

Practice Exam 1

No calculators. Show your work. Clearly mark each answer.

1. State the domain and the range of the function $\sqrt{1-x^2}$. Is this function one-to-one? Sketch the graph.
2. For which value of a is the following function continuous?

$$f(x) = \begin{cases} x^2 + a, & x > 0 \\ 5x - 3, & x \leq 0. \end{cases}$$

3. Find the following limits if they exist.

(a)

$$\lim_{x \rightarrow 1^+} \frac{3x - 2}{x - 1}$$

(b)

$$\lim_{x \rightarrow 0} \frac{\sqrt{x+1} - 1}{x}$$

(c)

$$\lim_{x \rightarrow 0} \frac{\sin(2x)}{\sin(x)}$$

(d)

$$\lim_{x \rightarrow \infty} \frac{\sqrt{x^4 + x + 1} - x^2}{x^2}$$

4. Find the vertical asymptotes of the function $e^{-\frac{1}{x}}$.
5. Find the equation of the line passing through the points $(-2, -3)$ and $(1, 1)$.
6. Suppose a stone is thrown vertically upward from a height of 4 feet. The height s in feet of the stone above the ground t seconds after it is thrown is

$$s(t) = -16t^2 + 32t + 4.$$

- (a) What is average velocity of the stone after 1 second?
- (b) What is average velocity of the stone after t seconds?
- (c) What is initial velocity of the stone?
- (d) When does the stone strike the ground?