Name: _____

CLASSWORK 109

Find the antiderivative of each function.

1. $y = \frac{12}{x^3}$

2. $y = 3x - 1 - \sin x$

3 $y = \frac{10x^4 + 2x}{2x^5 + x^2 + 3}$

4. $y = \cos(3x - 5)$

5. $y = 4x \ln x + 2x$

6. $y = (x + 1)e^x$

7. The **velocity** of an object over time is described by the equation $y = -.3x^2 + 4x - 7$, where y represents velocity in meters per second and x represents time in seconds.

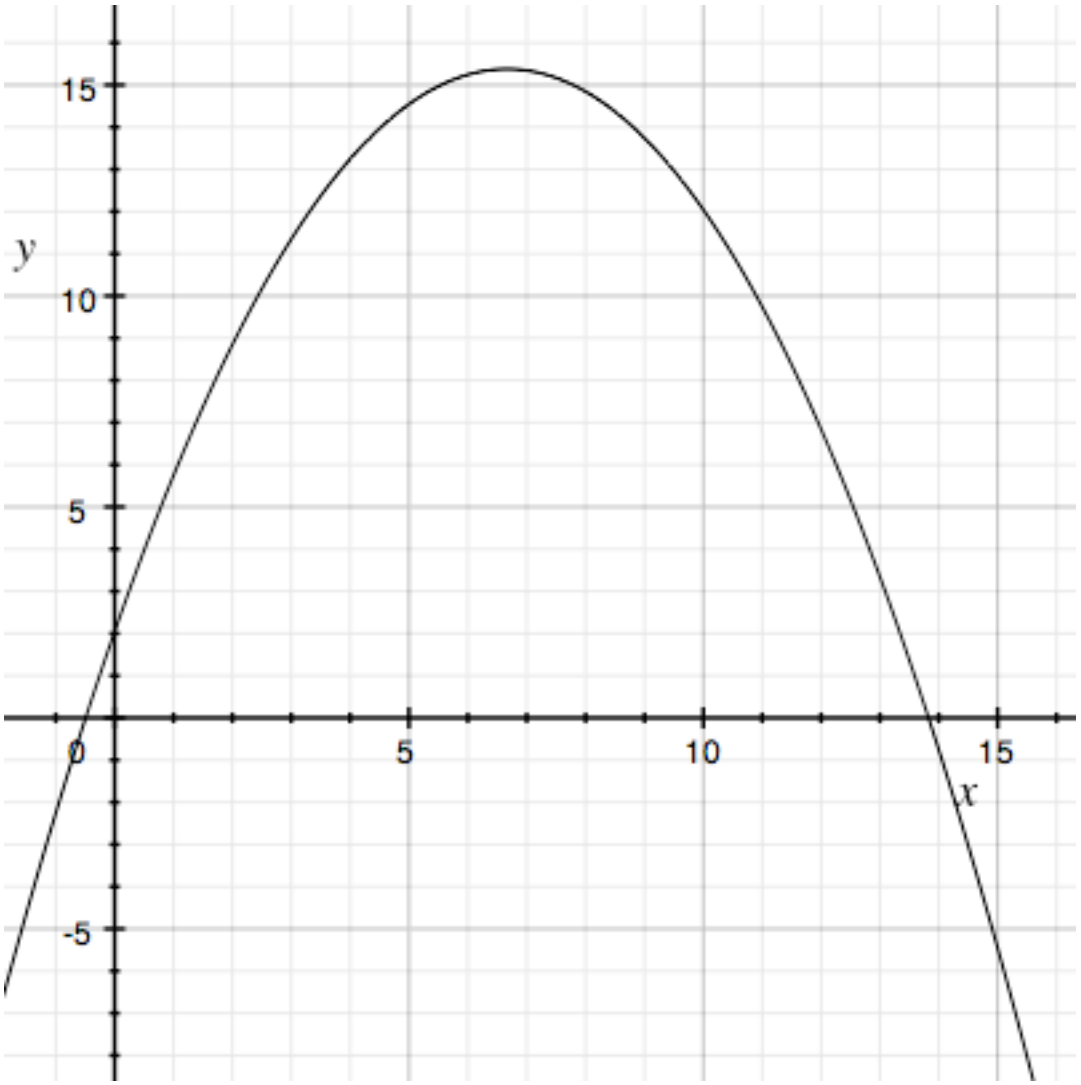
a) Find the object's velocity at t = 3 seconds and at t = 5 seconds.

b) Find the **average acceleration** between t = 3 and t = 5.

c) Illustrate what you just did on the graph on the next page. Why is this not the **exact** acceleration at t = 3?

d) Calculate the average acceleration between t = 3 and t = 3.1.

e) Calculate the exact, instantaneous rate of acceleration at t = 3.



f) If the object kept going at the speed it had at t = 3, how far would it travel between t = 3 s and t = 5 s?

g) Why does (f) **not** give the exact answer for how far the object has travelled?

h) If the object's velocity at t = 3 was imagined to be constant for at least .01 seconds, how far would we estimate that the object travelled between t = 3 and t = 3.01?

i) Does letter (h) give a good approximation of the actual distance travelled? Explain.

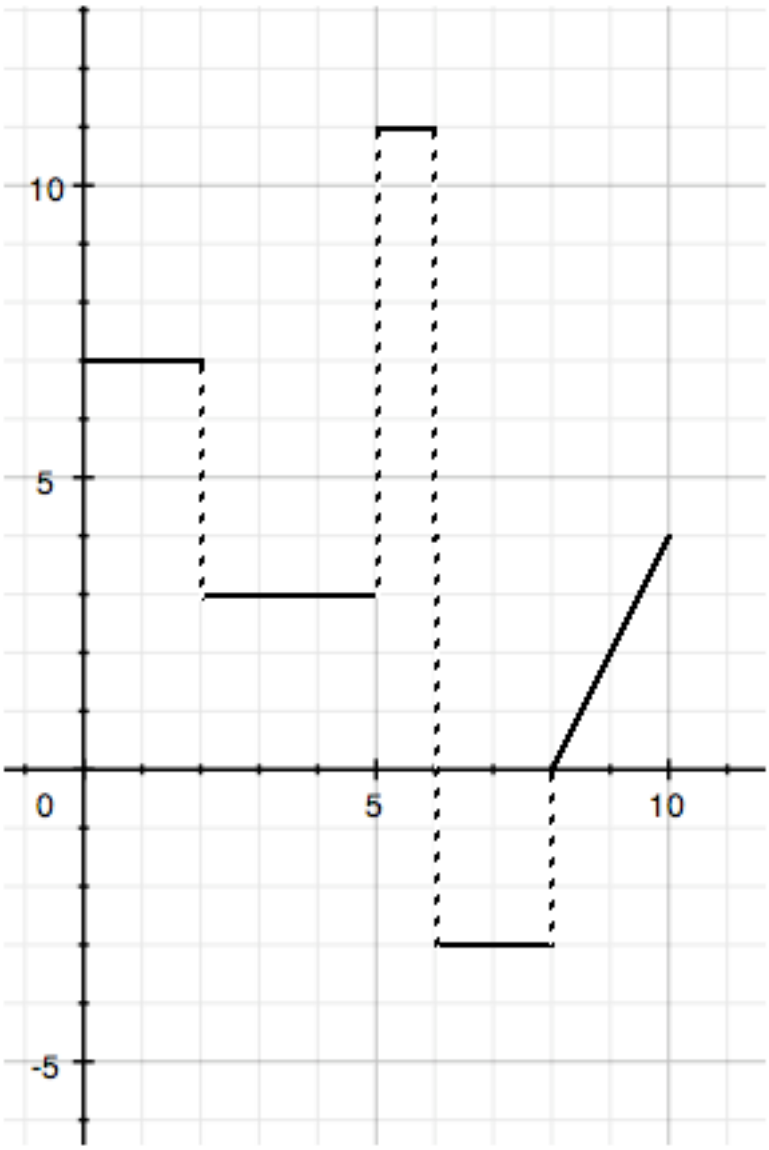
j) Label the graph to show **geometrically** what you calculated in part (f) and in part (h).

k) Find an equation for the object's position over time.

l) Calculate the **exact** displacement between t = 3 and t = 5.

m) Calculate the exact displacement between t = 3 and t = 3.01 .

6. A velocity-time graph is shown below. Calculate the total distance travelled by the object over the entire interval of time between t = 0 and t = 10.



Does this graph portray realistic movement? (would a real object move like this?) Explain.

Can we know where the object started?

Do we know the actual position of the object or just *how much it has moved?*