $x = 9$.

5. Solve the equation $6 - 3 \cdot 5^x = 2$.

6. Complete the following from the textbook: page 26 # 1- 4, 13 - 18

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1. During a football game, the quarterback held the ball on the 50 yard line while the receiver ran toward the goal line. After waiting 3 seconds, the quarterback threw the ball to the receiver.

Using the intersection of the goal line and the sideline as the origin, let x = the number of yards from the goal line, let y = the number of yards from the sideline, and t = the number of seconds the receiver has been running.

The two equations describing the receiver's path are given by

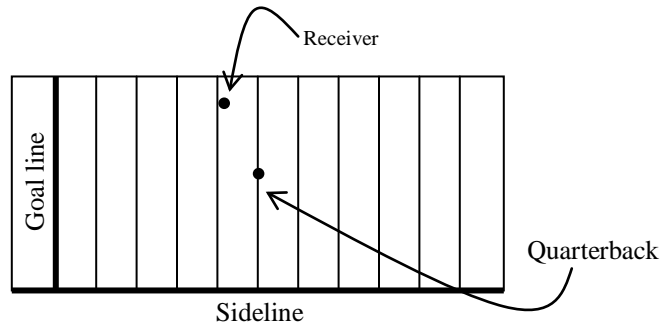
$$x_1 = 42 - 6t \quad 0 \leq t \leq 7.5$$

$$y_1 = 45 - t$$

The two equations describing the path of the ball are given by

$$x_2 = 50 - 22(t - 3) \quad 3 \leq t \leq 7.5$$

$$y_2 = 27 + 6(t - 3)$$



**These equations give the path of the ball viewed from above. They ignore the height of the ball.

a) Choose an appropriate window and graph the receiver's path. Explain your choice for the window.

b) Graph the path of the ball.

♪: To make sure that the graph doesn't start for 3 seconds, enter $x_2 = 50 - 22(t - 3)(t \geq 3)$

$$y_2 = 27 + 6(t - 3)(t \geq 3)$$

c) Assuming the height of the ball is not an issue, does the receiver catch the ball? Explain your reasoning. If not, change the equations above so that the receiver does catch the ball.

2. Complete the following problems from the textbook: page 34 – 36 #5, 7, 9, 11, 12, 13, 14, 23, 25, 41, and 46

AP Calculus
1.5 Worksheet

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1. **Explain** how to FIND an inverse of a given function algebraically.

2. **Explain** how to VERIFY two functions are inverses of each other.

3. Let $f(x) = 1 - \ln(x - 2)$.

a) What is the domain of f ?

b) What is the range of f ?

c) What are the x -intercepts of the graph of f ?

d) Find f^{-1} .

e) Verify your answer to part d .

4. Complete the following questions from the textbook: p44 #13, 15, 18, 23, 33, 34, 37 – 42, 46, 48, 49, 54, 55, and 57

AP Calculus
1.6 Worksheet

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1. Complete the following questions from the textbook:

- a) Page 52 - 53 # 11 – 14, 24, 31 – 38, 41 – 43
- b) Page 55 #1, 2, and 4

2. Let $f(x) = 1 - 3\cos(2x)$.

- a) What is the domain of $f(x)$?
- b) What is the range of $f(x)$?
- c) What is the period of $f(x)$?
- d) Is $f(x)$ an even function, an odd function, or neither? Justify your response.

e) Find all the zeros of $f(x)$ on the interval $\left[\frac{\pi}{2}, \pi\right]$.

The next two examples came from the 2007 AP Exam Free Response #4 (without a calculator). While the question itself focused on topics we will not cover until later in the year, the problems students had in answering the question stemmed from solving the following equations.

3. Solve for t if $0 \leq t \leq 2\pi$. $e^{-t} \cos t + \sin t(-e^{-t}) = 0$

4. Solve for A : $A(-2e^{-t} \cos t) + e^{-t}(\cos t - \sin t) + e^{-t} \sin t = 0$

5. Begin reviewing Chapter 1 by completing the following questions from the textbook: Page 56 #1 – 53 odd, 60 – 67. This is not due until the day of the exam.