Name: _____

CLASSWORK 106

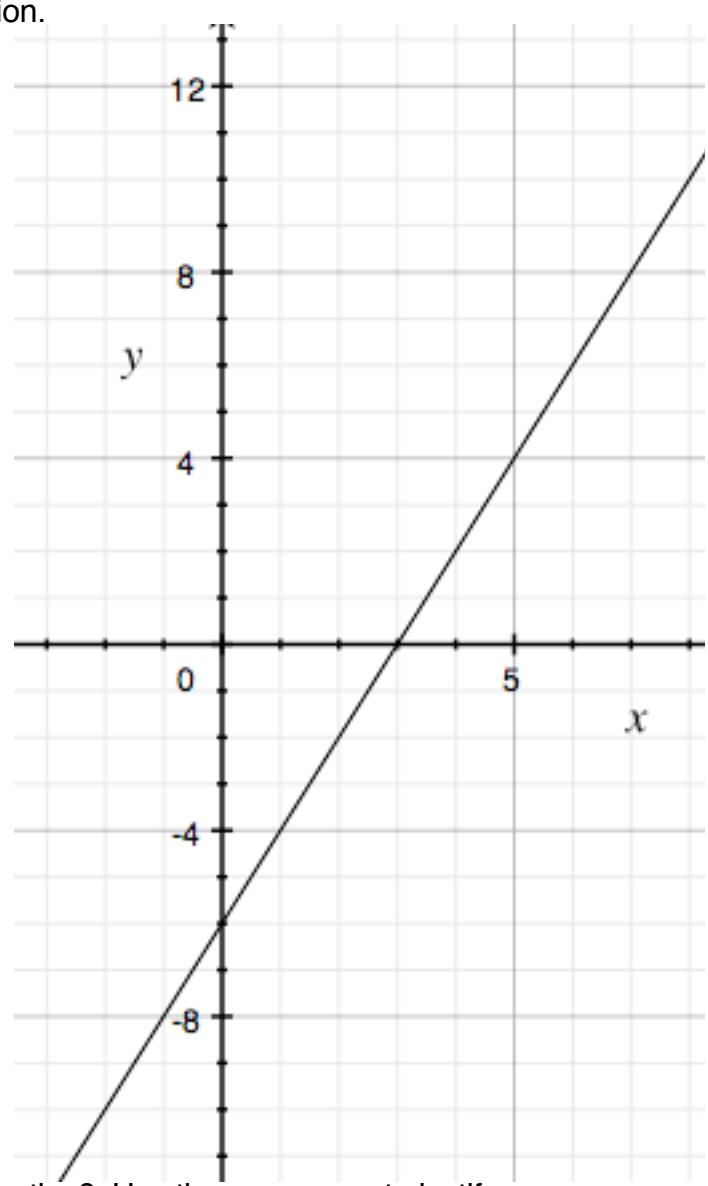
Find the antiderivative of each function.

1. $y = 5x^{-6}$

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

3. $y = (\ln x)^3 / x$

4. The graph below shows **the derivative** of a function.



a) Where is this function accumulating positive area?

b) Where is this function accumulating negative area?

c) When does the total area under the curve start to increase?

c) When does **the original function** (the area function) have a minimum?

d) When is the area under the curve 0 ?

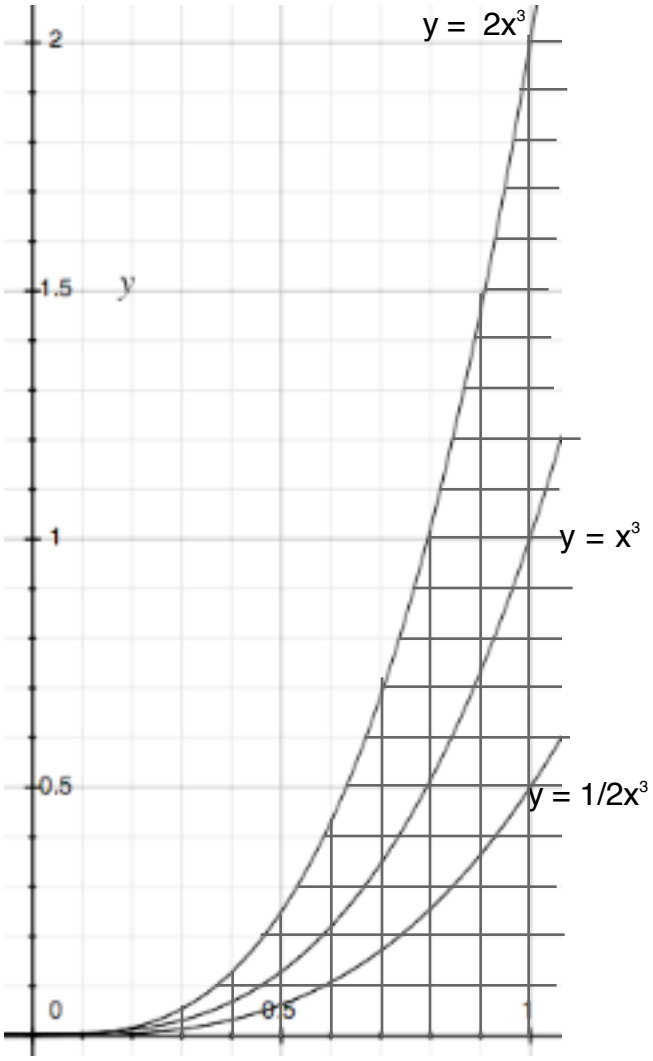
e) What **is** this derivative graph? What is its antiderivative? Use these answers to justify your answers to (a) through (d).

5. a) Find the area under the curve $y = x^3$ from 0 to 1.

b) Find the area under the curve $y = 2x^3$ from 0 to 1.

c) Find the area under the curve $y = 1/2x^3$ from 0 to 1.

d) What does a coefficient do to the area under a given curve? Explain why this makes sense geometrically.



6. An object is moving according to the equation $y = 1/4x^5 - 3x$ where x represents time in seconds and y represents displacement in meters.

a) Find the object's position after 2 seconds.

b) Find the object's average velocity between t = 2 seconds and t = 2.1 seconds.

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

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

a) Sketch a graph of velocity over time.

b) Write an equation for the object's **distance** as compared to time. How is this geometrically represented on the graph above?

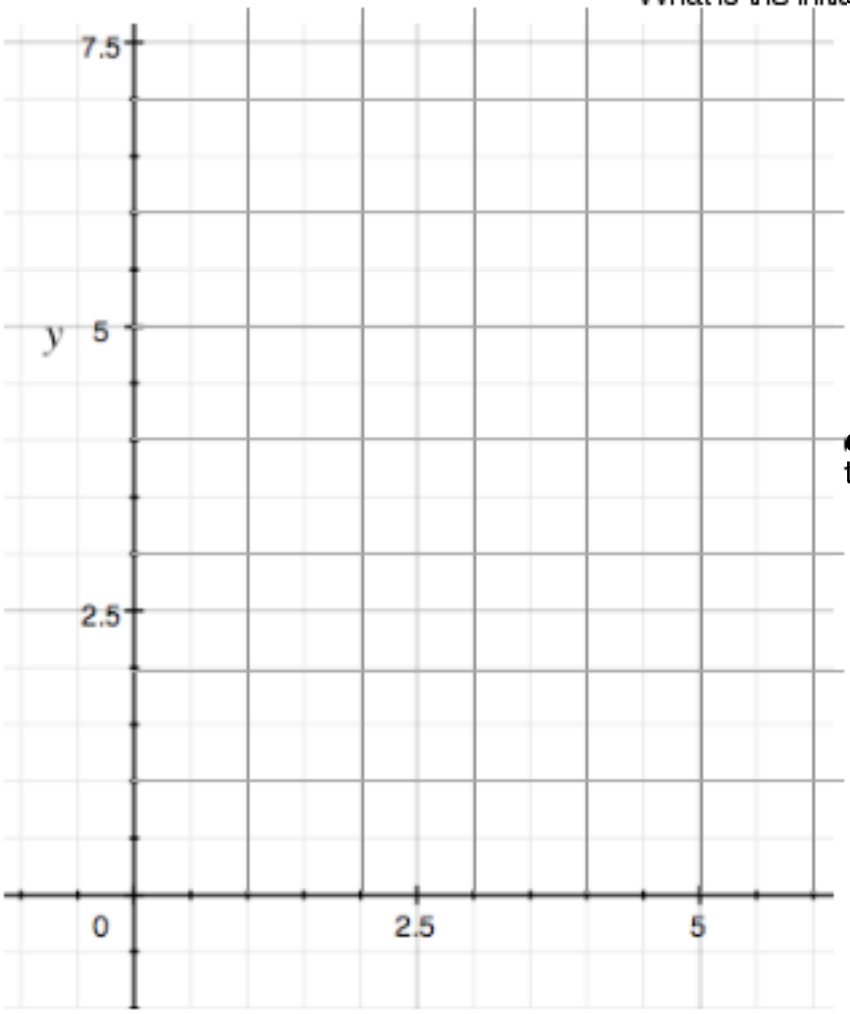
c) Sketch a graph of **distance versus time** for this object.

7. The **velocity** of an object over time is described by the equation $y = -3x + 6$ 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?

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8. 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.

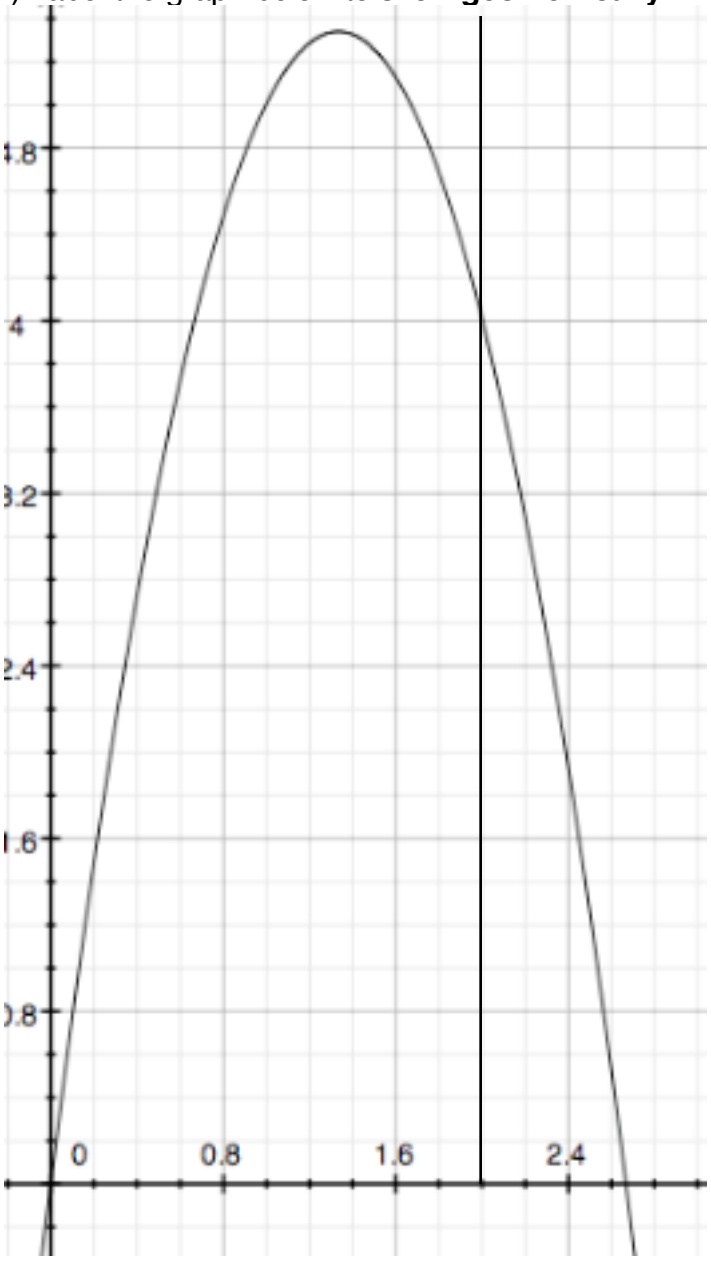
b) If the object kept going at that rate, how far would it have travelled between t = 2 seconds and t = 3 seconds?

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 below to show **geometrically** what you calculated in part (b) and in part (d).



g) When you calculate **displacement** using a 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 .