# Classifying Shapes

| Triangles | Scalene | Isosceles | Equilateral | Right |
|---|---|---|---|---|
| | No equal sides | 2 equal sides | All sides equal | 2 sides form a right angle (perpendicular) |

Ex/ Determine what type of triangle is formed by the vertices X(5,-1), Y(8,5) and Z(11,2).

$m_{XY} = \frac{5-(-1)}{8-5} = \frac{6}{3} = 2$

$d_{XY} = \sqrt{(5-8)^2 + (-1-5)^2} = \sqrt{(-3)^2 + (-6)^2} = \sqrt{45}$

$m_{YZ} = \frac{5-2}{8-11} = \frac{3}{-3} = -1$

$d_{YZ} = \sqrt{(8-11)^2 + (5-2)^2} = \sqrt{(-3)^2 + 3^2} = \sqrt{18}$

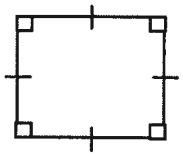
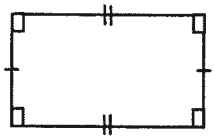
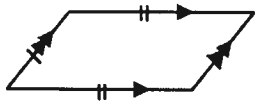
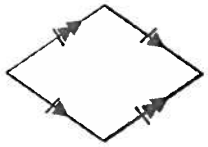
$m_{XZ} = \frac{-1-2}{5-11} = \frac{-3}{-6} = \frac{1}{2}$

$d_{XZ} = \sqrt{(5-11)^2 + (-1-2)^2} = \sqrt{(-6)^2 + (-3)^2} = \sqrt{45}$

Since no perpendicular slopes, it is <u>not</u> right angled.

Since 2 of the sides have the same length it is an isosceles triangle.

| Quadrilaterals (4 sided) | Square | Rectangle | Parallelogram | Rhombus |
|---|---|---|---|---|
| **Lengths** | All equal | 2 Pairs of equal | 2 Pairs of equal | All equal |
| **Angles** | Adjoining sides are perpendicular | Adjoining sides are perpendicular | No perpendicular sides **but** opposite sides are parallel | No perpendicular sides **but** opposite sides are parallel |

Ex/ What type of quadrilateral could be formed given the following information:

| | Slopes | | | | Lengths | | | |
|---|---|---|---|---|---|---|---|---|
| Quad # | AB | BC | CD | AD | AB | BC | CD | AD |
| 1 | 4 | -1/2 | 4 | -1/2 | 2 | 2 | 2 | 2 |
| 2 | 1 | -1 | 1 | -1 | 5 | 5 | 5 | 5 |

#1 - rhombus - 4 equal sides
- No ⊥ slopes, but opposite are parallel

#2 - Square - 4 equal sides
- ⊥ slope adjacent

Ex/ Determine what type of quadrilateral is formed by the vertices A(4,-3), B(10,3), C(15,-2) and D(9,-8).

$m_{AB} = \frac{3-(-3)}{10-4} = \frac{6}{6} = 1$ $\quad d_{AB} = \sqrt{(4-10)^2+(-3-3)^2} = \sqrt{(-6)^2+(-6)^2} = \sqrt{72}$

↖↘ Perpendicular

$m_{BC} = \frac{-2-3}{15-10} = \frac{-5}{5} = -1$ $\quad d_{BC} = \sqrt{(10-15)^2+(3-(-2))^2} = \sqrt{(-5)^2+5^2} = \sqrt{50}$

$m_{CD} = \frac{-8-(-2)}{9-15} = \frac{-6}{-6} = 1$ $\quad d_{CD} = \sqrt{(15-9)^2+(-2-(-8))^2} = \sqrt{6^2+6^2} = \sqrt{72}$

$m_{AD} = \frac{-8-(-3)}{9-4} = \frac{-5}{5} = -1$ $\quad d_{AD} = \sqrt{(4-9)^2+(-3-(-8))^2} = \sqrt{(-5)^2+5^2} = \sqrt{50}$

- Rectangle - 2 pairs of equal parallel side
- adjacent sides are perpendicular

Homework: Pg. 101 #'s: 1-3,8,11,13