



Math Placement Sample Exam

University of Nebraska –Lincoln

The Math Placement Exam (MPE) is required for all new students who have not received college credit for Calculus II with a C or better.

It is recommended that you take this sample test to get a feel for the types of questions and to determine if you need to review before taking the exam.

Directions:

Complete the four parts to the exam. You should not take more than 15 minutes for each part of the exam. If you are not fairly certain of how to do a problem, the problem should be left blank. After completing the exam, use the answer key to determine your score. Each part is graded with the following scoring scheme: 1 point per blank, 3 points per correct answer, and 0 points per wrong answer. There are 10 questions per part.

If your score was 19 or less in a part you might want to review using a Schaums Outline Series Study Guide which can be purchased on-line (Amazon or Follet websites) or at most large bookstores before taking the exam.

Part 1: Review for Part 1 Schaums Outline Elementary Algebra

Part 2: Review for Part 2 Schaums Outline Intermediate Algebra

Part 3: Review for Part 3 Schaums Outline Pre-calculus (skip trigonometry)

Part 4: Review for Part 4: Schaums Outline Pre-calculus

Questions:

New Transfer Students and Freshmen Students should contact New Student Enrollment at 402-472-4646 or nse@unl.edu.

PART I

1) $5 - 4(2 - 3) =$

- A) -1 B) 9 C) -6 D) -23 E) -15

2) $\frac{1}{3}\left(\frac{2}{5} - \frac{3}{4}\right) =$

- A)
- $\frac{5}{3}$
- B)
- $-\frac{1}{27}$
- C)
- $-\frac{1}{3}$
- D)
- $-\frac{7}{60}$
- E) none of these

3) $(7pq^4)(-2p^3q^5) =$

- A)
- $14p^3q^9$
- B)
- $5p^{-2}q^{-1}$
- C)
- $-14p^4q^9$
-
- D)
- $-14p^3q^{20}$
- E)
- $5p^3q^{20}$

4) If $2x - 4 = 4 + x$, then x is

- A)
- $-\frac{1}{3}$
- B) 8 C) 0 D)
- $\frac{8}{3}$
- E) none of these

5) $\frac{12a^3 + 8a}{4a} =$

- A)
- $3a^2 + 2$
- B)
- $5a^2$
- C)
- $12a^2 + 2$
-
- D)
- $3a^2 + 8a$
- E)
- $12a^3 + 2$

6) $\frac{x^2}{x^3} =$

- A)
- $\frac{2}{5}$
- B)
- $x^{\frac{2}{3}}$
- C)
- $\frac{1}{x^5}$
- D)
- x^3
- E)
- x^{10}

7) $\sqrt[3]{-27}$

- A) -3 B) -9 C) 3 D)
- $-\frac{5}{2}$
- E) 9

8) The x -intercept of the graph of the equation $3x - y - 15 = 0$ is x is equal to

- A) 15 B) 5 C) 0 D) -5 E) -15

9) $3a - [2 + 2(b - a)] =$

- A)
- $2a + b - 2$
- B)
- $a + 2b - 2$
- C)
- $5a - 2b - 2$
-
- D)
- $5a - 2b + 2$
- E)
- $7a - 4b$

10) Eggs are to be packed in cartons, each holding 12 eggs. If there are 138 eggs and as many cartons are completely filled as possible, how many eggs are left over?

- A) 6 B) 8 C) 11.5 D) 0.5 E) 138

CONTINUE WITH PART 2

PART 2

11) $(x+1)(x^2-x+1) =$

- A) x^3-1 B) x^3-x+1 C) x^3-x^2+1
 D) x^3-2x^2+2x-1 E) x^3+1
-

12) $\frac{8}{r} - \frac{5}{s} =$

- A) $\frac{8s-5r}{rs}$ B) $\frac{3}{rs}$ C) $\frac{3}{r-s}$ D) $\frac{3}{r+s}$ E) $\frac{8s+5r}{rs}$
-

13) The slope of the line $-3x + 5y - 8 = 0$ is

- A) $-\frac{5}{3}$ B) $-\frac{3}{5}$ C) $\frac{3}{5}$ D) $\frac{8}{5}$ E) $\frac{5}{3}$
-

14) $\frac{x^2-4}{5x} \cdot \frac{30}{3x-6} =$

- A) 4 B) $2(x+2)$ C) $\frac{4}{3}$ D) $\frac{2(x-2)}{x}$ E) $\frac{2(x+2)}{x}$
-

15) $\left[\frac{x^3}{5z} \right]^{-2} =$

- A) $\frac{x^6z^2}{25}$ B) $\frac{x^6}{5z^2}$ C) $\frac{25z^2}{x^6}$ D) $\frac{x^6}{25z^2}$ E) none of these

16) The inequality $4x - 5 < 3x + 8$ is equivalent to the inequality

- A) $x < -3$ B) $x < \frac{5}{4}$ C) $x < \frac{13}{4}$ D) $x < 13$
 E) none of these
-

17) $t+t^{-1} =$

- A) $2t$ B) 1 C) $\frac{t+1}{t}$ D) $\frac{t^2+1}{t}$ E) 0
-

18) If $xy = 2(x+y)$ then $y =$

- A) $\frac{2x}{x-1}$ B) $\frac{2x}{x+1}$ C) $\frac{2x}{x+2}$ D) $\frac{2x}{x-2}$ E) $\frac{x}{x-1}$
-

19) $\frac{1}{\sqrt[4]{16}} =$

- A) 64 B) 2 C) $\frac{1}{8}$ D) $\frac{1}{4}$ E) $\frac{1}{2}$
-

20) If $2x^2 - 2x = 3$, then $x =$

- A) $\frac{2 \pm \sqrt{28}}{4}$ B) $\frac{-2 \pm \sqrt{28}}{4}$ C) $\frac{2 \pm \sqrt{20}}{4}$ D) $\frac{-2 \pm \sqrt{20}}{4}$

- E) none of these

CONTINUE WITH PART 3

PART 3

- 21) The domain of the function $f(x) = \sqrt{2x-14}$ is
- A) $-\infty < x < \infty$ B) $x \geq 0$ C) $x \geq 14$
 D) $x \leq 7$ E) $x \geq 7$
-
- 22) If $f(x) = x^2$ then $f(x-1) =$
- A) $x^2 - 1$ B) $x^3 - x^2$ C) $x^2 + x - 1$
 D) $x^3 - 1$ E) $x^2 - 2x + 1$
-
- 23) $\frac{1}{\sqrt{7}+1} =$
- A) $\frac{1-\sqrt{7}}{6}$ B) $\frac{\sqrt{7}-1}{6}$ C) $\frac{\sqrt{7}-1}{48}$
 D) $\frac{1+\sqrt{7}}{-48}$ E) $\frac{1+\sqrt{7}}{6}$
-
- 24) In the system of equations $\begin{cases} 2x+6y=5 \\ x-3y=8 \end{cases}$, one coordinate of the solution is
- A) $x = -\frac{11}{12}$ B) $x = 0$ C) $x = \frac{5}{2}$
 D) $x = \frac{13}{4}$ E) $x = \frac{21}{4}$

- 25) $e^x e^y =$
- A) $2e^{xy}$ B) e^{2xy} C) e^{xy} D) e^{x+y} E) e^{2+x+y}
-
- 26) The inequality $(x+3)(x-2) > 0$ is equivalent to
- A) $-3 < x < 2$ B) $x < -3$ or $x > 2$ C) $-2 < x < 3$
 D) $x < -2$ or $x > 3$ E) none of these
-
- 27) The slope of the line through the points $(-5, -3)$ and $(-1, -8)$ is
- A) $\frac{4}{5}$ B) $-\frac{4}{5}$ C) $-\frac{5}{4}$ D) $\frac{5}{4}$ E) none of these
-
- 28) If $f(x) = 5x + 1$ and $g(x) = x^2$, then $g(f(x)) =$
- A) $x^2(5x+1)$ B) $5x^2+1$ C) x^2+5x+1
 D) $25x^2+1$ E) $(5x+1)^2$
-
- 29) $\log_3(9) =$
- A) $\frac{1}{3}$ B) 27 C) 12 D) 2 E) 3
-
- 30) $\log_{10}(4) + \log_{10}(x) =$
- A) $\log_{10}(4^x)$ B) $\log_{10}(4+x)$ C) $2 \log_{10}(2x)$
 D) $\log_{10}(4x)$ E) $\log_{10}(x^4)$

PART 4
TRIGONOMETRY

Unless otherwise stated, angles are in radians

31) In the right triangle shown,



$\cos \theta =$

- A) $\frac{\sqrt{4-x^2}}{1}$ B) $\frac{\sqrt{4-x^2}}{x}$ C) $\frac{2}{x}$ D) $\frac{x}{2}$ E) none of these

32) $\sin \frac{\pi}{3} =$

- A) $\frac{\sqrt{3}}{2}$ B) $\frac{1}{2}$ C) $\frac{\sqrt{2}}{3}$ D) $\frac{1}{\sqrt{3}}$ E) none of these

33) What is the radian measure of an angle whose degree measure is 75°

- A) $\frac{12\pi}{5}$ B) $\frac{12}{5\pi}$ C) $\frac{5\pi}{12}$ D) $\frac{\pi}{12}$ E) none of these

34) For which values of θ in the interval $0^\circ \leq \theta \leq 180^\circ$ is $\cos 3\theta = 1$?

- A) $0^\circ, 120^\circ$ B) 90° C) $30^\circ, 150^\circ$ D) $60^\circ, 180^\circ$
E) none of these

35) Which of the following numbers is largest?

- A) $\tan \frac{\pi}{6}$ B) $\tan \frac{\pi}{4}$ C) $\tan \frac{5\pi}{6}$ D) $\tan \pi$ E) $\tan 2\pi$

36) For which of the following values of x is $\frac{\cos x}{\sin x}$ not defined?

- A) $\frac{\pi}{2}$ B) $\frac{\pi}{3}$ C) $\frac{\pi}{4}$ D) $\frac{\pi}{6}$ E) 0

37) $\cos \theta < 0$ and $\tan \theta > 0$ whenever θ is an angle in

- A) quadrant I B) quadrant II C) quadrant III
D) quadrant IV E) quadrant III or IV

38) $\cos^2 \theta \sec \theta =$

- A) $\tan \theta$ B) $\cot \theta$ C) $\sin \theta$ D) $\cos \theta$ E) $\csc \theta$

39) The period of the function $y = \cos 2x$ is

- A) 1 B) $\frac{\pi}{2}$ C) π D) 2π E) 4π

40) The figure which best represents the graph of $y = \sin(x)$ is

