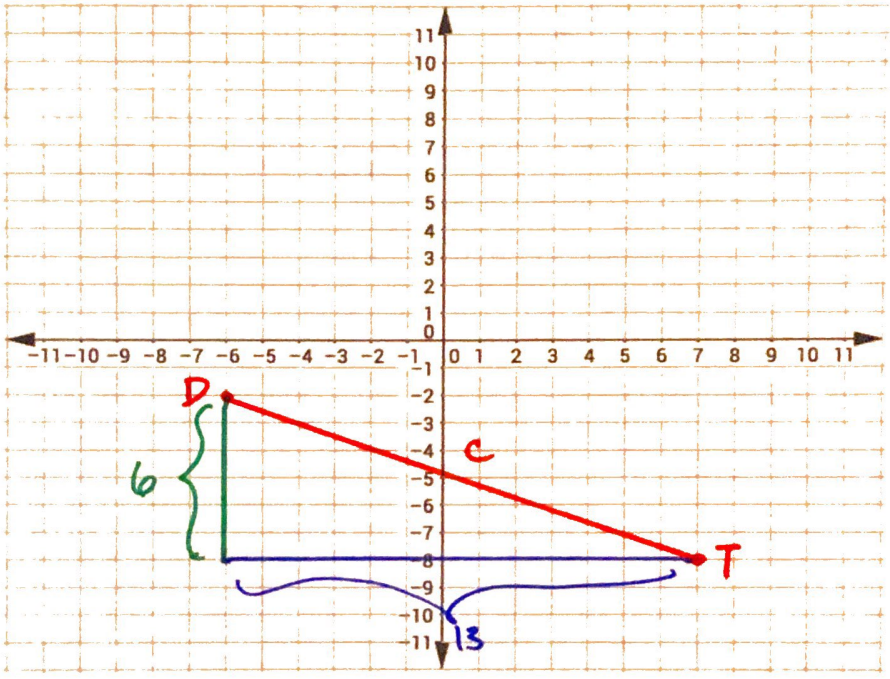
Name _____ Date_____

Introduction to Geometry – Points, Lanes and Planes
Midpoint and Distance in the Coordinate Plane – Part 2
Independent Practice

1. Consider the following coordinate plane.



Part A: Plot the points $D(-6,-2)$ and $T(7,-8)$. Describe how to find the distance between D and T using the Pythagorean Theorem.

$\overline{DT}$ is the hypotenuse of the right triangle formed with the horizontal & vertical lengths (rise & run) being the legs. You can use the Pythagorean Theorem to find $\overline{DT}$ by determining the sum of the squares of the legs.

Part B: Determine the length of $\overline{DT}$. Round your answer to two decimal places.

$a^2 + b^2 = c^2$

$6^2 + 13^2 = c^2$

$36 + 169 = c^2$

$205 = c^2$

$c = \sqrt{205}$

$c = 14.32$

2. Two horses are ready to return to their barn after a long workout session at the track. The horses are at coordinates $H(1, 10)$ and $Z(10, 1)$. Their barns are located in the same building, which is at coordinates $B(-3, -9)$. Each unit/grid on the coordinate plane represents 100 meters. Which horse is closer to the barn? Justify your answer.

$d_{\overline{HB}} = \sqrt{(1--3)^2+(10--9)^2}$

$= \sqrt{16+361} = \sqrt{377}$

$= 19.42$ or 1942m

$d_{\overline{ZB}} = \sqrt{(10--3)^2+(1--9)^2}$

$= \sqrt{169+100} = \sqrt{269}$

$= 16.40$ or 1640m

The horse at point Z is closer.

3. Darko found the distance between points $A(3, -4)$ and $B(-1, 3)$. His work is shown below.

$x_A = 3 \quad y_A = -4 \quad x_B = -1 \quad y_B = 3$

$D(A,B) = \sqrt{(-1-3)^2+(3-4)^2}$

$= \sqrt{(-4)^2+(-1)^2}$

$= \sqrt{16+1}$

$= \sqrt{17}$

≈ 4.123

He wants you to check his work before giving it to his teacher. Determine if Darko's work is correct. Explain each of the steps that he followed and identify and correct any error, if necessary. Round your answer to two decimal places.

$d_{\overline{AB}} = \sqrt{(-1-3)^2+(3--4)^2}$

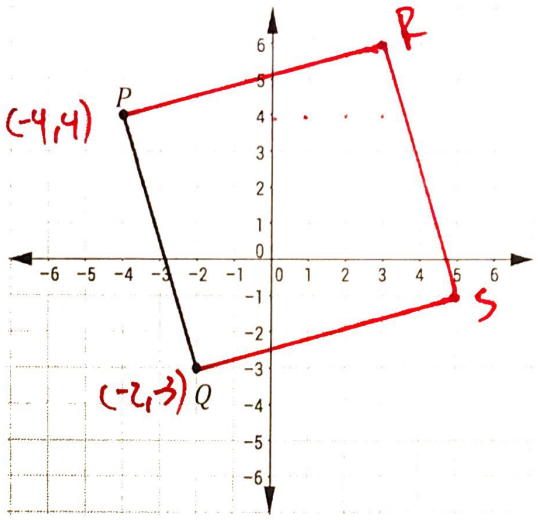
$= \sqrt{16+49}$

$= \sqrt{65}$

$= 8.06$

Darko subtracted $y_B - y_A$ correctly. He forgot the negative sign.

4. Consider the following graph.



Part A: Plot two points to form a square in the above graph. Label the points R and S. A square is a quadrilateral with all four sides of the same length. After plotting the points, trace the square by connecting the points.

Part B: To find the perimeter of a polygon, take the sum of the length of each side. What is the perimeter of the square that you created in *Part A*?

$d_{PQ} = \sqrt{(-4--2)^2 + (4--3)^2}$

$= \sqrt{(-2)^2 + (7)^2}$

$= \sqrt{53}$

The perimeter is $4\sqrt{53}$ or 29.12

5. Consider a triangle with vertices at $S(-2,-3)$, $A(2,3)$, and $N(5,-4)$.

Part A: What is the shortest side of the triangle? Select the correct response.

A $\overline{SA}$
B $\overline{AN}$
C $\overline{NS}$
D All sides are congruent.

Part B: Justify your answer from *Part A*.

$SA = \sqrt{(2--2)^2 + (3--3)^2}$

$= \sqrt{16+36}$

$= \sqrt{52} = 7.2$

$AN = \sqrt{(5-2)^2 + (-4-3)^2}$

$= \sqrt{9+49}$

$= \sqrt{58} = 7.6$

$NS = \sqrt{(5--2)^2 + (-4--3)^2}$

$= \sqrt{49+1}$

$= \sqrt{50} = 7.1$