MRS21 – Algebra 2/Trigonometry
Exam 4 Review Sheet

Topics:

- Solving Quadratic Equations by Completing the Square
- Solving Quadratic Equations using the Quadratic Formula
- Finding Complex Roots of a Quadratic Equation using the Quadratic Formula
- The Graph of a Quadratic Equation in the form $y = ax^2 + bx + c$
- The Nature of the Roots of a Quadratic Equation (using the discriminant)
- Sum and Product of the Roots of a Quadratic Equation

Be sure to thoroughly prepare for the exam by reviewing (and re-doing) problems in your class notes and homework assignments.

Note that exams are **cumulative**, meaning that some questions on this exam will cover topics that were tested on previous exams and quizzes.

Practice Problems:

1. If the roots of a quadratic equation are –7 and 4, write the equation in the form $ax^2 + bx + c = 0$.

2. Write an equation in the form $ax^2 + bx + c = 0$ if the sum of the roots is 5 and the product of the roots is 3.

3. Find the sum and the product of the roots of the equation $2x^2 - 4x + 1 = 0$.

4. What is the positive value of *m* in the equation $4x^2 + mx + 9 = 0$ that makes the roots of the equation real, equal, and rational?
   (1) 12 (3) 3
   (2) 9 (4) 4

5. The roots of the quadratic equation $4x^2 = 2 + 7x$ are best described as
   (1) real, equal, and rational (3) real, unequal, and irrational
   (2) imaginary (4) real, unequal, and rational

6. The roots of the equation $x^2 - 8x = 8(x - 8)$ are
   (1) rational and equal (3) irrational and equal
   (2) irrational and unequal (4) rational and unequal

7. For what values of *p* are the roots of the equation $2x^2 - x - p = 0$ imaginary?

8. Find all values of *p* such that the roots of the equation $2x^2 - x - 8p = 0$ are equal.

9. Given $y = ax^2 + bx + c$, where *a*, *b*, and *c* are constants, make a rough sketch of the graph (correctly showing the number of *x*-intercepts) for each of the following cases:
   i) the discriminant is positive ii) the discriminant is zero iii) the discriminant is negative

10. Which is the equation of the axis of symmetry of the graph of the equation $y = x^2 - 3x - 6$?

(1) $x = 3$ (3) $y = 3$

(2) $x = \frac{3}{2}$ (4) $y = \frac{3}{2}$

11. Solve by completing the square.

(a) $x^2 + 6x = -4$ (b) $3x^2 - 6x + 7 = 0$

12. Solve using the Quadratic Formula. Express the roots in simplest radical form.

(a) $3x^2 = 4x + 2$ (b) $2x^2 - 2x - 3 = 0$

13. Solve for n and express the roots in simplest $a + bi$ form:

(a) $5n + 12 = -\dfrac{8}{n}$ (b) $9n^2 = 2(3n - 1)$

14. If the graph of $y = x^2$ is translated 5 units to the left and 7 units down, what is the resulting equation?

15. If the graph of $y = x^2$ is translated 2 units to the right, then reflected in the x-axis, and finally translated 3 units up, what is the resulting equation?

16. If one root of the equation $x^2 + kx - 15 = 0$ is -3, what is the other root?

17. If one root of the equation $x^2 + 8x + c = 0$ is -2,

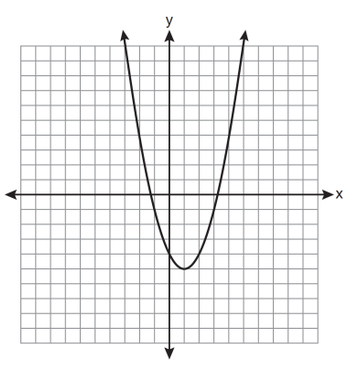
(a) what is the other root?

(b) what is the value of c?

18. If the roots of a quadratic equation are $5 \pm i\sqrt{3}$, write the equation in the form $ax^2 + bx + c = 0$.

19. The graph of a parabola is represented by the equation $y = ax^2$, where a is a positive integer. If a is multiplied by 2, the new parabola will become

(1) narrower and open downward (3) wider and open downward

(2) narrower and open upward (4) wider and open upward

20. State the equation of the axis of symmetry and the coordinates of the vertex of the parabola graphed below.