

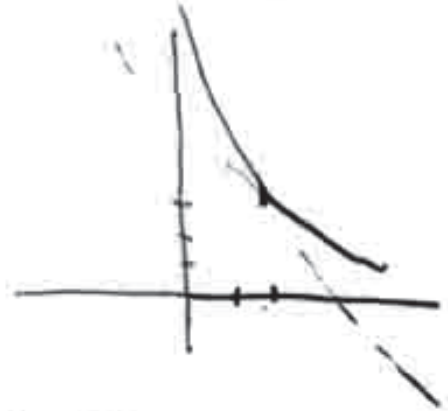
5. (5 pts.) A function  $f$  satisfies the following conditions:  $f(2) = 3$ ,  $f'(2) = -2$ , and  $f''(x) > 0$  for all  $x$ .

(a) Circle each of the following numbers that is a possible value for  $f(1)$ .

1

5

9



(b) Explain the reason for your answers.

Since  $f$  is concave up for all  $x$ , the graph lies above the tangent line. The point  $(1, 5)$  is on the tangent line, and  $(1, 1)$  is below the tangent line. Thus,  $f(1) = 9$  is the only possible choice given.

6. (7 pts.) Ebenezer borrows \$10,000 to help pay the cost of his college expenses. No interest is charged on the loan while Ebenezer is in school. After graduation, the loan starts accruing interest at an annual rate of  $r\%$  per year. He plans to pay off the loan by making equal monthly payments over a 10 year period. Let  $C(r)$  denote the total cost of Ebenezer repaying the loan when the interest rate is  $r\%$ .

(a) What are the units of  $C'(r)$ ?

The units of  $C'(r)$  are dollars per percent or  $\$/\%$ .

(b) What is the practical meaning of the equation  $C'(5) = 586$ ?

The equation  $C'(5) = 586$  indicates that if the interest rate increased from 5% to 6%, the total cost of repaying the loan would increase by approximately \$586.