

Example: Properties of Trapezoids**Problem:**

Find the length of XY and the measure of angle D . Trapezoid $ABCD$ with parallel sides AB and CD . X is the midpoint of AD ; Y is the midpoint of BC ; AB equals 21 meters; CD equals 33 meters; and angle A measures 122 degrees.

Solution:

We are given that X is the midpoint of one leg and Y is the midpoint of the other leg, so segment XY is called the midsegment of the trapezoid.

The midsegment is equal to one-half the sum of the two bases.

In this trapezoid, AB equals 21 and CD equals 33. XY , then, equals one-half the sum of 21 and 33.

Simplifying this, XY equals one-half of 54, which equals 27 meters.

Since this is a trapezoid with side AB parallel to side DC , angle A and angle D are supplementary.

This means that the sum of the measure of angle A and the measure of angle D equals 180.

Angle A measures 122, so we can write the equation 122 plus the measure of angle D equals 180.

Simplifying this, we get that the measure of angle D equals 58 degrees.