

Name: _____

Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page.

No calculators or notes allowed.

Show all work clearly.

Use proper notation.

Question	Points	Score
1	5	
2	5	
3	10	
4	15	
5	15	
6	5	
7	5	
8	25	
Total	75	

2. (5 points) An object's acceleration to Earth's core is not a constant 9.8 m/s^2 , but rather the acceleration changes. This is because $F = ma$, the mass m of the object is unchanging, but $F = G \frac{Mm}{d^2}$, where G is a constant, M is the (constant) mass of Earth, and d is the distance between Earth and the object.

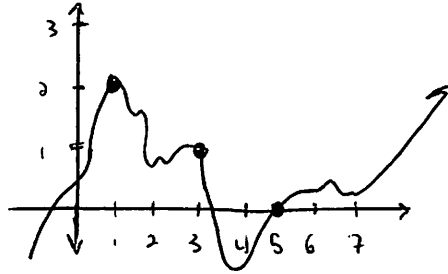
(a) (2 points) Suppose that rocket launches straight up into Earth's atmosphere. What does the sign of $\frac{dF}{dt}$ mean?

(b) (3 points) What can we conclude about velocity when $\frac{dF}{dt} = 0$?

4. (15 points) Graph $y = x^5 - 5x^4$, including its correct intercepts, local extrema, and inflection points.

6. (5 points) Approximate the following integral, using the graph, and three rectangles of equal width.

$$\int_1^7 v(t) dt$$



7. (5 points) Write in sigma notation the following:

$$\frac{4}{5} + \frac{5}{7} + \frac{6}{9} + \frac{7}{11} + \cdots + \frac{15}{27}$$

(c) (5 points) $\int (2r + 1)^3 dr$

(d) (10 points) $\int x^{1/2} \sin(x^{3/2} + 1) dx$