Name_____ Date:_____ Period:_____

AP CALCULUS BC SUMMER ASSIGNMENT

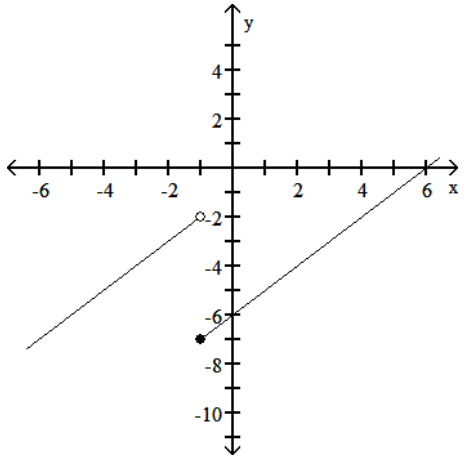
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Determine the limit algebraically, if it exists.

1) $\lim_{x \to 6} \frac{x^2 - 36}{x + 6}$ 1) _____

Determine the limit graphically, if it exists.

2) Find $\lim_{x \to 1^-} f(x)$ and $\lim_{x \to 1^+} f(x)$. 2) _____



Find the limit, if it exists.

3) $\lim_{x \to \infty} \frac{-7x^2 - 4x + 19}{-19x^2 + 5x + 9}$ 3) _____

Find the points of discontinuity. Identify each type of discontinuity.

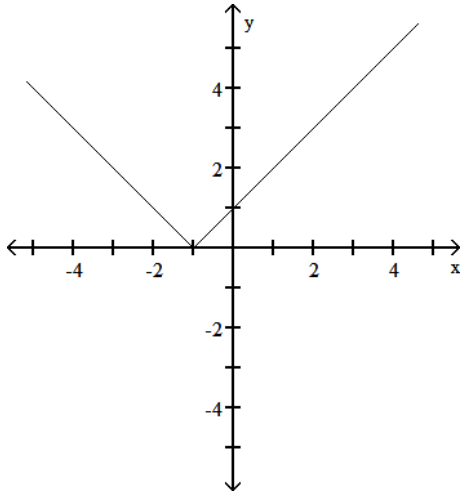
4) $y = \frac{x + 1}{x^2 - 12x + 35}$ 4) _____

Find the equation for the tangent to the curve at the given point.

5) $f(x) = 3 - x^2$ at $x = 5$ 5) _____

The figure shows the graph of a function. At the given value of x, does the function appear to be differentiable, continuous but not differentiable, or neither continuous nor differentiable?

6) $x = -1$ 6) _____



Find dy/dx.

7) $y = 3x^4 + 8x^3 - 1$ 7) _____

8) $y = (4x - 6)(6x + 1)$ 8) _____

9) $y = \frac{x}{7x - 8}$ 9) _____

Find the slope of the line tangent to the curve at the given value of x.

10) $y = x^2 - 6x; x = 5$ 10) _____

Find the fourth derivative of the function.

11) $y = 3x^3 + 4x^2 - 5x$ 11) _____

Find dy/dx.

12) $y = x^6 \cos x - 11x \sin x - 11 \cos x$ 12) _____

13) $y = \sqrt{14x - x^7}$ 13) _____

Find dy/dx by implicit differentiation. If applicable, express the result in terms of x and y.

14) $8y^2 - 3x^2 - 19 = 0$ 14) _____

Find the derivative of the given function.

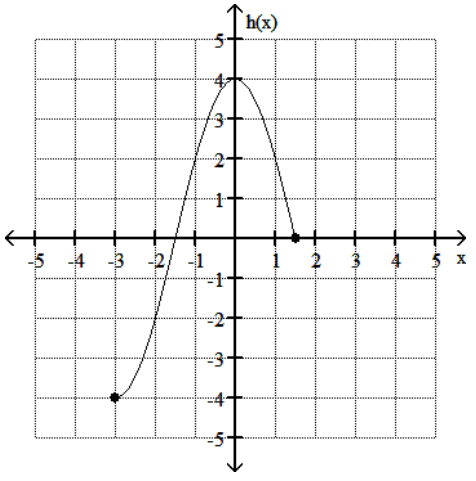
15) $y = 2 \sin^{-1}(4x^3)$ 15) _____

Find dy/dx.

16) $f(x) = 9e^{-8x}$ 16) _____

Find the location of the indicated absolute extremum for the function.

17) Minimum 17) _____



Give an appropriate answer.

18) Find the value or values of c that satisfy $\frac{f(b) - f(a)}{b - a} = f'(c)$ for the function $f(x) = x^2 + 4x + 4$ on the interval $[-2, 1]$. 18) _____

Solve the problem.

19) A carpenter is building a rectangular room with a fixed perimeter of 160 ft. What are the dimensions of the largest room that can be built? What is its area? 19) _____

Find the linearization L(x) of f(x) at x = a.

20) $f(x) = 5x^2 - 3x + 2, a = 4$ 20) _____

Solve the problem.

21) A ladder is slipping down a vertical wall. If the ladder is 20 ft long and the top of it is slipping at the constant rate of 2 ft/s, how fast is the bottom of the ladder moving along the ground when the bottom is 16 ft from the wall? 21) _____

22) Suppose that $\int_1^3 f(x)\,dx = 1$. Find $\int_6^6 f(x)\,dx$ and $\int_3^1 f(x)\,dx$. 22) _____

Evaluate the integral.

23) $\int_0^{\pi/2} 9 \sin x \, dx$ 23) _____

Use the Trapezoidal Rule to estimate the integral.

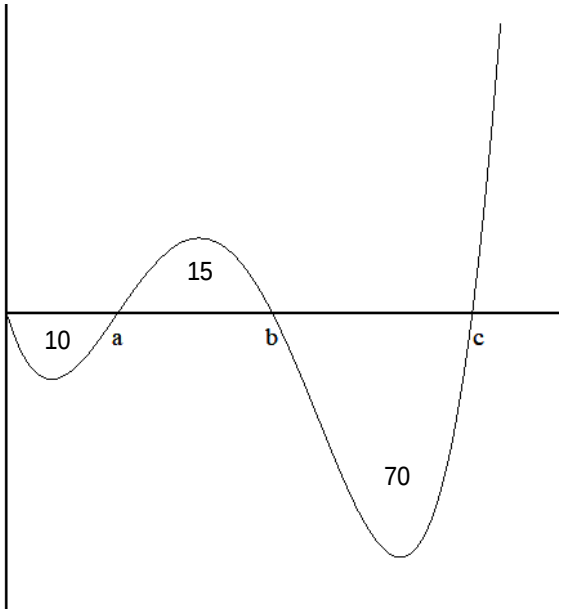
24) $\int_0^2 4x^2 \, dx$, n = 4 24) _____

Evaluate the integral using the given substitution.

25) $\int \sin 14x \, dx$, u = 14x 25) _____

Solve the problem.

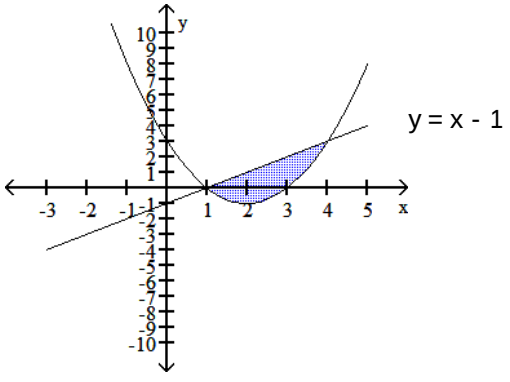
26) A particle moves along the x-axis (units in cm). Its initial position at t = 0 sec is x(0) = 14. The figure shows the graph of the particle's velocity v(t). The numbers are the areas of the enclosed regions. 26) _____



What is the particle's displacement between t = 0 and t = c?

Find the area of the shaded region.

27) $y = x^2 - 4x + 3$ 27) _____



Find the volume of the solid generated by revolving the region bounded by the given lines and curves about the x-axis.

28) $y = \sqrt{x}$, y = 0, x = 0, x = 4 28) _____