

MATH 1230 PRACTICE MIDTERM TEST  
(DURATION: 1 HOUR)

1. (5 marks) Solve the inequality  $|2x - 3| + x < 1$ , and express your answer in interval notation.

2. (8 marks) Use  $\varepsilon$ - $\delta$  definition of limit to show  $\lim_{x \rightarrow 2} \frac{x+3}{x-1} = 5$ .

3. Compute the following two limits. (You do not need to use the formal definition of limit.)

(a) (4 marks)  $\lim_{x \rightarrow 3^+} \frac{\sqrt{x-3}}{|x-3|}$

(b) (5 marks)  $\lim_{x \rightarrow 1} \frac{x^2 - \sqrt{x}}{x - 1}$

4. (5 marks) Precisely state the intermediate value theorem. Show there exists a number  $c$  satisfying  $c^3 = 3$ .

5. (6 marks) Use the definition of the derivative to compute  $f'(2)$ , where  $f(x) = 2/x^3$ .

6. (7 marks) There are two lines passing through  $(0, 0)$  that are tangent to the curve  $y = 2x^2 + 1$ . Find the equations of these tangent lines.