1. Let $f(x) = \dfrac{1}{x}$.

   (a) Find the equation of the tangent line to $y = f(x)$ at:

      i. $x = -1$

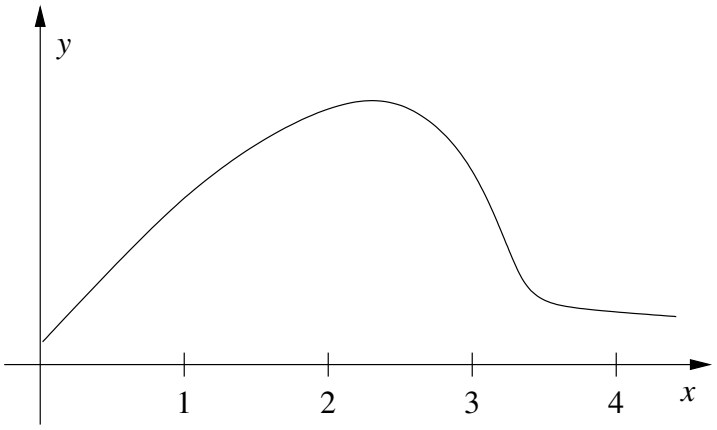
      ii. $x = 1/2$

      iii. $x = 2$

      iv. $x = 5$

   (b) As x increases from $x = 1/2$ to $x = 5$, is the **slope** of the tangent line to $y = f(x)$ increasing or decreasing? See if you can come to an agreement on what is the correct answer, and why.

2. Suppose $h(t)$ represents the height of some object at time t, and that $h(t)$ has the following graph.



   Put the following quantities in order, from least to greatest:

   - The instantaneous velocity of the object at $t = 3$
   - The slope of the tangent line at $t = 1$
   - The average velocity of the object between $t = 3$ and $t = 4$
   - $\dfrac{h(3) - h(1)}{2}$

   Explain your answers. You will probably want to draw on the graph.

3. Suppose an object moves in a straight line, that $s(t)$ is the position of the object at time t, and that we know the following about $s(t)$:

t (seconds)	1.0	1.5	2.0	2.5	3.0	3.5	4.0
$s(t)$ (meters)	6.2	7.8	9.5	11.4	13.4	15.6	17.9

(a) Find the average velocity of the object between $t = 2.0$ and $t = 2.5$.

(b) Same, for between $t = 1.5$ and $t = 2.0$.

(c) Suppose we also know that the object is always accelerating over this range of time. What can you say **for sure** about $s'(2.0)$? Use that information to come up with a reasonable estimate of $s'(2.0)$.