

Your Name:

Instructor: Steven Clontz

Circle the letter for your final answer. Show your work. Calculators are not allowed.

1. The displacement of a particle moving in a straight line is given by $s = t^2 - t$. Find the average velocity from $t = 1$ to $t = 3$.

a) $\frac{1}{2}$ b) 1 c) 2 d) 3 e) 4

2. Evaluate $\lim_{a \rightarrow \infty} \frac{1 + a - 2a^3}{4a^3 + a^2 + 1}$.

a) $-\frac{1}{2}$ b) DNE c) $\frac{1}{2}$ d) $\frac{1}{4}$ e) 0

3. Evaluate $\lim_{\theta \rightarrow -4^-} \frac{\theta}{\theta + 4}$.

a) $-\frac{4}{0}$

b) DNE

c) ∞

d) $-\infty$

e) $\frac{4}{0}$

4. Evaluate $\lim_{y \rightarrow -1} \frac{y^3 + 1}{y + 1}$.

a) DNE

b) $\frac{0}{0}$

c) 1

d) 2

e) -1

5. Recall that $-1 \leq \sin(\theta) \leq 1$. Use the squeeze theorem to find $\lim_{x \rightarrow \infty} \frac{\sin(x^2)}{x}$

- a) $\frac{\infty}{\infty}$ b) 0 c) 1 d) ∞ e) DNE
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6. Evaluate $\lim_{x \rightarrow 0} 4x \cot(2x)$.

- a) $\frac{2}{4}$ b) ∞ c) 0 d) 2 e) DNE
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7. Evaluate $\lim_{s \rightarrow 4} \frac{s - 4}{\sqrt{s} - 2}$.

- a) $\frac{0}{0}$ b) 4 c) 2 d) 0 e) DNE
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8. Find $\lim_{h \rightarrow 0} \frac{f(1+h) - f(1)}{h}$ where $f(x) = x^2 - 2$.

- a) DNE b) $\frac{0}{0}$ c) 1 d) 2 e) -1
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9. Evaluate $\csc^2\left(\frac{3\pi}{4}\right) - \cot^2\left(\frac{3\pi}{4}\right)$.

- a) $\sqrt{2}$ b) 2 c) $\sqrt{2} - 1$ d) $\sqrt{2} + 1$ e) 1
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10. Evaluate $\lim_{z \rightarrow -\infty} \frac{-5z^7 + z}{z^2 + z^4}$.

- a) $-\infty$ b) DNE c) ∞ d) -5 e) 1
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11. Evaluate $\lim_{\alpha \rightarrow 9} \frac{\alpha^2 - 4\alpha}{\alpha^2 - 18\alpha + 81}$.

- a) $\frac{45}{0}$ b) DNE c) ∞ d) $-\infty$ e) 0
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12. Evaluate $\lim_{w \rightarrow 3} \frac{2w^2 - 8}{w - 4}$.

- a) DNE b) -10 c) 2 d) -2 e) 0
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13. Simplify $(2^3 \cdot 4^3)^{-\frac{1}{3}}$

a) 8

b) $\frac{1}{8}$

c) $\sqrt[3]{8}$

d) $\frac{1}{\sqrt[3]{8}}$

e) *lol*

14. Evaluate $\lim_{h \rightarrow 0} \frac{4h^2}{\sin^2(2h)}$.

a) 1

b) ∞

c) 0

d) 2

e) $\frac{0}{0}$

15. Find the horizontal asymptote for $y = \frac{1 + 7x^2 + 3x^3}{x^4 - x}$ if there is any.

- a) $y = 1$ b) $y = 0$ c) $y = 3$ d) $y = 7$ e) no horizontal asymptote
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16. Find the vertical asymptote(s) for $y = \frac{1 + 7x^2 + 3x^3}{x^4 - x}$ if there are any.

- a) $x = 0$ b) $x = 0, x = 1$ c) $x = -1, x = 0, x = 1$
d) $x = -1, x = 1$ e) no vertical asymptotes
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