Classwork 57

1. Given the function $y = 1/6x^3 + 4x^2 + 14x - 5$

a) Find its maxes and mins.

b) Find its inflection point.

2. a) An object starts out going 2 m/s at $t = 0$. At $t = 5$, the object is going 9 m/s. It is accelerating constantly. Find the object's acceleration.
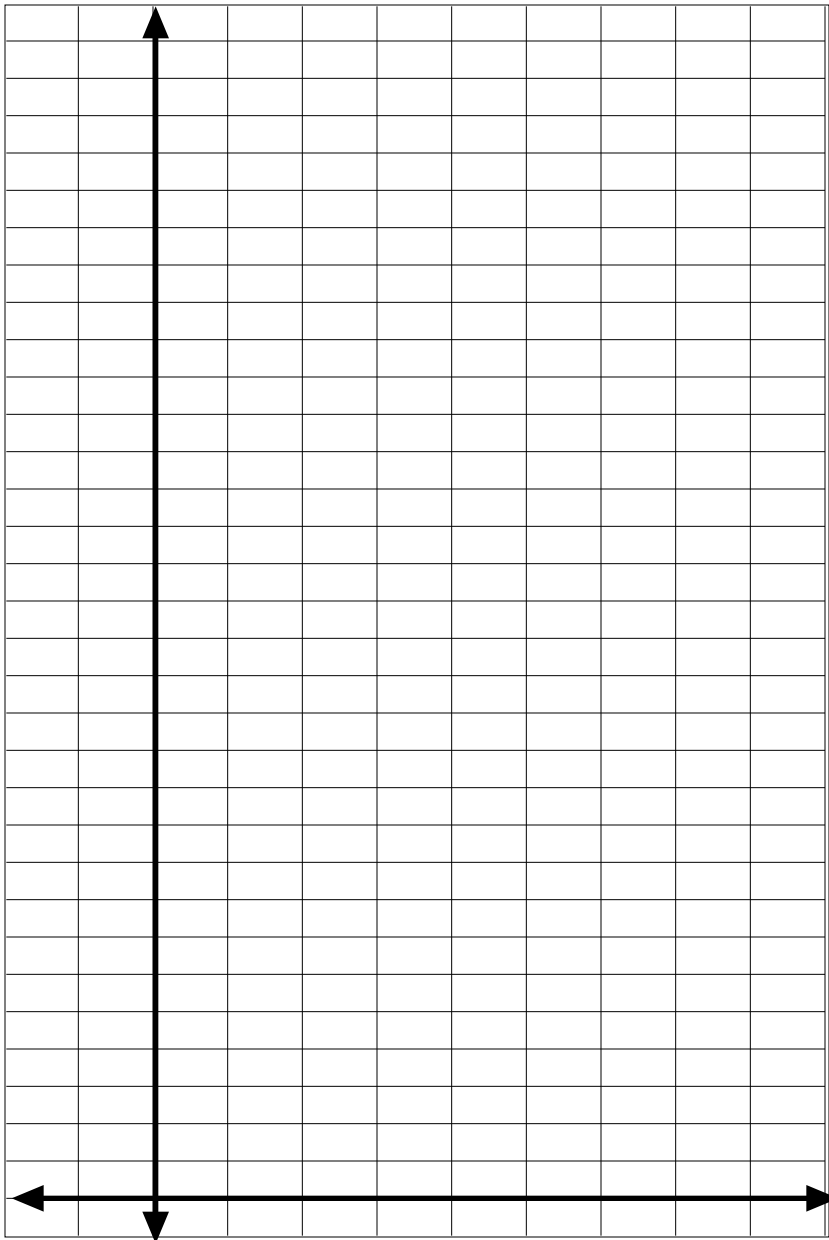
b) If the object kept on accelerating like this, what would its speed be at $t = 7$ seconds?

c) Find the distance travelled from $t = 0$ to $t = 4$.

3. Tanasia is driving in Prospect Park at a velocity of 30 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 Tanasia'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?

5. An object is moving according to the formula $y = 6/t^2 + 5t^3$ where y represents distance in meters and t represents time in seconds.

a) Find the object's position at $t = 4$.

b) Find the object's speed at $t = 4$.

c) Find the object's acceleration at $t = 4$.

d) When is the object's displacement at a maximum?

e) When is the object's speed at a maximum?

6. An object is moving according to the formula $y = 4/t + 4t^3$ where y represents distance in meters and t represents time in seconds.

a) Find the object's position at $t = 2$.

b) Find the object's speed at t = 2.

c) Find the object's acceleration at t = 2.

d) When is the object's displacement at a maximum?

e) When is the object's *speed* at a maximum?

f) Draw a sketch of what is happening.