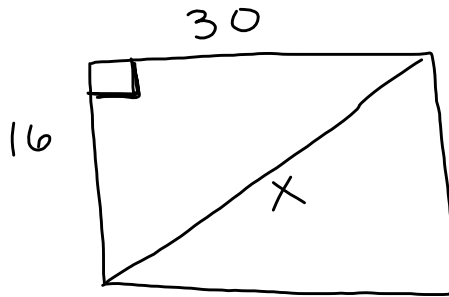


DO NOW

A builder is building a rectangular deck with dimensions of 16 feet by 30 feet. To ensure that the sides form 90° angles, what should each diagonal measure?



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

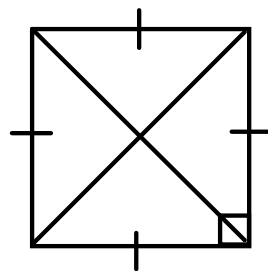
$$16^2 + 30^2 = x^2$$

$$256 + 900 = x^2$$

$$\sqrt{1156} = \sqrt{x^2}$$

$$34 = x$$

A **square** is a parallelogram with four right angles AND four congruent sides



It has ALL the properties of:

a parallelogram, PLUS a rectangle PLUS a rhombus!

Properties of a Square

Opp. sides \parallel

Diagonals are \perp

Diagonals are \cong

Diagonals bisect each other

4 right \angle 's

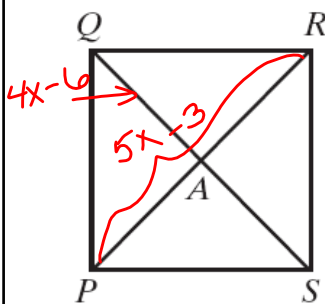
4 \cong sides

Opp. angles \cong

Diagonals bisect vertex \angle 's

Consecutive \angle 's are supplementary

- 1) In square $PQRS$, $PR = 5x - 3$ and $QA = 4x - 6$.
What are the values of x , PR , QS , and QA ?



$$2(4x - 6) = 5x - 3$$

$$8x - 12 = 5x - 3$$

$$3x = 9$$

$$\boxed{x = 3}$$

$$QA = \frac{1}{2} PR$$

OR

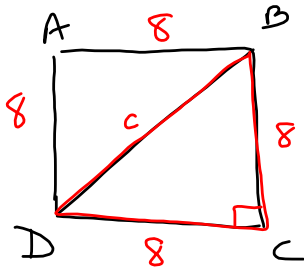
$$2QA = PR$$

$$PR = 12$$

$$QS = 12$$

$$QA = 6$$

2) The perimeter of square $ABCD$ is 32. Find the length of diagonal BD .

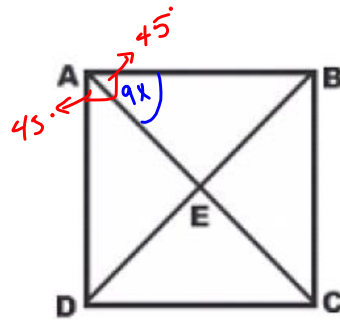


$$P = 32$$

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 8^2 + 8^2 &= c^2 \\ 64 + 64 &= c^2 \\ \sqrt{128} &= \sqrt{c^2} \\ \sqrt{128} &= c \\ \swarrow \quad \searrow \\ \sqrt{64} \cdot \sqrt{2} &= c \\ \boxed{8\sqrt{2} = c} \end{aligned}$$

4, 9, 16, 25, 36, 49, (64)...

3) Given square $ABCD$ and $m\angle BAC = (9x)^\circ$, find x



$$9x = 45$$

$$\boxed{x = 5}$$

- 4) In the diagram below of rhombus $ABCD$, the diagonals \overline{AC} and \overline{BD} intersect at E .

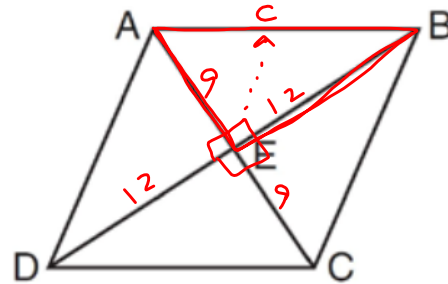
If $AC = 18$ and $BD = 24$, what is the length of one side of rhombus $ABCD$?

$$9^2 + 12^2 = c^2$$

$$81 + 144 = c^2$$

$$\sqrt{225} = \sqrt{c^2}$$

$$\boxed{15 = c}$$



- 5) In the accompanying diagram of rectangle $ABCD$, $m\angle BAC = 3x + 4$ and $m\angle ACD = x + 28$.

What is $m\angle CAD$?

$$3x + 4 = x + 28$$

$$2x = 24$$

$$x = 12$$

$$\boxed{m\angle CAD = 50^\circ}$$

