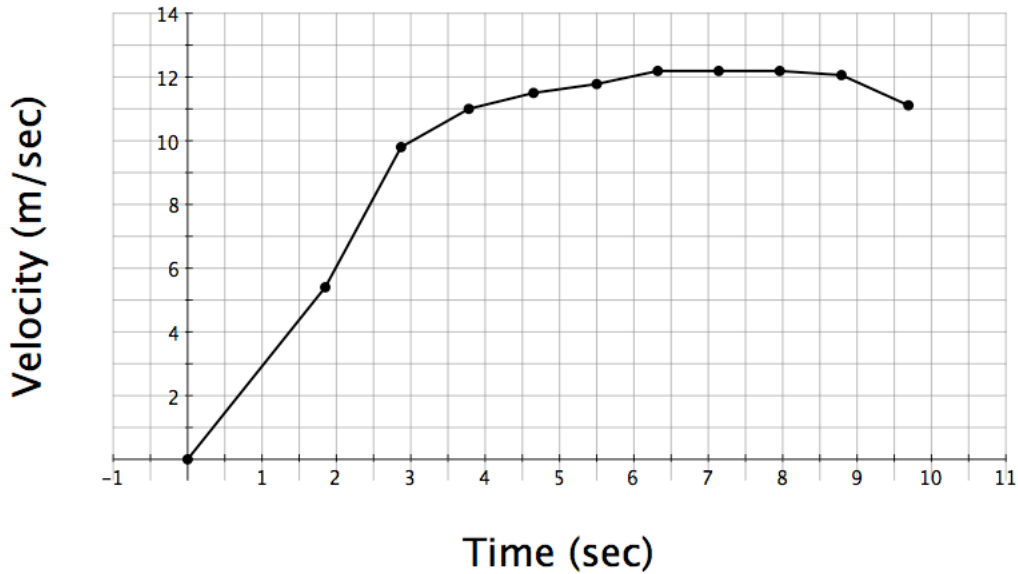


Intro to Calculus Test 7 Mr. Holcomb 2008/2009
Gandalf or Prof. Dumbledore?

Problem

1. (15 points)

The current 100 meter record for running 9.69 seconds and is held by Usain Bolt. The graph below represents this amazing run.



- When, approximately, was Bolt going fastest?
- Approximately how far did Bolt run in the first 4 seconds of the race? Justify with clear and complete calculations.
- Estimate the derivative at 3 seconds. Justify with clear and complete calculations.
- What does your answer to question (c) mean in terms of Bolts motion?
- Without calculating, what's the value of the definite integral over the interval $t = [0, 9.69]$?

4. (8 points)

Write a polar equation for each of the following sets of data.

a.

r	2	2	2	2
θ	$\frac{\pi}{3}$	0	$-\frac{\pi}{3}$	$-\frac{2\pi}{3}$

b.

r	0	1	2	3
θ	$\frac{2\pi}{3}$	$\frac{2\pi}{3}$	$\frac{2\pi}{3}$	$\frac{2\pi}{3}$

c.

r	3	4	5	6
θ	$\frac{\pi}{3}$	0	$-\frac{\pi}{3}$	$-\frac{2\pi}{3}$

5. (8 points)

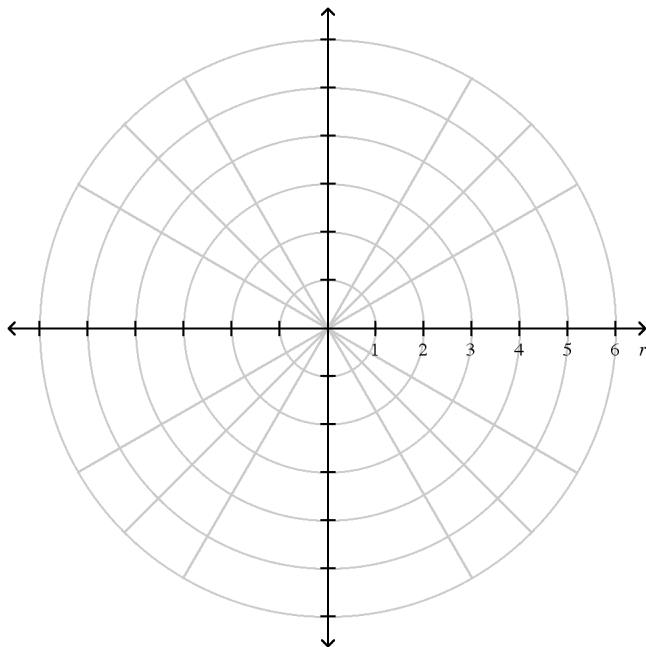
Plot the following points. Label the points with their letter

point A: $\left(3, \frac{2\pi}{3}\right)$

point B: $\left(1, -\frac{27\pi}{4}\right)$

point C: $\left(-4, -\frac{5\pi}{6}\right)$

point D: $\left(-4, -\frac{41\pi}{3}\right)$



6. (7 points)

a. Convert the polar coordinate $\left(2, \frac{\pi}{3}\right)$ to rectangular coordinates.

b. Convert the rectangular coordinate $(-2, 4)$ to polar coordinates.

7. (12 points)

Let $f(x) = 2x^2 - x + 3$.

a. Find the slope of the line which passes through the points $(2, 9)$ and $(2.5, f(2.5))$.

b. Write an expression, in terms of h , for the slope of the line passing through $(2, 9)$ and $(2+h, f(2+h))$. Simplify your expression.

c. Suppose that you evaluated your expression from part (b) for a value of h that is really close to zero. What would your answer be really close to?

d. In calculus terms, what are you finding in part (c) of this problem?