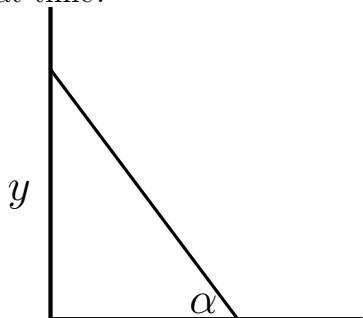


MA161 EXAM 3 PRACTICE — ALDEN BRADFORD — FALL 2018

1. A ladder 5 feet long rests against a vertical wall. The top of the ladder is sliding down the wall. At a certain time,  $y$  is 4 feet and the angle  $\alpha$  is decreasing at a rate of 2 radians/minute. How fast is  $y$  decreasing at that time?



2. If  $f(5) = 6$  and the derivative of  $f$  is always less than or equal to 10, what is the largest value  $f(10)$  could take?
3. Find the absolute minimum ( $m$ ) and the absolute maximum ( $M$ ) of the function  $f(x) = \frac{\ln x}{x^2}$  on the interval  $[\frac{1}{e}, e]$ .
4. Find the number  $c$  that satisfies the conclusion of the Mean Value Theorem for the function  $f(x) = x^2$  on the interval  $[0, 8]$  (that is,  $a = 0$  and  $b = 8$ ).
5. Find the minimum value of  $f(x) = x^3 - x$  on the closed interval  $[-1, 1]$ .  
*Hint: Find the actual value of  $f$  and NOT the  $x$ -value at which that minimum occurs.*
6. If  $f(4) = 10$  and  $f'(x) \geq 3$  for  $2 \leq x \leq 4$ , then the Mean Value Theorem guarantees  $f(2)$  can be **no bigger** than what number?