



MA140: SAMPLE Class Test 1

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Your name:

Instructions

- Duration: **40 minutes**
- You may **not** use notes, calculator, or any electronic device.
- Encode your ID number in the boxes on the left. The 1st digit of your ID number goes in the 1st column, the 2nd digit in the 2nd column, etc.
- Each question has **one** correct answer. Use a dark coloured pen or pencil and completely fill answer boxes corresponding to your choice

Good	Bad
<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Question 1 What is the largest possible subset of \mathbb{R} that could be the **domain** of the function:

$$f(x) = \frac{2x}{x^2 + 2x - 8}?$$

- | | |
|--|--|
| <input type="checkbox"/> all of \mathbb{R} | <input type="checkbox"/> $x = 2$ and $x = -4$ |
| <input type="checkbox"/> $(-\infty, -4) \cup (-4, 0) \cup (0, 2) \cup (2, \infty)$ | <input type="checkbox"/> $(-\infty, -4) \cup (-4, 2) \cup (2, \infty)$ |

Question 2 Which of the following corresponds to $f(x) = \frac{8x - 12}{x^2 - 2x - 3}$ expressed as *partial fractions*?

- | | | | |
|--|--|--|--|
| <input type="checkbox"/> $\frac{3}{x+3} + \frac{5}{x-1}$ | <input type="checkbox"/> $\frac{3}{x+3} - \frac{5}{x-1}$ | <input type="checkbox"/> $\frac{3}{x-3} + \frac{5}{x+1}$ | <input type="checkbox"/> $\frac{3}{x-3} - \frac{5}{x+1}$ |
|--|--|--|--|

Question 3 Let $f(x) = \begin{cases} x+2 & x \leq -2 \\ -x & x > 2. \end{cases}$ Why type of *discontinuity* does f have at $x = 2$?

- | | |
|---|--|
| <input type="checkbox"/> Jump discontinuity | <input type="checkbox"/> None (f is continuous) |
| <input type="checkbox"/> Infinite discontinuity | <input type="checkbox"/> Removable discontinuity |

Question 4 What does $\lim_{x \rightarrow -4} \frac{x^2 + 3x - 4}{x^2 + x - 12}$ evaluate as?

- | | | | | |
|-----------------------------------|---|----------------------------|------------------------------------|--|
| <input type="checkbox"/> ∞ | <input type="checkbox"/> $-\frac{7}{5}$ | <input type="checkbox"/> 0 | <input type="checkbox"/> $-\infty$ | <input type="checkbox"/> $\frac{5}{7}$ |
|-----------------------------------|---|----------------------------|------------------------------------|--|



Question 5 Let $f(x) = \frac{x^2 - 2x - 15}{3x^3 - 6x^2 - 45x}$. Which *one* of the following statements is true?

☐ $\lim_{x \rightarrow 0^-} f(x) = -\infty$

☐ $\lim_{x \rightarrow 0^+} f(x) = -\infty$

☐ $\lim_{x \rightarrow 0} f(x)$ exists

☐ $\lim_{x \rightarrow 0^+} f(x) = 0$

Question 6 Suppose that $g(x) = 2x^4 + x^2$, and $f(x)$ is such that $-g(x) \leq f(x) \leq g(x)$ for all x . Which *one* of the following statements is true?

☐ One cannot use the Squeeze Theorem to determine $\lim_{x \rightarrow 0} f(x)$

☐ One can use the Squeeze Theorem to determine $\lim_{x \rightarrow 1} f(x)$

☐ One can use the Squeeze Theorem to determine $\lim_{x \rightarrow 0} f(x)$

☐ One can use the Squeeze Theorem to determine $\lim_{x \rightarrow 1^+} f(x)$

Question 7 Let $f(x) = \frac{1}{x^2 - 1}$. Which *one* of the following statements is correct?

☐ f does not have any vertical asymptotes

☐ f has one vertical asymptote, which is at $x = 1$

☐ f has two vertical asymptotes, which are at $x = 1$ and $x = -1$

☐ f has one vertical asymptote, which is at $x = -1$

Question 8 Let $f(x) = 2x^3 - 3x^2$. Which *one* of the following statements is true?

☐ $f'(0) = 1$

☐ $f'(1) = 0$

☐ $f'(-2) = 12$

☐ $f'(1) = -1$

Question 9 Let $f(x) = -4x^3 + 2x^2 - 4$. Which *one* of the following is the tangent to f at $x = -1$?

☐ $y = -16x - 14$

☐ $y = -8x - 6$

☐ $y = -4$

☐ $y = -8x + 2$

Question 10 Let $f(x) = \frac{x^2}{1+x}$. Which *one* of the following is correct?

☐ $f'(1) = \frac{1}{4}$

☐ $f'(1) = -3$

☐ $f'(1) = -\frac{1}{4}$

☐ $f'(1) = \frac{3}{4}$