Name: ___________________________________________

**Chapter 3 Day 1: Distance & Midpoint Formulas, Equations of Lines, Parallel & Perpendicular Lines. Worksheet**

Do all your work on a separate piece of paper.

1. Find the midpoint of the line segments joining these pairs of points: (–9, –7) & (7, 2)

2. Find b given that A(3, –2) and B(b, 1) are $\sqrt{13}$ units apart.

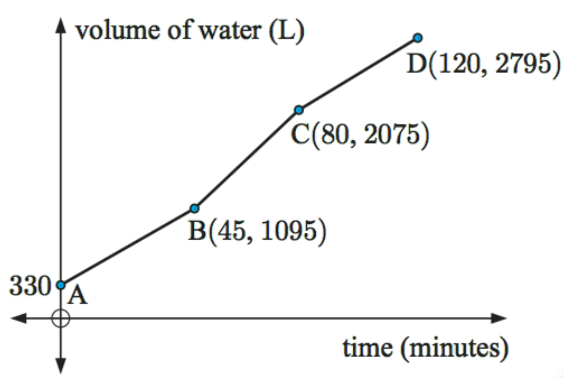
3. Use the distance formula to determine if triangle ABC, where A is (–2, 0), B is (2, 1), and C is (1, –3) is equilateral, isosceles, or scalene. Then determine if it is a right triangle.

4. Use the gradient-intercept form equation to find the equation of the straight line if:
   a. it passes through the point (1, –4) and has a gradient of 2
   b. it passes through the points (–1, 2) & (9, –3).
   c. it passes through the point (4, 3) and is perpendicular to the line joining the points (–1, 3) and (1, –1). Give the answer in the form ax + by + d = 0

5. Find t given that the line joining A (1, –3) to B (–2, t) is parallel to the line with gradient 1½. Then find t given that the same line is perpendicular to the line with gradient 1½.

6. The lines px + 4y – 2 = 0 and 2x – y + p =0 are perpendicular. Find the value of p.

7. Jalen monitors the amount of water in his rainwater tank during a storm.



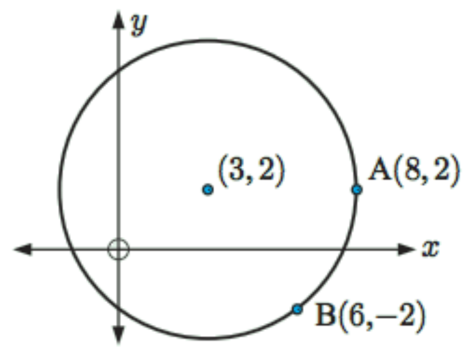

a. How much water was in the tank before the storm?
b. When was it raining the hardest?
c. At what rate is the tank filling between C and D?
d. What is the average water collection rate during the whole storm?

8. The illustrated circle has centre (3, 2) and radius 5. The points A(8, 2) and B(6, –2) lie on the circle.

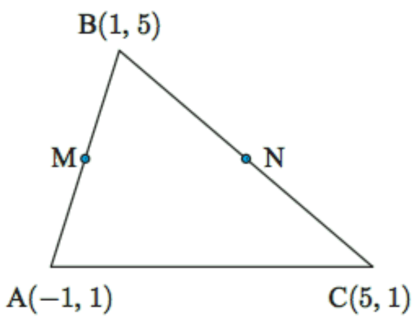
   a. Find the midpoint of chord AB.

   b. Hence, find the equation of the perpendicular bisector of the chord in standard form ax + by + d = 0.

   c. Show that this perpendicular bisector passes through the centre (3, 2). Hint: show that (3, 2) is on the line.




9. Farmer Huber has a triangular field with corners A(–1, 1), B(1, 5), and C(5, 1). There are gates at M and N, the midpoints of AB and BC respectively. A straight path goes from M to N.




   a. Use gradients to show that the path is parallel to AC.

   b. Show that the path is half as long as the fence line AC.