

**Intermediate Algebra**  
**Final Exam Practice, Non-Calculator**

**I. Identify the vertex and axis of symmetry, then sketch the graph of the function.**

1.  $f(x) = 2x^2 + 4x$                       2.  $f(x) = x^2 + 2x - 4$   
3.  $f(x) = \frac{1}{2}x^2 - 2x + 5$                 4.  $f(x) = 2x^2 + 3$

**II. Solve the following quadratic equations.**

5.  $2x^2 - 5x = 3$                             6.  $x^2 + 2x = 3$   
7.  $(2x - 1)^2 = 16$                         8.  $(3x + 1)^2 = 25$

**III. Scientific Notation.**

9. Write  $1.76 \times 10^{-5}$  in standard form.  
10. Write 246,100,000 using scientific notation.

**IV. Sketch the following graphs.**

11.  $f(x) = 2x - 4$                             12.  $f(x) = \frac{-1}{3}x + 5$

**V. Solve for x.**

13.  $3 - 2x = 4x + 5$                         14.  $3(2x + 1) + 4 = x$   
15.  $3 - 2x > 11 + x$                         16.  $2 + 3(2x + 1) \leq 3x - 4$

**VI. Solve the following systems of equations.**

17.  $x + 3y = -1$   
     $2x + 3y = -5$                             18.  $4x + 9y = -3$   
     $x - 3y = -6$

**VII. Simplify the following expressions by performing the indicated operations. Write all answers in simplified standard form. Write all fractions in lowest terms.**

19.  $(x^3 - 4x^2 + 7x - 6) - (-2x^3 + x - 4)$     20.  $(4c^2 + 3c - 2) + (3c^2 + 4c + 2)$   
21.  $(3x + 1)(2x - 5)$                         22.  $(8 - 6i) - (5 + 2i)$   
23.  $(4 + 5i) + (2 - 3i)$

**VIII. Factor Completely.**

24.  $5x^3 - 20x$                                 25.  $5x^2 - 6x + 1$

**IX. Solve the following equations.**

26.  $2x^2 + 8x = 0$                             27.  $4 = \frac{2}{3x-2}$

**ANSWERS:**

1.  $(-1, -2), x = -1$                         2.  $(-1, -5), x = -1$                         3.  $(2, 3), x = 2$   
4.  $(0, 3), x = 0$                                 5.  $x = \frac{-1}{2}, x = 3$                             6.  $x = -3, x = 1$   
7.  $x = \frac{5}{2}, x = \frac{-3}{2}$                                 8.  $x = \frac{4}{3}, x = -2$                             9. 0.0000176  
10.  $2.461 \times 10^8$                                 13.  $x = \frac{-1}{3}$                                         14.  $x = \frac{-7}{5}$   
15.  $(-\infty, \frac{-8}{3})$                                     16.  $(-\infty, -3]$                                 17.  $(-4, 1)$   
18.  $(-3, 1)$                                         19.  $3x^3 - 4x^2 + 6x - 2$                         20.  $7c^2 + 7c$   
21.  $6x^2 - 13x - 5$                                 22.  $3 - 8i$                                         23.  $6 + 2i$   
24.  $5x(x + 2)(x - 2)$                         25.  $(5x - 1)(x - 1)$                         26.  $x = -4, x = 0$   
27.  $x = \frac{5}{6}$