Name: _____

CLASSWORK 108

Find the antiderivative of each function.

1. $y = \frac{4}{x^5} - \sqrt[3]{x}$

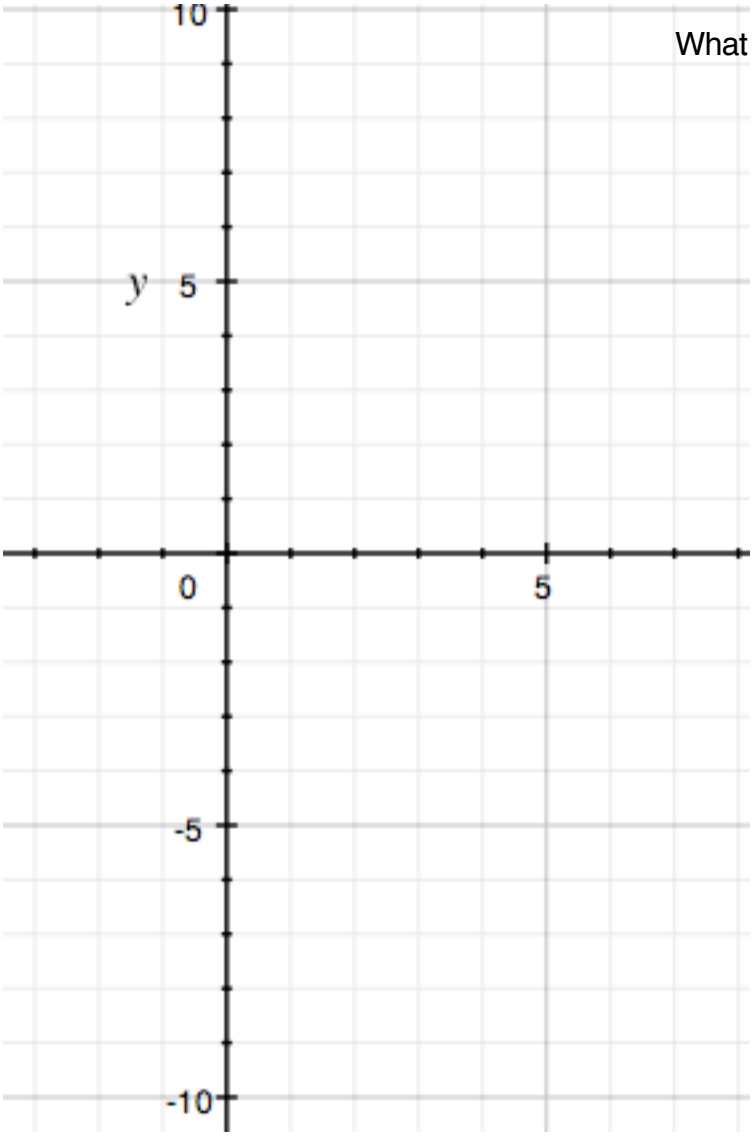
2. $y = 4\cos(3x) - 12x\sin(3x)$

3. $y = \frac{1}{x(\ln x)^2}$

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

a) Find the object's velocity at t = 1 seconds and at t = 2 seconds.

b) Sketch a graph of velocity versus time.



What is the **acceleration** of the object?

What is the initial velocity of the object?

c) Where is the velocity positive?

Where is it negative?

d) Find an equation for the object's **distance** over time. Then sketch it on the same graph.

e) What does the positive area represent? What does the negative area represent?

5. The **velocity** of an object over time is described by the equation $y = 8x^2 - 3x$, where y represents velocity in meters per second and x represents time in seconds.

a) Find the object's velocity at t = 2 seconds.

b) If the object kept going at that rate, how far would it have travelled between t = 2 seconds and t = 3 seconds?

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

d) If the object's velocity at t = 2 was imagined to be constant for at least .01 seconds, how far would we estimate that the object travelled between t = 2 and t = 2.01?

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

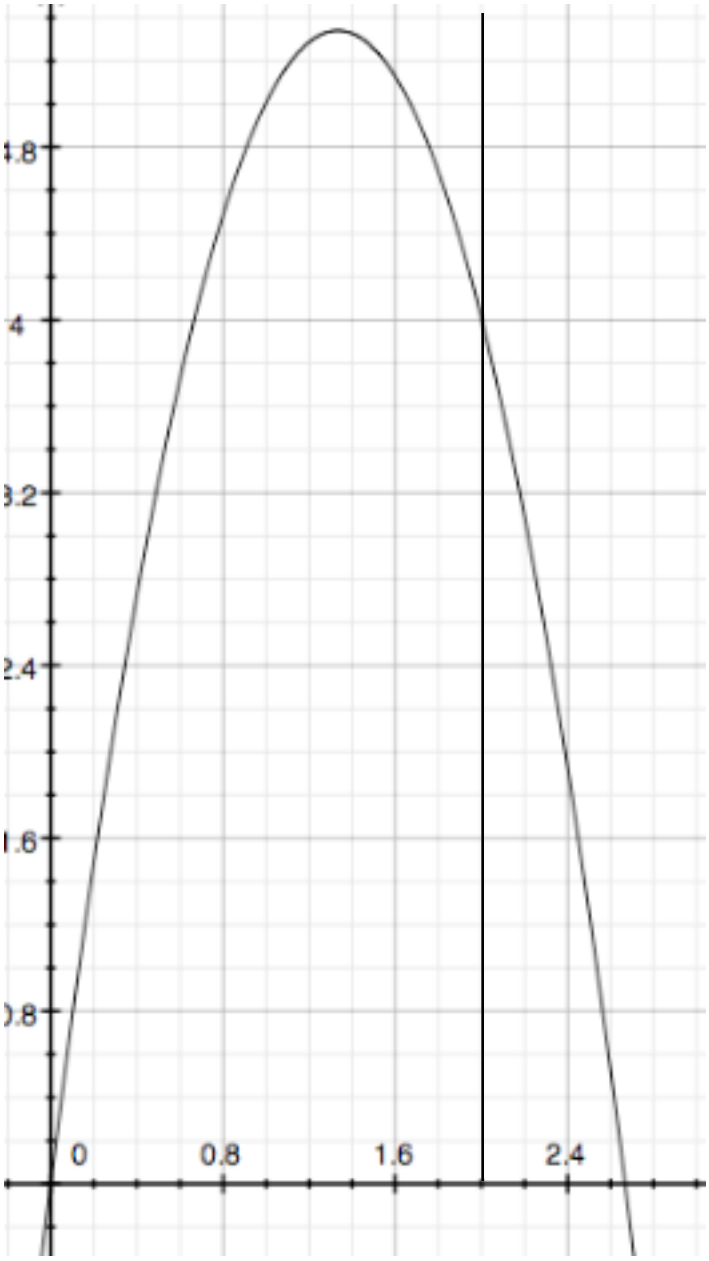
f) Label the graph on the next page to show **geometrically** what you calculated in part (b) and in part (d).

g) When you calculate **displacement** usinga velocity-time graph, what are you calculating geometrically?

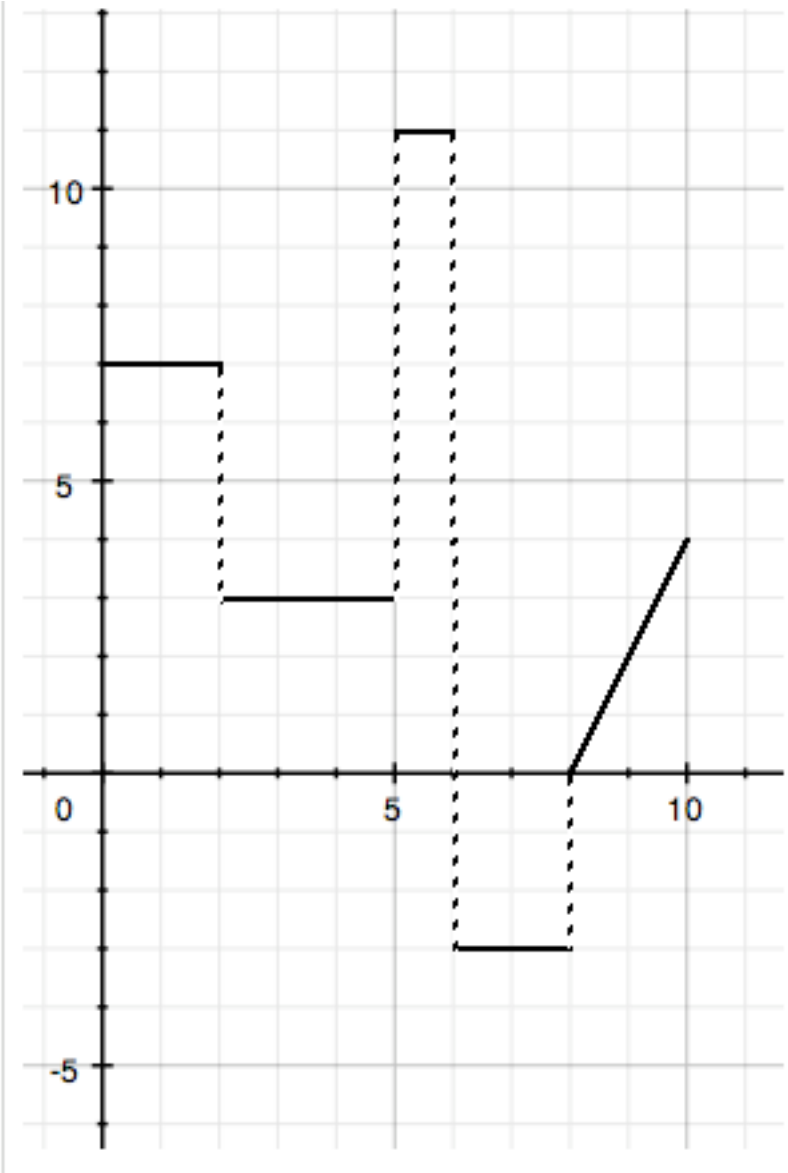
h) Find an equation for the object's position over time.

i) Calculate the **exact** displacement between t = 2 and t = 3.

j) Calculate the exact displacement between t = 2 and t = 2.01 .


0
0.8
1.6
2.4

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?*

The definite and indefinite integral: