MATH-1150 (DUPRÉ) SPRING 2011 TEST 1 ANSWERS

Wednesday 2 March 2011

FIRST: PRINT YOUR LAST NAME IN LARGE CAPITAL LETTERS ON THE UPPER RIGHT CORNER OF EACH SHEET TURNED IN.

SECOND: PRINT YOUR FIRST NAME IN CAPITAL LETTERS DIRECTLY UNDERNEATH YOUR LAST NAME ON EACH SHEET TURNED IN.

THIRD: WRITE YOUR SPRING 2011 MATH-1150 SECTION NUMBER DIRECTLY UNDERNEATH YOU FIRST NAME ON EACH SHEET TURNED IN.

FOURTH: Write NEATLY and CLEARLY, putting your answers in the space provided. If I cannot read it you do not get credit.

DIRECTIONS: In each problem give the value of the limit. The possible answers are a real number, $+\infty, -\infty$, or if none of these is correct, the limit does not exist, so just write DNE.

1. $\lim_{x\to 2} \frac{x^2-2}{x+2} =$

$$\frac{2^2-2}{2+2} = \frac{2}{4} = \frac{1}{2}$$

2. $\lim_{x\to 2} \frac{x^2-9}{x-3} =$

$$\frac{2^2-9}{2-3} = \frac{-5}{-1} = 5$$

3. $\lim_{x\to 3} \frac{x^2-9}{x-3} =$

$$\lim_{x\to 3} \frac{(x-3)(x+3)}{x-3} = \lim_{x\to 3}[x+3] = 3+3 = 6$$

4. $\lim_{x\to 2} \frac{x^2-9}{(x-2)^2(x+3)} =$

$$\frac{2^2-9}{(0^{\pm})^2(2+3)} = \frac{-5}{(0^+)(5)} = -\infty$$

5. $\lim_{x\to 2^+} \frac{(x^2-9)^2}{(x-2)(x+3)} =$

$$\frac{(-5)^2}{(0^+)(5)} = \frac{25}{(0^+)(5)} = \infty$$

6. $\lim_{x\to 2^-} \frac{(x^2-9)^2}{(x-2)(x+3)} =$

$$\frac{(-5)^2}{(0^-)(5)} = \frac{25}{(0^-)(5)} = -\infty$$

7. $\lim_{x\to\infty} \frac{(x^2-9)}{(x-2)(x+3)} =$

$$\lim_{x\to\infty} \frac{x^2}{(x)(x)} = \lim_{x\to\infty} 1 = 1$$

8. $\lim_{x\to-\infty} \frac{(x^2-9)}{(x-2)(x+3)} =$

$$\lim_{x\to-\infty} \frac{x^2}{(x)(x)} = \lim_{x\to-\infty} 1 = 1$$

9. $\lim_{x\to\infty} \sin x =$

$$DNE$$

9. $\lim_{x\to 0} [\sin x]^2 =$

$$[\sin 0]^2 = 0^2 = 0$$

10. $\lim_{x\to 0} [\ln x]^2 =$

$$[-\infty]^2 = \infty$$

11. $\lim_{x\to 0} \sin \frac{1}{x} =$

$$DNE$$

12. $\lim_{x\to 0} x^3 \sin \frac{1}{x} =$

$$0, \text{ by the Squeeze Theorem}$$

since

$$-|x|^3 \leq x^3 \sin \frac{1}{x} \leq |x|^3, \text{ and } \lim_{x\to 0} x^3 = 0$$