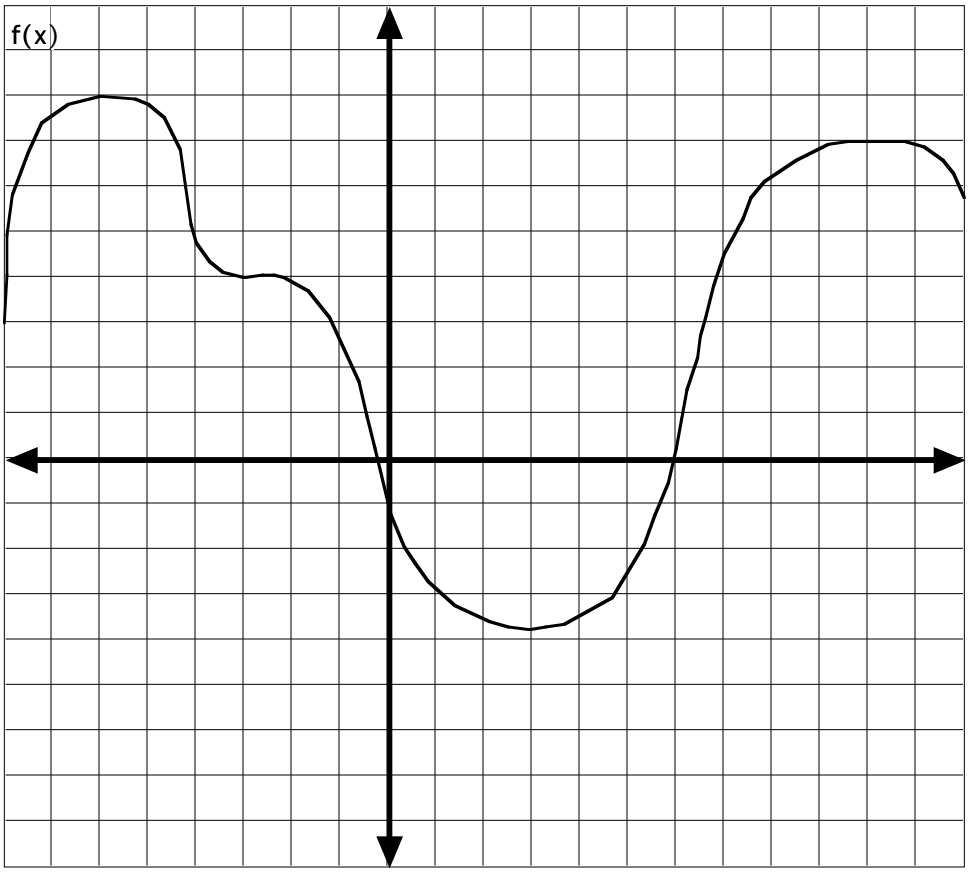
Name: _____ **TC**

Classwork 55

1. Describe the value of the function, its first derivative, and its second derivative at each value. Tell whether it is **POSITIVE, NEGATIVE, or ZERO.**

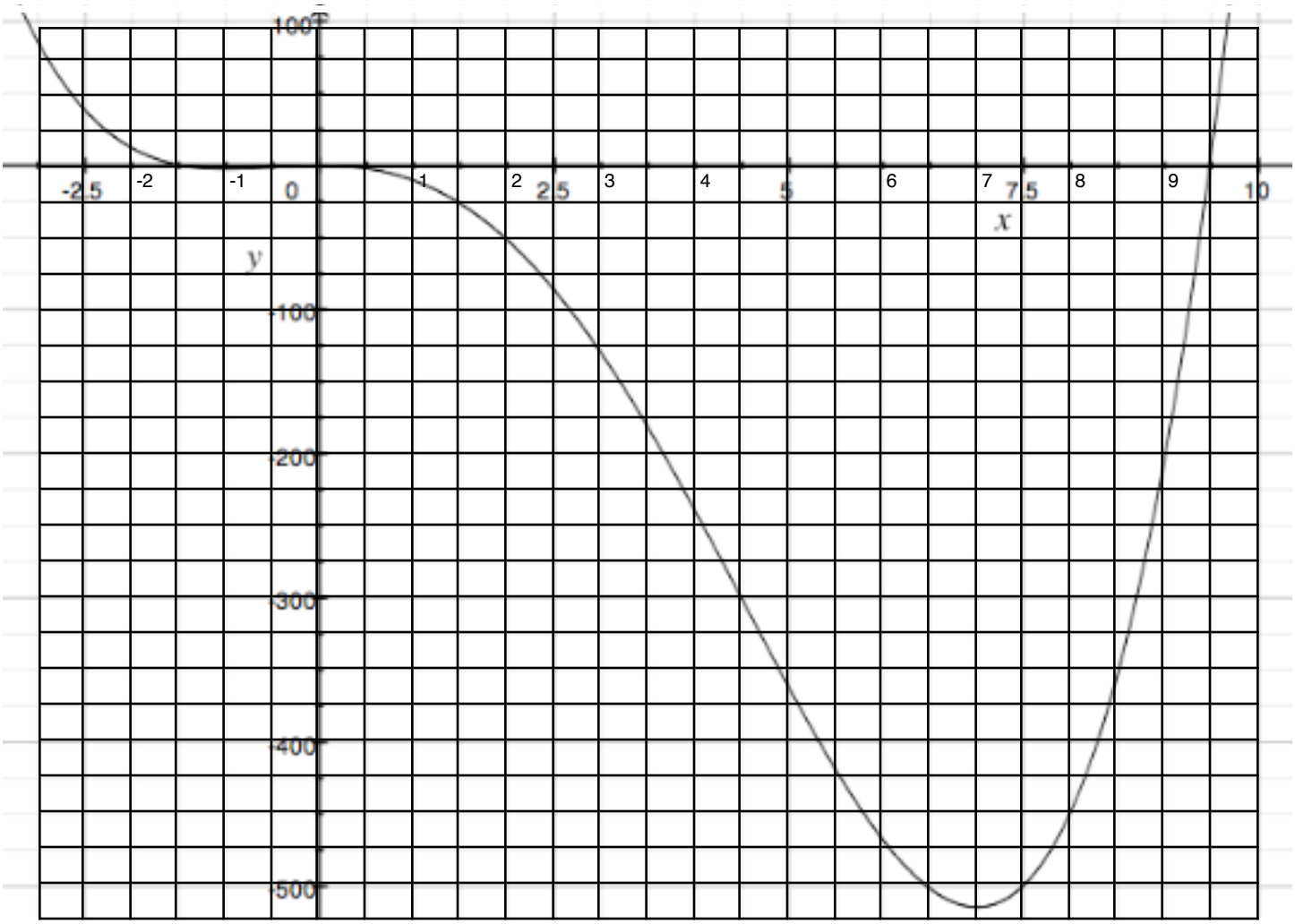


x	f(x)	f'(x)	f''(x)
-7			
-6			
-5			
-4			
-3.5			
-3			
-1			
1			
3			
5			
6			
8			
10			
12			

2. The graph on the next page shows $f(x) = 1/2x^4 - 4x^3 - 7x^2$.

a) When is the ***function*** equal to zero? Use algebra and then the calculator.

b) When is the ***derivative*** equal to zero? Use calculus and then check your answer with the calculator.



c) When is the **second derivative** equal to zero? Use calculus and then check your answer with the calculator.

3. Let's say we graph distance on the y-axis and time on the x-axis.

a) What does f(x) tell you?

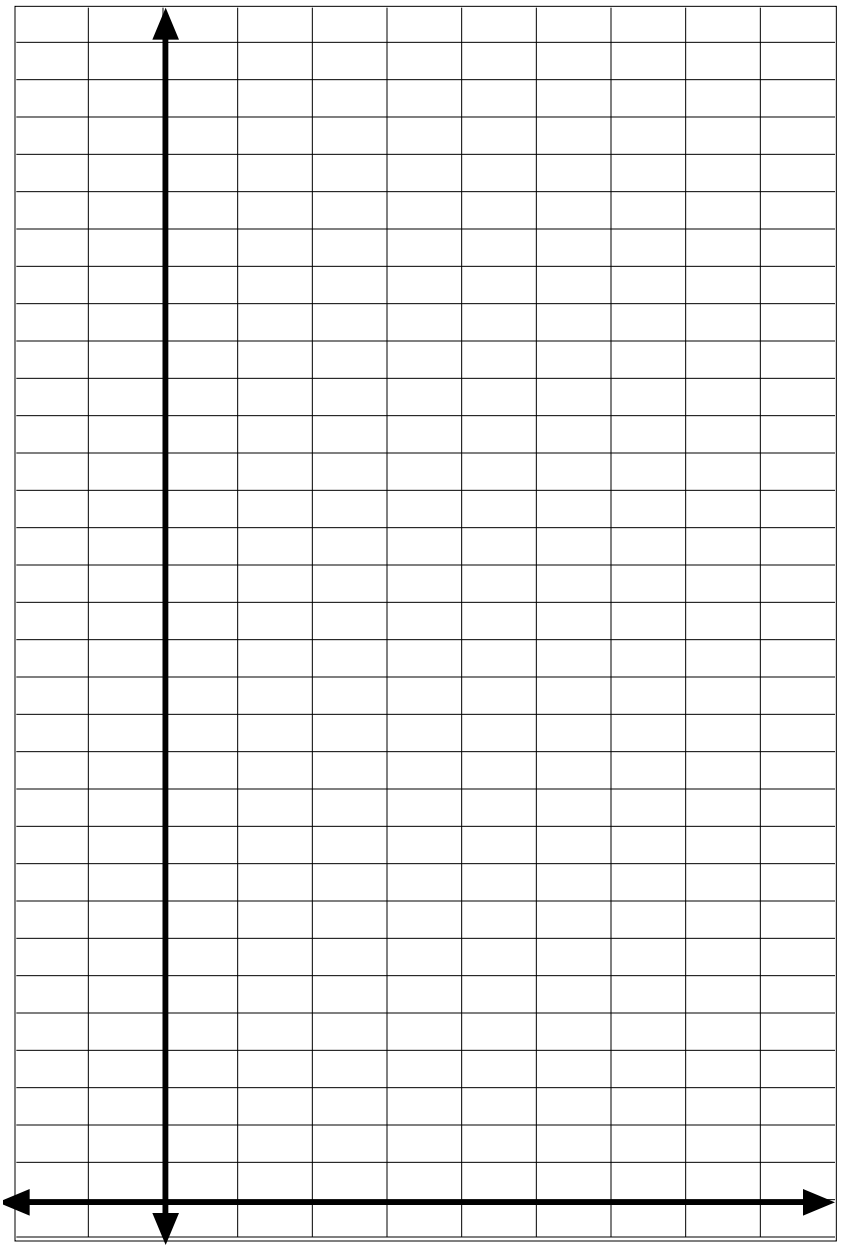
b) What does f'(x) tell you?

c) What does f''(x) tell you?

4. Jessica is driving in Prospect Park at a velocity of 20 m/s. She sees a cute little squirrel in the road ahead and starts breaking so that she doesn't hit it. She starts decelerating at a rate of 6 m/s^2.

a) **Use the equation relating distance to acceleration:**

to plot Jessica's position on the graph below. Start at (0,0).



time (s)	position (displacement)	velocity
0	0	

b) Graph the **velocity over time** on the same set of axes.

c) What is the slope of the velocity curve?

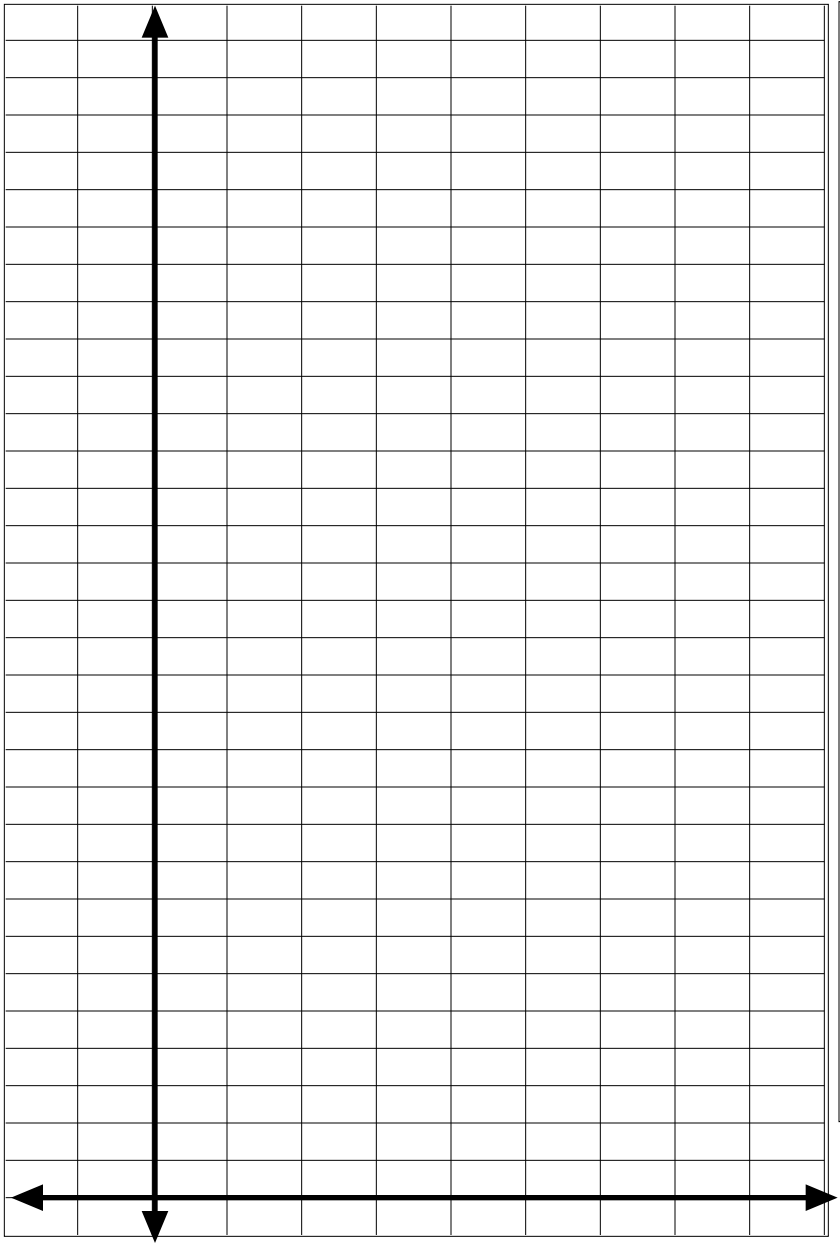
d) Where is the derivative of the derivative equal to zero?

e) In physics, what is the second derivative of a position-time graph?

2. Carlos is driving in Prospect Park at a velocity of 5 m/s. He sees a cute little squirrel in the road ahead and puts his foot on the gas, trying to chase down the squirrel. He starts accelerating at a rate of 6 m/s^2.

a) **Use the equation relating distance to acceleration:**

to plot Carlos's position on the graph below. Start at (0,0).



time (s)	position (displacement)	velocity
0	0	

b) Graph the **velocity over time** on the same set of axes.

c) What is the slope of the velocity curve?

d) Where is the derivative of the derivative equal to zero?

e) What's the difference in shape between this graph and the graph from #1?

f) What would it mean for the acceleration to be zero (on its way from positive to negative or negative to positive)?