

The lengths of diagonals of a rectangle are represented by $5x$ yards and $7x - 18$ yards. Find the length of each diagonal.

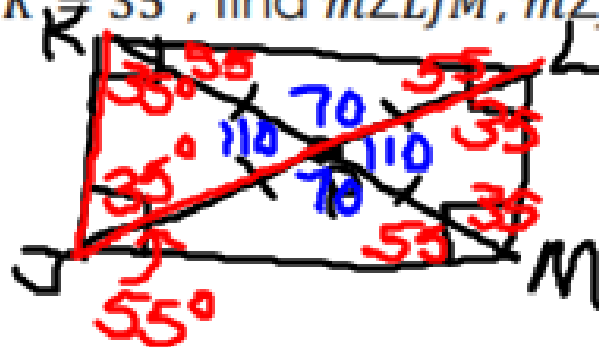
$$\begin{array}{r} 5x = 7x - 18 \\ - 7x \quad - 7x \\ \hline -2x = -18 \\ x = 9 \end{array}$$

$$5(9) = 45$$

$$7(9) - 18 = 45$$

Rectangle JKLM has diagonals intersecting at P . If $m\angle LJK = 35^\circ$, find $m\angle LJM$, $m\angle JLK$, $m\angle JPK$, and $m\angle JPM$.

$$\begin{array}{r} 90 \\ - 35 \\ \hline 55^\circ \end{array}$$



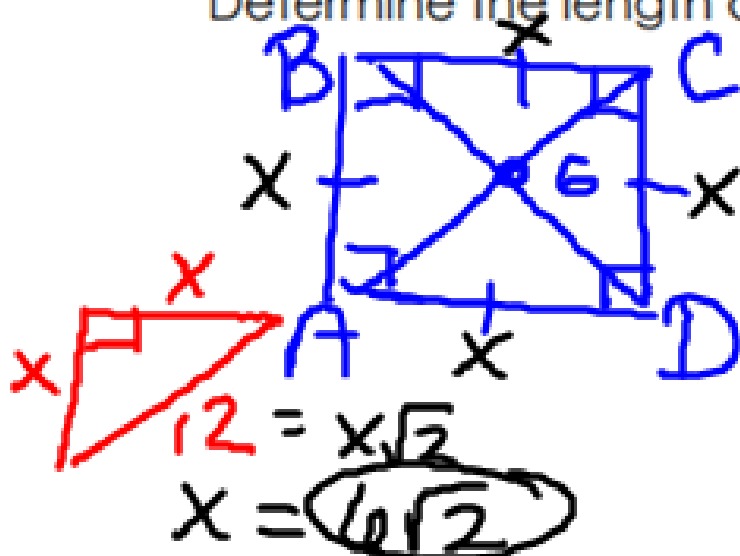
$$\begin{array}{r} 35 \quad 180 \\ 35 \quad - 70 \\ \hline 70 \quad 110 \end{array}$$

$$\begin{array}{l} m\angle LJM = 55 \\ m\angle JLK = 55 \\ m\angle JPK = 110 \\ m\angle JPM = 70 \end{array}$$

In square $ABCD$, the diagonals intersect at G . If $AC = 9x - 6$ and $BD = 21x - 30$.

$$BD = 21(2) - 30 = 12 \qquad AC = 9(2) - 6 = 12$$

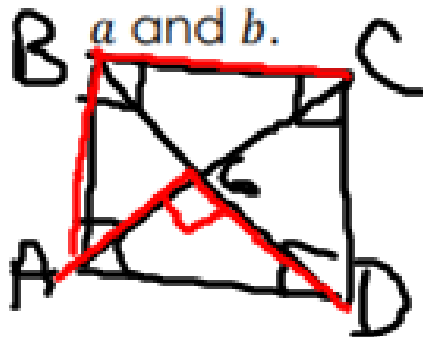
Determine the length of the side of the square.



$$\begin{aligned} 9x - 6 &= 21x - 30 \\ -9x &\quad -9x \\ \hline -6 &= 12x - 30 \\ +30 &\quad +30 \\ \hline 24 &= 12x \quad x = 2 \end{aligned}$$

In square $ABCD$, the diagonals intersect at G .

If $m\angle AGD = a + 2b$ and $m\angle ABC = 2a - b$, find the values of a and b .



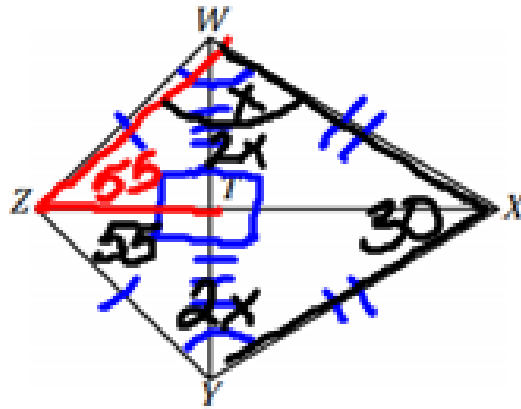
$$\begin{aligned} 2a - b &= 90 \rightarrow 2a - b = 90 \\ 2(a + 2b) &= 90 \rightarrow 2a + 4b = 180 \\ \hline &\quad -5b = -90 \\ &\quad b = 18 \\ a + 2(18) &= 90 \\ a + 36 &= 90 \quad a = 54 \end{aligned}$$

1. Identify which quadrilateral(s) meet the following criteria.

Criteria	Trapezoid	Parallelogram	Kite	Rhombus	Rectangle	Square
No parallel sides	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exactly one pair of parallel sides	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exactly <u>one pair</u> of sides are both congruent and parallel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Two pairs of opposite sides are congruent	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Two pairs of opposite angles are congruent	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Consecutive angles are supplementary	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Diagonals bisect the vertex angles	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

1. If two opposite angles of a quadrilateral are supplementary, is the quadrilateral a parallelogram?
- (A) No, because in parallelograms, angles are supplementary if and only if they are consecutive.
 - (B) No, because opposite angles in a parallelogram are never congruent.
 - (C) Yes, but only when the angles of the quadrilateral are right angles. Otherwise, it will be a trapezoid rather than a parallelogram.
 - (D) Yes, because only squares have that property, and squares are both parallelograms and quadrilaterals.

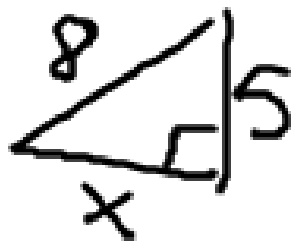
Consider kite $WXYZ$.



a. If $m\angle WZT = 55^\circ$ and $m\angle WXY = 30^\circ$, find $m\angle ZWX$.

$$\begin{aligned}
 55 + 55 + 30 + 2x + 2x &= 360 \\
 - 140 + 4x &= 360 \\
 - 140 & \\
 4x &= 220 \\
 x &= 55^\circ
 \end{aligned}$$

b. If $WZ = 8$ and $WT = 5$, find ZT .



$$\begin{aligned}
 x^2 + 5^2 &= 8^2 \\
 x^2 + 25 &= 64 \\
 - 25 & - 25 \\
 \hline
 \sqrt{x^2} &= \sqrt{39}
 \end{aligned}$$

$$\sqrt{39}$$