

DoNow

1. Find the slope of the line tangent to the graph of $x^2 + y^2 = 9$ at $(1.8, 2.4)$.

For Groups to Present**2. Follow That Particle!**

For 4.95 seconds, a particle moves along the x -axis according to the position function

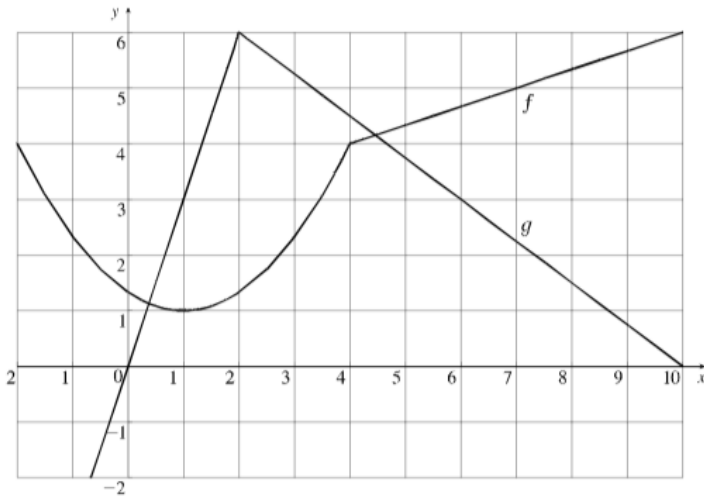
$$x(t) = \frac{e^t(5-t) - 5}{5}$$

where t is measured in seconds and x in centimeters.

Answer the following questions. Though you can visualize this motion and verify many of your answers using a graph, first attempt all the problems by hand, and then graph the position function to verify your answers.

- (a) What is the position of the particle at $t = 0$, $t = 1$, $t = 2$, $t = 4.95$?
- (b) Find the velocity of the particle at time t .
What is the velocity of the particle at $t = 0$, $t = 1$, $t = 2$, $t = 4.95$?
- (c) When is the particle at rest?
When is the particle moving forward?
- (d) Find the total distance traveled by the particle on the intervals $[0, 1]$ and $[1, 2]$.
Which is larger and why?
- (e) Find the acceleration of the particle at time t .
- (f) When was the particle speeding up?
Slowing down?

3. Chain Rule and Graphs



Define $h(x) = f \circ g(x)$.

- (a) Compute $h'(1)$.
- (b) Compute $h'(0)$.
- (c) Does $h'(2)$ exist?

A straightedge can help more than a calculator.

4. We know that when $y = e^x$, $\frac{dy}{dx} = e^x$.

Demonstrate how to use this fact to find the derivatives of:

- (a) $f(x) = b^x$
- (b) $g(x) = \ln x$

5. Let $s(x) = \log_{10}(x)$. Demonstrate how to find an equation for $s'(x)$.

6. Revised *Seven Easy Pieces*

	f'' ??? concave up	f'' ??? concave down	f'' ??? no concavity
f' ??? increasing	??	??	??
f' ??? decreasing	??	??	??
f' ??? constant	—	—	??