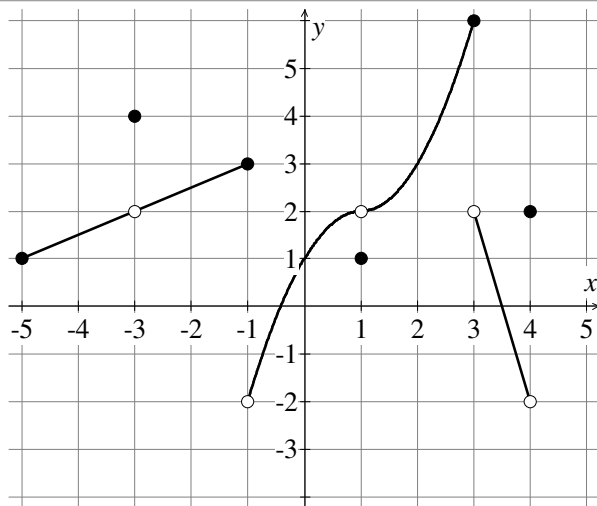


Name: _____ Per: _____ Date: _____



Graph of f

1. The graph of the function f is shown above.
 - A. For what values of a does $\lim_{x \rightarrow a} f(x) = 2$?
 - B. Does $\lim_{x \rightarrow -3} f(x) = f(-3)$?
 - C. Does $\lim_{x \rightarrow 2} f(x) = f(2)$?
 - D. Is f continuous on the open interval $(1, 3)$?
 - E. Is f differentiable at $x = 2$ and $x = -3$?

2. The maximum speed of an external hard drive spins at a rate of 7,200 revolutions per minute (rpm). The function $t = f(r)$ models the amount of time t , in minutes, it takes the hard drive to reach its maximum speed. What are the units for $f'(r)$?

3. Let $f(x) = \ln(x^2)(x^4 + 1)$ and $g(x) = -x^3 - x - 4$ on the closed interval $[-4, -0.5]$. Find where the line tangent to the graph of f at $x = -1$ is parallel to the line tangent to the graph of g at $x = a$, where a is a constant.

4. The radius of a spherical hot air balloon is decreasing at the rate of $\frac{16}{\pi}$ feet per minute. At the instant the radius of the balloon is 10 feet, what is the rate at which the volume is changing? Use $V = \frac{4}{3}\pi r^3$.

5. Consider a triangle in the xy -plane. Two vertices of the triangle are on the x -axis at $(2, 0)$ and $(6, 0)$, and a third vertex is on the graph of $y = -\frac{1}{2}x^2 + 3x + \frac{23}{2}$ for $0 \leq x \leq 8$. What is the maximum area of such a triangle?

6. The first derivative of the function f is defined by $f'(x) = \frac{x + 2e^x}{x^2 + 0.3}$. Find the following.

A. On what intervals is f increasing?

B. On what intervals is f decreasing?

C. Find any point of inflections.

D. Find any local maximums and minimums.

x	0.0	1.5	3.0	4.0	7.0	7.5	8.0
$f(x)$	-6.1	-1.6	-6.6	-1.6	-2.1	-1.0	-2.6

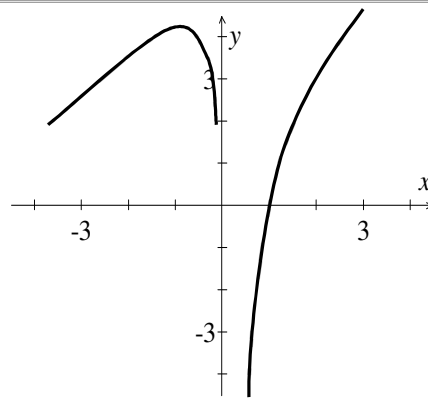
7. The table above shows selected values of a continuous function f . For $0 \leq x \leq 8$, what is the fewest possible number of times $f(x) = -2$.

8. Disneyland® has a maximum capacity of approximately 80,000 visitors at any given time t measured in hours. Let $E(t)$ to model the number of people entering the park per hour and $L(t)$ to model the number of people leaving the park.

A. Write an expression that finds the rate of change of the number of people entering and leaving the park at any time t .

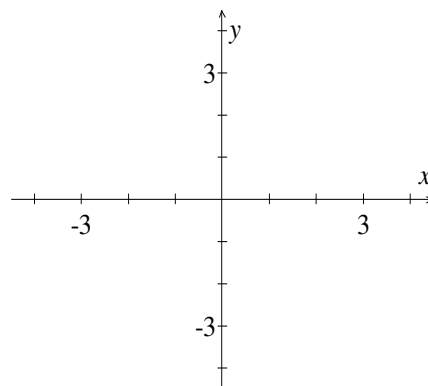
B. Write an expression that finds the rate of change of the number of people entering the park is increasing.

C. Write an expression that finds the rate of change of the number of people entering the park is decreasing.



Graph of f'

9. The graph of f' , the derivative of the function f , is shown above. Sketch the graph of the antiderivative of f' .



Graph of f