

Montana State University
Sample Mathematics Placement Level Exam

The Math Placement Level Exam (MPLEX) is an essential part of your course schedule planning. It is offered during Orientation and the beginning of each semester. The results are good for one year. It will assist you in selecting the mathematics course which matches your academic preparation. If you enrol in a course that is inappropriate for your skill level, it can be costly to you in time, money and frustration. In an effort to alleviate the problems caused by mismatching a course's demands with a student's mathematical skills, **prerequisites are enforced**. Statistics indicate that, when mathematics prerequisites are enforced, students are more successful in the mathematics courses they take.

Please work through the following example questions. They are representative both in format and content of the type of questions you will be presented with while taking the MPLEX at a computer terminal. Answers are multiple choice or fill-in-the-blank.

You will be placed in one of the levels (Level 1 through Level V) of courses we offer at MSU. Your placement level is displayed on the screen immediately after you complete the exam. A calculator is permitted but not necessary.

The correct answers for the sample problems below are given on the last exam page. If you require additional practice problems, the MSU bookstore sells the **APCAW** (Algebra, Pre Calculus: A Workbook) for approximately \$10.00. Good luck with your preparation for the Math Placement Level Exam.

Questions 1 - 5 focus on basic arithmetic. If they present difficulty, you should review a Prealgebra textbook before attempting the MPLEX if you hope to bypass M 065 (Prealgebra).

1. $\frac{3}{4} + \frac{5}{3} - \frac{7}{4} \cdot \frac{1}{2} =$

- (a) $\frac{1}{15}$ (b) $\frac{37}{24}$ (c) $\frac{1}{24}$ (d) $\frac{14}{15}$ (e) none of these

2. 20 is what percent of 0.5?

- (a) 4000% (b) 25% (c) 40% (d) 2.5% (e) none of these

3. $\frac{-4 + 19}{-5} - 6 - (8 - 17) =$

- (a) -18 (b) 18 (c) 6 (d) 0 (e) none of these

4. $9 - 2[1 - 3(5 - 7)^3] =$ _____.

5. Evaluate $ab^2 - bc$ when $a = -5$, $b = 3$ and $c = \frac{-1}{2}$.

- (a) $\frac{-93}{2}$ (b) 24 (c) $\frac{453}{2}$ (d) -111 (e) none of these

Questions 6 - 11 focus on beginning algebra material. If they present difficulty, you should review an Algebra textbook before attempting the MPLEX if you hope to bypass M 096 or M 097 (Survey of Algebra).

6. Solve: $8 - 6w < 7$

- (a) $w > \frac{1}{6}$ (b) $w > \frac{7}{2}$ (c) $w < \frac{1}{6}$ (d) $w < \frac{7}{2}$ (e) none of these

7. Solve: $-2(t + 6) = 5t - (t + 1)$

- (a) $t = \frac{5}{6}$ (b) $t = \frac{-11}{6}$ (c) $t = \frac{-11}{2}$ (d) $t = \frac{5}{2}$ (e) none of these

8. Find an equation of the line passing through the points $(-6, 2)$ and $(4, -3)$.

- (a) $y = -2x + 10$ (b) $y = -2x + 14$ (c) $y = \frac{-1}{2}x + 4$
(d) $y = \frac{-1}{2}x - 1$ (e) none of these

9. Solve the following system of equations.

$$2x + 5y = -7$$

$$x - 4y = 3$$

The y -coordinate of the solution is: $y = \underline{\hspace{2cm}}$.

10. $(2a^{-2}b^5)^3(3ab^5)^2 =$

- (a) $72a^{-4}b^{25}$ (b) $12a^{-2}b^{15}$ (c) $72a^{-6}b^{150}$ (d) $12a^4b^{15}$ (e) none of these

11. Solve $6a^2 + a - 35 = 0$. The smaller solution is:

- (a) $a = \frac{-7}{2}$ (b) $a = \frac{-7}{3}$ (c) $a = \frac{-5}{3}$ (d) $a = \frac{-5}{2}$ (e) none of these

Questions 12 - 17 focus on advanced algebra material. If they present difficulty, you should review a College Algebra textbook before attempting the MPLEX if you hope to bypass M 121 (College Algebra).

12. $\frac{1 - 2a^{-1} - 3a^{-2}}{1 + a^{-1}} =$

(a) $\frac{-4}{a^2}$ (b) $\frac{-1}{a}$ (c) $\frac{a-3}{a}$ (d) $\frac{-2a-3}{a^2}$ (e) none of these

13. Solve: $\frac{x}{x^2 - 7x + 12} + \frac{2x}{x^2 - 4x + 3} = \frac{3}{x^2 - 5x + 4}$

(a) $x = 3$ or $x = 1$ (b) $x = -3$ or $x = -1$ (c) $x = 1$ only
 (d) no solution (e) none of these

14. Solve: $3xy^2 - 5yz = 4x$ for x

(a) $x = \frac{3y^2 - 5yz}{4}$ (b) $x = \frac{4 + 5yz}{3y^2}$ (c) $x = \frac{5yz}{3y^2 - 4}$
 (d) $x = \frac{-5yz}{y^2}$ (e) none of these

15. The two roots of: $3x^2 - 2 = -x$ are _____ and _____.

16. Solve: $p = (p + 20)^{\frac{1}{2}}$

(a) $p = 5$ or $p = -4$ (b) $p = 5$ only (c) $p = 0$ only
 (d) there is no solution (e) none of these

17. Jim's speed for most of his 300 mile road trip was 65 mph. When traveling over icy mountain passes his speed slowed to 40 mph. If the total time of the trip was 5 hours, how many miles were driven at 65 mph?

(a) 260 miles (b) 220 miles (c) 90 miles (d) 40 miles (e) none of these

Questions 18 - 23 focus on material from trigonometry and other advanced math topics. If your math background exceeds the minimum entrance requirements and you hope to start with calculus, you will also answer questions from this set. You may need to review appropriate textbooks before attempting the MPLEX if you hope to bypass M 151 (Precalculus).

18. What is the domain of $f(x) = (x + 2)^{-1}$
- (a) $(-2, 2)$ (b) $(-\infty, \infty)$ (c) $(-\infty, 2) \cup (2, \infty)$
 (d) $(-\infty, -2) \cup (-2, \infty)$ (e) none of these
19. If $f(x) = x^2 + 5x$ and $g(x) = \frac{1}{x+2}$, then $f(g(x)) =$
- (a) $\frac{x^2 + 5x}{x+2}$ (b) $\frac{1}{x^2 + 5x + 2}$ (c) $\frac{5x + 11}{(x+2)^2}$
 (d) $x^2 + 5x + \frac{1}{x+2}$ (e) none of these
20. Solve: $\log 5 + 2 \log x = 3$
- (a) $x = \sqrt{0.6}$ (b) $x = 0.3$ (c) $x = 2\sqrt{10}$ (d) $x = 10\sqrt{2}$ (e) none of these
21. If $\sin \theta = \frac{4}{5}$ and $\frac{\pi}{2} < \theta < \pi$ then $\tan \theta =$ _____.
22. $\cos(\sin^{-1} x) =$
- (a) $\sqrt{1 - x^2}$ (b) $\cos(90^\circ - x)$ (c) $\frac{1}{x}$ (d) 1 (e) none of these
23. $\frac{1}{1 - \sin \theta} - \frac{1}{1 + \sin \theta} =$
- (a) 0 (b) $-2 \csc \theta$ (c) $2 \sin \theta \sec^2 \theta$ (d) $2 \cos \theta \csc^2 \theta$ (e) none of these

KEY: 1. b 2. a 3. d 4. -41 5. e 6. a 7. b 8. d 9. -1 10. a 11. d
 12. c 13. d 14. c 15. -1, 2/3 16. b 17. a 18. d 19. c 20. d 21. -4/3 22. a 23. c