

Homework #3

Due w/10 9/28

Section 3.1

4.

s	1.9	1.99	1.999	2.001	2.01	2.1
f(s)	-.741	-.0794	-.008	.008	.0806	.861

$$\lim_{s \rightarrow 2} s(s^2 - 4) = 0$$

12.

t	2.7	2.71	2.718	2.719	2.72	2.8
f(t)	1.997	1.994	1.9998	2.0005	2.001	2.059

$$\lim_{t \rightarrow e} \ln t^2 = 2$$

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18.

x	100	1000	10 ⁴	10 ⁵	10 ⁶	10 ⁷	10 ⁸
f(x)	-1.000	-1.00	-1.00	-1	-1	-1	-1

$$\lim_{x \rightarrow \infty} \frac{x^2}{2 - x^2} = -1$$

20.

x	1	10	10 ²	10 ³	10 ⁴
f(x)	.3679	4.5 x 10 ⁻⁵	3.7 x 10 ⁻⁴⁴	.00	.00

$$\lim_{x \rightarrow \infty} e^{-x} = 0$$

32.

x	-.1	-.01	-.001	.001	.01	.1
f(x)	-.002	-1.8 x 10 ⁻⁵	-1.8 x 10 ⁻¹⁰	-1.78 x 10 ⁻⁷	-1.77 x 10 ⁻⁵	-.002

$$\lim_{x \rightarrow 0} \frac{\sqrt{2-x} - \sqrt{2}}{2x} = 0$$

34.

x	-1	-10	-100	-10 ³	-10 ⁴	-10 ⁵
f(x)	1	1.82	1.98	1.998	1.9998	1.99998

x	5	10	100	10 ³	10 ⁴	10 ⁵
f(x)	2.5	2.22	2.02	2.002	2.0002	2.00002

x	.9	.99	.999	1.001	1.01	1.1
f(x)	-18	-198	-1998	2002	202	22

$$\lim_{x \rightarrow \infty} \frac{2x}{x-1} = 2$$

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$$\lim_{x \rightarrow 1} \frac{2x}{x-1} \text{ DNE}$$

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36. $\lim_{x \rightarrow 0} \cos \frac{1}{x}$ DNE (oscillates between -1 and 1)

38. $\lim_{x \rightarrow 2} (3x^4 - 2x + 1) = \lim_{x \rightarrow 2} (3x^4) - \lim_{x \rightarrow 2} (2x) + \lim_{x \rightarrow 2} (1) = 3 \lim_{x \rightarrow 2} (x^4) - 2 \lim_{x \rightarrow 2} (x) + 1$
 $= 3(2)^4 - 2(2) + 1 = 3(16) - 4 + 1 = 48 - 3 = 45$

42. $\lim_{x \rightarrow -2} \left(\frac{x^2}{2} - \frac{2}{x} \right) = \lim_{x \rightarrow -2} \left(\frac{1}{2} x^2 \right) - \lim_{x \rightarrow -2} \left(2 \left(\frac{1}{x} \right) \right) = \frac{1}{2} \lim_{x \rightarrow -2} (x^2) - 2 \lim_{x \rightarrow -2} \left(\frac{1}{x} \right)$
 $= \frac{1}{2} (-2)^2 - 2 \left(-\frac{1}{2} \right) = \frac{1}{2} (4) - 2 \left(-\frac{1}{2} \right) = 2 - \frac{1}{2} = \frac{3}{2}$

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$$50. \lim_{x \rightarrow 1} \frac{(x-1)^2}{x^2-1} = \lim_{x \rightarrow 1} \frac{(x-1)^2}{(x-1)(x+1)} = \lim_{x \rightarrow 1} \left(\frac{x-1}{x+1} \right) = \frac{\lim_{x \rightarrow 1} (x-1)}{\lim_{x \rightarrow 1} (x+1)} = \frac{1-1}{1+1} = \frac{0}{2} = 0$$

GRADE

$$52. \lim_{x \rightarrow -4} \frac{x+4}{16-x^2} = \lim_{x \rightarrow -4} \frac{x+4}{(4+x)(4-x)} = \lim_{x \rightarrow -4} \frac{1}{4-x} = \frac{1}{\lim_{x \rightarrow -4} (4-x)} = \frac{1}{4+4} = \frac{1}{8}$$