

**MATH 8: HANDOUT 02**  
**REVIEW II**

1. Consider the following quadratic equation:

$$x^2 + 13x + 30 = 0$$

- (a) What is the discriminant of this equation?  
(b) Sketch a graph of this quadratic polynomial using completing the square method.  
(c) Solve the equation.
2. Let  $x + y = 10$  and  $xy = 15$   
(a) Calculate  $x^2 + y^2$ .  
(b) Calculate  $(x - y)^2$ .  
(c) Calculate  $\frac{1}{x} + \frac{1}{y}$ .
3. Without solving the equation  $x^2 - 12x + 19 = 0$  find the value of the following expression:

$$x_1(1 - x_1) + x_2(1 - x_2).$$

4. Write down the following fraction in a form  $a + b\sqrt{5}$ :

$$\frac{9 - 3\sqrt{5}}{\sqrt{5} - 2}$$

5. Solve the equation:

$$|3x - 8| = 10$$

6. Solve the following inequality. Write your answer as a set of possible values for  $x$ .

$$\frac{(x + 2)^2(x - 7)}{x + 3} \leq 0$$

7. Which of the following numbers is the largest:  $\sin 30^\circ \times \cos 30^\circ$ ,  $\sin 45^\circ \times \cos 45^\circ$ ,  $\sin 60^\circ \times \cos 60^\circ$ ?
8. If a right triangle  $\triangle ABC$  has sides  $AB = 3\sqrt{3}$  and  $BC = 9$ , and side  $AC$  is the hypotenuse, find all 3 angles of the triangle.
9. A cruise ship travels north for 3 miles and then north-west for another 3 miles. How far will it end up from its original position? [North-end is the direction that bisects the angle between north and east.]
10. Consider a parallelogram  $ABCD$  with  $AB = 1$ ,  $AD = 3$ ,  $\angle A = 40^\circ$ . Find the lengths of diagonals in this parallelogram.