MA 16010 - Exam 1 Practice Exam 2

1. Which of the following functions has an amplitude of 2 and a period of 4?

   A. $y = 2\cos(\frac{\pi x}{2})$
   B. $y = 2\sin(4x)$
   C. $y = 4\cos(2x)$
   D. $y = 2\sin(8\pi x)$
   E. $y = 4\cos(\frac{2x}{\pi})$

2. Find the domain of:

$$f(x) = \frac{2\ln x}{3 - e^x}$$

   A. $(-\infty, 0) \cup (0, \infty)$
   B. $(0, \ln 3) \cup (\ln 3, \infty)$
   C. $(-\infty, \ln 3) \cup (\ln 3, \infty)$
   D. $(-\infty, 0) \cup (0, \ln 3) \cup (\ln 3, \infty)$
   E. $(0, \infty)$

3. Solve for θ $(0 \le \theta < 2\pi)$:

$$\sin^2(2\theta) - \sin(2\theta) = 2$$

A. $\theta = \frac{\pi}{2}, \theta = \frac{3\pi}{4}, \theta = \frac{7\pi}{4}$

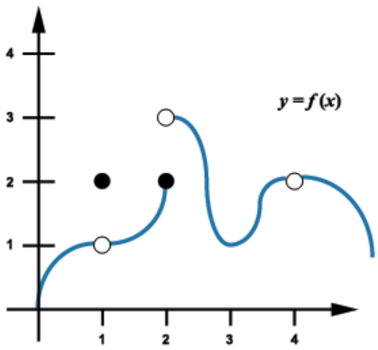
B. $\theta = \frac{\pi}{2}, \theta = \frac{3\pi}{4}, \theta = \frac{5\pi}{4}$

C. $\theta = \frac{\pi}{4}, \theta = \frac{\pi}{2}, \theta = \frac{5\pi}{4}$

D. $\theta = \frac{3\pi}{4}, \theta = \frac{7\pi}{4}$

E. $\theta = \frac{\pi}{2}, \theta = \frac{3\pi}{2}$

4. Choose the correct statement(s) regarding $f(x)$.



I. $f(x)$ is discontinuous at $x = 1$, $x = 2$ and $x = 4$.

II. $\lim_{x \to 2} f(x) = 2$

III. $\lim_{x \to 4} f(x)$ does not exist.

IV. $\lim_{x \to 1} f(x) = 2$

A. I only

B. IV only

C. I and II only

D. I and IV only

E. II and III only

5. Given $f(x) = \dfrac{1}{x+1}$, and $g(x) = \dfrac{x-1}{x^2-1}$, which of the following statements is false?

A. $g(x)$ has a removable discontinuity at $x = 1$

B. $f(x)$ has a non-removable discontinuity at $x = -1$

C. $g(x)$ has a vertical asymptote at $x = 1$

D. $f(x)$ has a vertical asymptote at $x = -1$

E. $g(x)$ has a non-removable discontinuity at $x = -1$

6. If $\lim_{x \to c} f(x) = -6$ and $\lim_{x \to c} g(x) = 4$, find

$$\lim_{x \to c}[f^2(x) + 2g(x)]$$

A. 44

B. -4

C. 32

D. -28

E. 4

7. Given the piecewise function:

$$f(x) = \begin{cases} x+4 & \text{if } x \leq -2 \\ -x-2 & \text{if } -2 < x \leq 2 \\ x-2 & \text{if } x > 2 \end{cases}$$

Which of the following statements is false?

A. $\lim_{x \to -2^-} f(x) = 2$

B. $\lim_{x \to -2^+} f(x) = 0$

C. $\lim_{x \to 0^-} f(x) = -2$

D. $\lim_{x \to 2^-} f(x) = -2$

E. $\lim_{x \to 2^+} f(x) = 0$

8. Which of following does NOT equal to positive infinity ($+\infty$)?

A. $\lim_{x \to 0^-} \frac{5x+4}{x^2}$

B. $\lim_{x \to 3^+} \frac{3}{x-3}$

C. $\lim_{x \to 2^+} \frac{x+8}{2-x}$

D. $\lim_{x \to 4^-} \frac{x^2}{\sqrt{16-x^2}}$

E. $\lim_{x \to 2^-} \frac{1}{(x-2)^2}$

9. Find the limit:

$$\lim_{x\to 1} \frac{-4x+4}{x^2-4x+3}$$

   A. 0
   B. 1
   C. 2
   D. $\frac{4}{3}$
   E. DNE

10. Assuming that a, b, and c are positive quantities, which one of the following expressions is not equal to $\ln\left(\frac{ab}{c}\right)$?

   A. $\ln a + 2\ln\sqrt{b} - 3\ln\sqrt[3]{c}$
   B. $\ln(a^2b^2) - \ln(abc)$
   C. $\frac{1}{3}\ln a^3 + \frac{1}{2}\ln b^2 - \ln c$
   D. $\ln b^2 + \ln\left(\frac{ac}{b}\right) + \ln c^{-2}$
   E. $\ln(2a) + \ln(2b) - 4\ln c$

11. Consider the function $f(x) = \dfrac{1}{2x-1}$. When using the definition of derivative (the limit process) to compute $f'(x)$, we would need to find the following limit:

   A. $\displaystyle\lim_{h\to 0} \frac{-2}{(2x+2h-1)(2x-1)}$

   B. $\displaystyle\lim_{h\to 0} \frac{h-1}{(2x+h-1)(2x-1)}$

   C. $\displaystyle\lim_{h\to 0} \frac{-1}{(2x+h-1)(2x-1)}$

   D. $\displaystyle\lim_{h\to 0} \frac{h}{(2x+2h-1)(2x-1)}$

   E. $\displaystyle\lim_{h\to 0} \frac{-h}{(2x+h-1)(2x+2h-1)}$

12. Given $f(x) = \dfrac{x^2-9}{x}$, and $f'(x) = \dfrac{x^2+9}{x^2}$.

   Find the equation of the tangent line to the graph of $f(x)$ at $x = -1$.

   A. $y = 8x + 18$

   B. $y = 8x - 2$

   C. $y = 8x - 18$

   D. $y = 10x - 2$

   E. $y = 10x + 18$