

Your Name:

Instructor: Steven Clontz

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

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1. Given the function  $h(z) = \sin\left(\frac{\pi z}{6}\right)$ , find its average rate of change between  $z = 1$  and  $z = 3$ .

- a)  $\sqrt{3}$       b)  $\frac{\sqrt{3}}{2}$       c)  $\frac{\sqrt{3}}{4}$       d)  $\frac{1}{2}$       e)  $\frac{1}{4}$
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2. Evaluate  $\lim_{x \rightarrow \infty} \frac{6x^{\frac{7}{6}} - 5x^2}{4x^{\frac{5}{2}} + 7 - 2x^2}$ .

- a)  $-\frac{3}{2}$       b)  $-\infty$       c)  $\frac{5}{7}$       d) 3      e) 0
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3. Evaluate  $\lim_{\alpha \rightarrow -2^+} \frac{e^\alpha}{2 + \alpha}$ .

- a)  $-\frac{e^2}{0}$       b) DNE      c)  $\infty$       d)  $-\infty$       e)  $\frac{e^2}{0}$
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4. Evaluate  $\lim_{t \rightarrow 1} \frac{2t^3 - 2}{t - 1}$ .

- a)  $\frac{0}{0}$       b) 2      c) DNE      d)  $\infty$       e) 6
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5. Suppose that  $\frac{1}{s^2} \leq g(s) \leq \frac{1}{s}$  for  $s > 1$ . Use the squeeze theorem to find  $\lim_{s \rightarrow 1^+} g(s) - 1$ .

a) 0

b) 1

c) 2

d) -1

e) -2

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6. Evaluate  $\lim_{a \rightarrow 0} \frac{\cot(3a)}{\cot(7a)}$ .

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

b)  $\infty$

c)  $\frac{3}{7}$

d)  $\frac{7}{3}$

e) DNE

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7. Evaluate  $\lim_{x \rightarrow -3} \frac{x^2 - 9}{\sqrt{x + 4} - 1}$ .

- a)  $\frac{0}{0}$       b) 6      c) -12      d) -3      e) 0
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8. Find  $\lim_{h \rightarrow 0} \frac{f(2+h) - f(2)}{h}$  where  $f(x) = x^2 - 1$ .

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

- a) 1      b) 0      c)  $\sqrt{2} - 1$       d)  $\sqrt{2} + 1$       e)  $\sqrt{2}$
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10. Evaluate  $\lim_{x \rightarrow \infty} \frac{2x^3}{x(x+1)(x-1)}$ .

- a)  $-\infty$       b) DNE      c) 2      d) 0      e)  $\infty$
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11. Evaluate  $\lim_{\beta \rightarrow -2} \frac{\beta^2 - 3\beta + 2}{\beta + 2}$ .

a)  $\frac{12}{0}$

b) DNE

c)  $\infty$

d)  $-\infty$

e) 1

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12. Evaluate  $\lim_{z \rightarrow 2} \frac{z - 2}{z^2 + 4}$ .

a) DNE

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

c) 2

d)  $\frac{1}{2}$

e) 0

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13. Simplify  $(8^2 \cdot 3^{-3})^{\frac{1}{3}}$

a)  $\frac{4}{3}$

b)  $\frac{1}{12}$

c) 12

d)  $\frac{8}{3}$

e)  $\frac{9}{4}$

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

a) DNE

b) 2

c)  $\frac{1}{2}$

d)  $\frac{0}{0}$

e) 0

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

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

- a)  $x = -2$       b)  $x = -2, x = 2$       c)  $x = 2$       d)  $x = -4$       e) no vertical asymptotes
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