

University of Saskatchewan
Department of Mathematics and Statistics
Practice Test I

May 19, 2006

Math 110.3

Time: 60 minutes

Closed book. No calculators. No formula sheets.

Print your name clearly and write your student ID number on the opscan sheet. Encode your answers carefully on the opscan sheet. Use the provided examination booklets as a scrap paper only! Solutions in the examination booklets that are not copied onto the opscan sheet will NOT be graded!

Each question has equal mark. There is only one correct answer to each question. Total number of points: 15

- Solve for x : $|6x + 4| \geq 1$.
A) $(-\infty, -\frac{5}{6}]$ B) $[-\infty, -\frac{5}{6})$ C) $[-\frac{5}{6}, -\frac{1}{2}]$
D) $(-\frac{5}{6}, -\frac{1}{2})$ E) $[-\frac{1}{2}, \infty)$ F) $(-\frac{1}{2}, \infty)$
G) $(-\infty, -\frac{5}{6}) \cup [-\frac{1}{2}, \infty)$ H) $(-\infty, -\frac{5}{6}) \cup (\frac{5}{6}, \infty)$
- Solve for x : $x(x+1)(x-2) \geq 0$.
A) $(-\infty, -1) \cup (0, +\infty)$ B) $(-\infty, -1] \cup [0, \infty)$
C) $(-1, 0) \cup (2, \infty)$ D) $[-1, 0] \cup [2, +\infty)$
E) $(-\infty, -2) \cup (1, \infty)$ F) $(-\infty, -2] \cup [1, \infty)$
G) $(-2, 0) \cup (1, \infty)$ H) $[-2, 0] \cup [1, \infty)$
- Find an equation of the line perpendicular to the line $y = -\frac{1}{2}x - 3$ and passing through $(2, 3)$.
A) $y - 2 = -\frac{1}{2}x$ B) $y - 2 = 2x$ C) $y - 3 = -\frac{1}{2}x$
D) $y - 3 = 2x$ E) $y - 3 = -\frac{1}{2}(x + 3)$ F) $y - 3 = 2(x - 2)$
G) $y + 3 = -\frac{1}{2}(x - 2)$ H) $y + 3 = 2(x - 2)$
- Find all the values of x in the interval $[0, 2\pi]$ that satisfy the inequality $\cos x > \frac{\sqrt{3}}{2}$.
A) $[0, \frac{\pi}{6}]$ B) $[0, \frac{\pi}{3}]$ C) $[\frac{\pi}{6}, 2\pi]$ D) $[\frac{\pi}{3}, 2\pi]$
E) $[0, \frac{\pi}{6}] \cup [\frac{11\pi}{6}, 2\pi]$ F) $[\frac{\pi}{6}, \frac{5\pi}{6}]$ G) $[\frac{5\pi}{6}, 2\pi]$ H) $[0, \frac{\pi}{3}] \cup [\frac{2\pi}{3}, \pi]$
- Find the domain of the function $f(x) = \frac{\sqrt{x}}{x^2 - 2x + 1}$.
A) $[0, \infty)$ B) $(0, \infty)$ C) $[1, \infty)$
D) $(1, \infty)$ E) $[0, 1)$ F) $(0, 1)$
G) $[0, 1) \cup (1, \infty)$ H) $(0, 1) \cup (1, \infty)$

6. Which of the following functions below has a graph obtained from the graph of $y = \sqrt{x}$ by shrinking it vertically 2 times, then reflecting about the y axis and lifting up by 1 unit?
- A) $y = \frac{\sqrt{-x}}{2} + 1$ B) $y = -\frac{\sqrt{x}}{2} + 1$
 C) $y = -\frac{\sqrt{x}}{2} - 1$ D) $y = \frac{\sqrt{x}}{2} - 1$
 E) $y = \sqrt{-2x} + 1$ F) $y = -\sqrt{2x} + 1$
 G) $y = \sqrt{-2x} - 1$ H) $y = \sqrt{-2x} + 1$
7. Find the domain of the function $f \circ g$ if $f(x) = x^2 + 4$ and $g(x) = \sqrt{x-1}$.
- A) $(-\infty, \infty)$ B) $[1, \infty)$ C) $[0, \infty)$ D) $(1, \infty)$
 E) $(0, \infty)$ F) $[-1, \infty)$ G) $(-1, \infty)$ H) $(-\infty, 1)$
8. Solve for x : $\log_2 x < 5$.
- A) $(-\infty, 32)$ B) $(-\infty, 32]$ C) $(32, \infty)$ D) $[32, \infty)$
 E) $[0, 32)$ F) $[0, 32]$ G) $(0, 32]$ H) $(0, 32)$
9. Find $\cos(2x)$ if $\sin x = -\frac{\sqrt{3}}{2}$ and $x \in [\pi, \frac{3\pi}{2}]$.
- A) $-\frac{\sqrt{3}}{2}$ B) $\frac{\sqrt{3}}{2}$ C) $-\frac{1}{2}$ D) $\frac{1}{2}$ E) 0 F) 1 G) -1 H) $\frac{\pi}{4}$
10. Find the exact value of the expression $\tan(2\sin^{-1}x)$.
- A) x B) $\sqrt{1-x^2}$ C) $\sqrt{x^2-1}$ D) $\frac{\sqrt{x^2-1}}{x}$
 E) $\frac{x}{\sqrt{x^2-1}}$ F) $\frac{x}{\sqrt{1-x^2}}$ G) $\frac{x}{\sqrt{1+x^2}}$ H) 1
11. Find the domain of f^{-1} if $f(x) = \frac{x+1}{x-1}$.
- A) $(1, \infty)$ B) $(-\infty, 1)$ C) $(-1, \infty)$
 D) $(-\infty, -1)$ E) $(-\infty, 1) \cup (1, \infty)$ F) $(-\infty, -1) \cup (-1, \infty)$
 G) $(-\infty, \infty)$ H) none of the above
12. Find $\lim_{x \rightarrow 2} \frac{x^2-x+6}{x-2}$.
- A) 0 B) 2 C) 6
 D) -3 E) ∞ F) $-\infty$
 G) **D.N.E.** H) none of the above
13. Find $\lim_{h \rightarrow 0} \frac{\sqrt{1+h}-1}{h}$.
- A) $\frac{1}{2}$ B) $-\frac{1}{2}$ C) 1 D) -1
 E) 0 F) ∞ G) **D. N. E.** H) none of the above
14. Find $\lim_{x \rightarrow 0^+} \sqrt{x}(2 + \sin \frac{2\pi}{x})$.
- A) 2 B) 1 C) -1 D) 0
 E) $-\frac{\pi}{2}$ F) $\frac{\pi}{2}$ G) **D. N. E.** H) $-\infty$
15. Find $\lim_{x \rightarrow 2^+} \frac{x^2+2x+7}{x-2}$.
- A) 7 B) 1 C) -7 D) -1
 E) 0 F) ∞ G) $-\infty$ H) **D. N. E.**

Answers: 1 G, 2 D, 3 F, 4 E, 5 G, 6 A, 7 B, 8 H, 9 C, 10 F, 11 E, 12 G, 13 A, 14 D, 15 F