PRACTICE FOR PLACEMENT EXAM – PART B

For students trying to place into:
MAT 1110, Math for Elementary Teachers I
MAT 1120, Math for Elementary Teachers II
MAT 1500, College Algebra for the Social and Management Sciences
MAT 1800, Precalculus
Or to Achieve Math Competency

Problems 26-40 are based on Intermediate Algebra. Those wishing to place into MAT 1110, 1120, 1500 or 1800 should have this material mastered (as well as the material for Part A.) To study, take the Practice Exam Part B. It contains 30 questions which cover the same topics as the 15 questions on the Placement Exam Part B. The questions on the actual Placement Exam are multiple choice.

For help with specific questions, go to the Mathematics Resource Center in room 1198 FAB. The lab is free of charge and an appointment is not necessary.

For additional practice, take the previous final exams for MAT 1050.

For a general review, consult any intermediate algebra textbook. You may borrow one from the Mathematics Resource Center.
1. Simplify completely: \( \sqrt[3]{\frac{x^0 y^4}{3z^3}} \cdot \sqrt[3]{81x^9 y^{-10} z^6} \)

2. Simplify completely: \( \left( \frac{1}{2^5} + 2 \frac{3}{2} \right)^2 \)

3. Solve: \( 3 - \left| \frac{2x + 5}{3} \right| = 5 \)

4. Solve: \( 2 - 4 \left| x + 2 \right| \geq -6 \)

5. Let \( f \) be the function given by \( f(x) = 3x + |4 - x| \). Find and simplify \( f(5) + \left[ f(-1) \right]^2 \).

6. Find the equation of the line that is perpendicular to the line \( y = 5 \) and passes through the point \((-3, 2)\).

7. Find the equation of the line that is parallel to the line \(-2y + 7x = 3\) and passes through the point \((1, -3)\).

8. A triangular entrance to a tent is 2 feet taller than it is wide. The area of the entrance is 12 square feet. Find the height and the base.

9. Solve, writing any non-real solutions in the form \( a + bi \): 
\( x^4 + 10x^2 = 6x^3 \)

10. Graph, labeling the vertex and all \( x \) and \( y \) intercepts: \( f(x) = -x^2 + 6x - 5 \)

11. Simplify completely: 
\[ \frac{5 + \frac{x + 3}{x - 1}}{3x - 1} \div \frac{1}{1 - x^2} \]

12. Let \( f(x) = \sqrt{5 - 2x} - \frac{x}{2} \). Find all input(s), \( x \), such that \( f(x) = -2 \).

13. Solve: \( (x - 2)^2 (x + 3) > 0 \)
14. The graph of a function, \( f \), is shown here.

   a) What is the domain of \( f \)?
   b) What is \( f(4) \)?
   c) For what input(s), \( x \), is \( f(x) = 2 \)?

15. Find: 
   a) \( \log_{12} \left( \frac{1}{144} \right) \)
   b) \( \log_{81} (3) \)
   c) \( \log_{32} \left( \frac{1}{2} \right) \)

16. In the right triangle shown, find \( x \):

17. Simplify completely: 
   \( \left( \frac{-2x^9}{y^2z^{-3}} \right)^{-2} x^{-3} y^4 z \)

18. Simplify completely: 
   \( \frac{16^{\frac{1}{2}} + 9^{-\frac{1}{2}}}{16^{\frac{1}{2}} - 9^{-\frac{1}{2}}} \)

19. Solve: 
   \(-3 - 2x + 5 \leq -11\)

20. Let \( g \) be the function given by 
   \( g(x) = \frac{x + 4}{\sqrt{7x - 5}} \).

   Find and simplify \( 4g(3) + 2[g(2)]^2 \).
21. The diagonal of a rectangle is 6 inches longer than the width. The length is 12 inches.
   a) Find the width of the rectangle.
   b) Find the area of the rectangle.

22. Solve, writing any non-real solutions in the form \( a + bi \): \( 5x^2 = 2x^3 - x^4 \)

23. Graph, labeling the vertex and all \( x \) and \( y \) intercepts: \( f(x) = 2x^2 + 12x + 10 \)

24. Simplify completely: \( \frac{x+8-5}{x-8-12} \)

25. Solve: \( x^2 < 9 \).

26. The graph of a function, \( g \), is shown here.
   a) What is the domain of \( g \)?
   b) What is the range of \( g \)?
   c) For what input(s), \( x \), is \( g(x) = 0 \)?

27. Find: a) \( \log_2(16) \) b) \( \log_{\sqrt{3}}(1) \) c) \( \log_{\sqrt{3}}(9) \)

28. Simplify completely: \( \left( \frac{1}{2} + \frac{1}{\sqrt{8}} \right)^2 \)

29. Solve: \( 5 - \sqrt{1 - 4x} = -x \)

30. A ladder leans against a building, reaching 8 feet up the wall. The angle the ladder makes with the ground is 72°. How long is the ladder?