OPENING PROBLEM

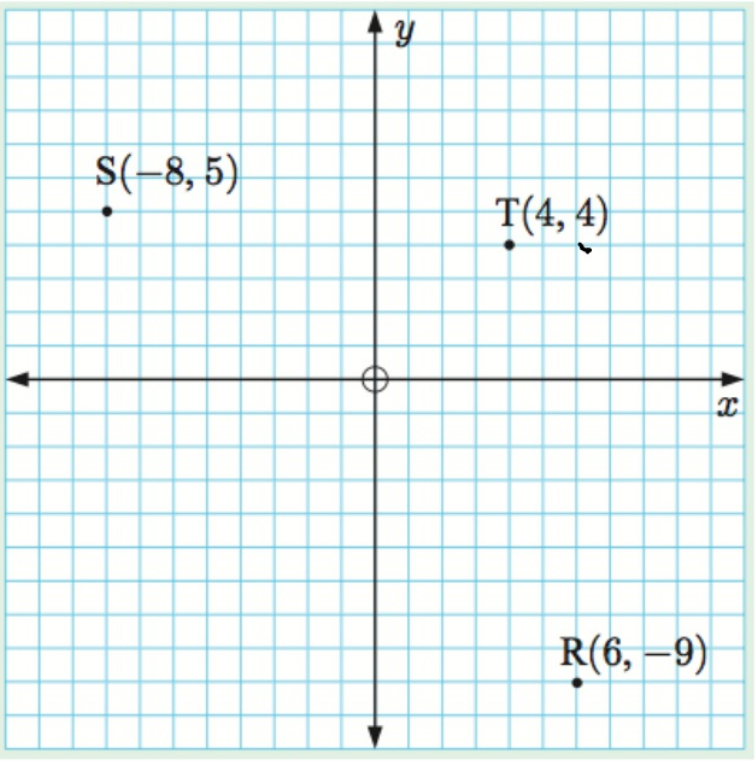
A city has two hospitals: Ridgehaven located at $R(6, -9)$, and Sunport located at $S(-8, 5)$.

Things to think about:

a Trish lives at $T(4, 4)$. Which hospital is Trish closest to?

b Can you find the point midway between the hospitals?

c The city's planning council wants to define a 'boundary line' so that people will go to the hospital closest to them. Can you find the equation of this boundary line?



Chapter 13

Coordinate geometry

Syllabus reference: 5.1

Contents:

A DISTANCE BETWEEN TWO POINTS

The distance d between two points (x_1, y_1) and (x_2, y_2) is given by

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}.$$

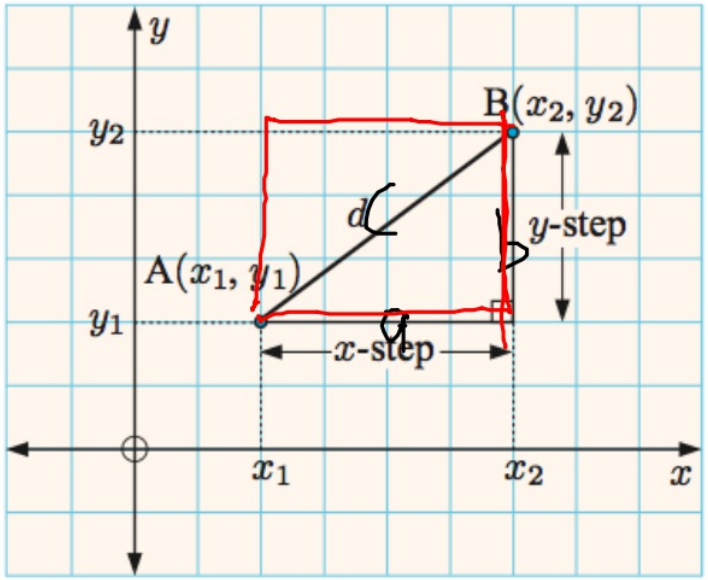
$\sqrt{4^2 + 3^2} = d$

Let's derive the distance formula:

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

$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{d^2}$

$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = d$



Triangle classification:

Equilateral:	Isosceles:	Scalene:
3 equal sides	2 equal sides	No equal sides

Use the distance formula to classify triangle ABC as either equilateral, isosceles, or scalene.

a A(−1, 0), B(−2, 3), C(−5, 4)

$x_1\ y_1$ $x_2\ y_2$

AB = 3.16

$\sqrt{(-2-(-1))^2+(3-0)^2}$

$\sqrt{(-1)^2+3^2}$

$\sqrt{1+9} = \sqrt{10}$

BC = 3.16

AC = 5.66

How can you tell if a triangle on a coordinate plane is a right triangle?

if $a^2 + b^2 = c^2$, then it is a right $\triangle$

Use the distance formula to see if the following triangles are right angled. If they are, state the vertex where the right angle is.

b A(−1, 2), B(3, 4), C(5, 0)

Yes, right $\triangle$

$AB = 4.47$

$BC = 4.47$

$AC = 6.32$

$4.47^2 + 4.47^2 = 6.32^2$

$39.96 = 39.94$

Exercise 13 A # 1, 2, 3, 4 (a-c on all)