Worksheet: The Converse of the Pythagorean Theorem

Q1: What can the converse of the Pythagorean theorem be used for?

Question Video

A finding the angles in a triangle

B demonstrating that a triangle has a right angle

C demonstrating that a triangle is equilateral

D finding lengths in an equilateral triangle

E demonstrating that a triangle is an isosceles triangle

Q2: Can the lengths 7.9 cm, 8.1 cm, and 5.3 cm form a right-angled triangle?

Question Video

A yes

B no

Q3: Can the lengths 16.6 cm, 6.3 cm, and 11.3 cm form a right-angled triangle?

Question Video

A yes

B no

Q4: Can the lengths 14.4 cm, 19.2 cm, and 24 cm form a right-angled triangle?

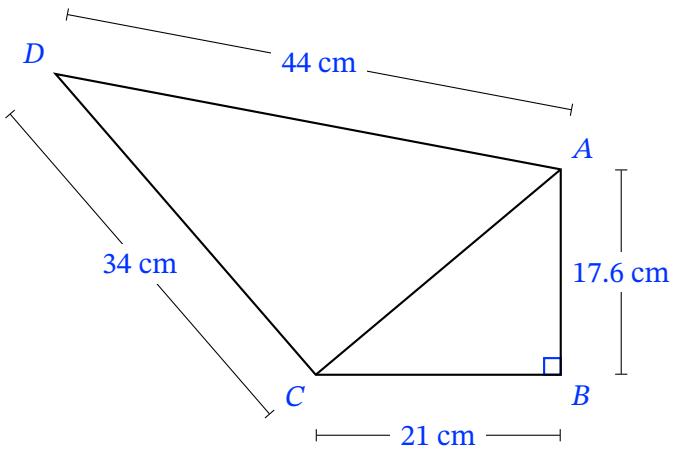
Question Video

A no

B yes

Q5: Is $\triangle ACD$ a right-angled triangle at C?

Question Video

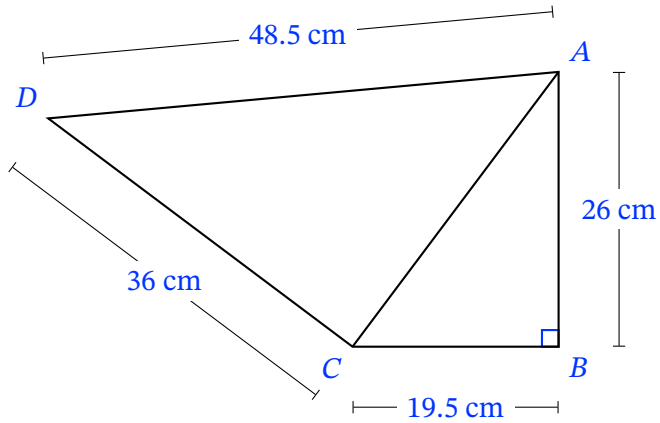


A no

B yes

Q6: Is $\triangle ACD$ a right-angled triangle at C?

Question Video

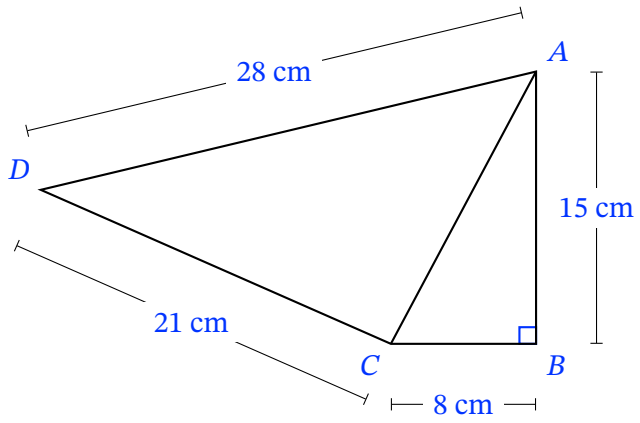


A yes

B no

Q7: Is $\triangle ACD$ a right-angled triangle at C?

Question Video



A no

B yes

Q8: A triangle has sides of lengths 36.4, 27.3 and 45.5. What is its area?

Question Video

A 621.08

B 993.72

C 496.86

D 828.1

Q9: A triangle has sides of lengths 20.4, 59.5 and 62.9. What is its area?

Question Video

A 1,871.28

B 1,213.8

C 606.9

D 641.58

Q10: A triangle has sides of lengths 44, 4.2 and 44.2. What is its area?

Question Video

A 92.82

B 184.8

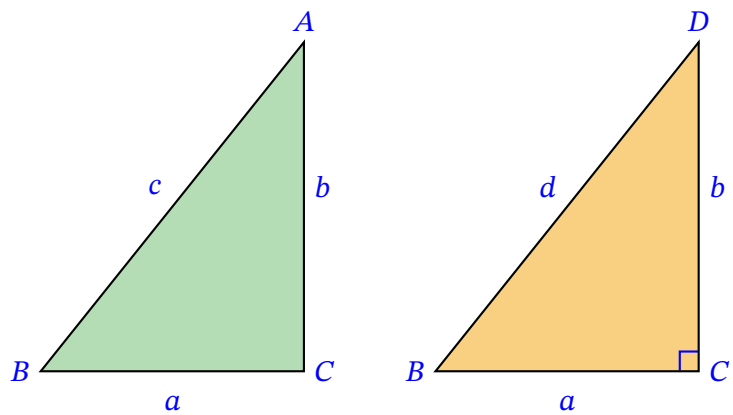
C 92.4

D 972.4

Q11: The Pythagorean theorem states that, in a right triangle, the area of a square on the hypotenuse is equal to the sum of the areas of the squares on the legs. Does this mean that a triangle where $c^2 = a^2 + b^2$ is necessarily a right triangle?

Question Video

Let us assume that $\triangle ABC$ is of side lengths a, b, and c, with $c^2 = a^2 + b^2$. Let $\triangle DBC$ be a right triangle of side lengths a, b, and d.



Using the Pythagorean theorem, what can you say about the relationship between a, b, and d?

A $d^2 = a^2 + b^2$

B $a^2 = d^2 + b^2$

C $b^2 = a^2 + d^2$

We know that for $\triangle ABC$, $c^2 = a^2 + b^2$.

What do you conclude about d?

A $d = c$

B $d \neq c$

C $d > c$

- Is it possible to construct different triangles with the same length sides?

A no

B yes

- What do you conclude about $\triangle ABC$?

A It is congruent to $\triangle DBC$, so it has a right angle at B.

B It is congruent to $\triangle DBC$, so it has a right angle at A.

C It is congruent to $\triangle DBC$, so it has a right angle at C.

D It is similar to $\triangle DBC$, so it has a right angle at C.

E It is similar to $\triangle DBC$, so it has a right angle at A.

Q12: In triangle ABC point D lies on $\overline{BC}$ and $\overrightarrow{AD} \perp \overline{BC}$, $AC = 37.8$, $AD = 10.08$, and $AB = 10.76$. Find the length of $\overline{BC}$ to the nearest tenth, and then determine whether $\triangle ABC$ is a right-angled triangle or not.

A $BC = 2.9$, not a right-angled triangle

B $BC = 37.5$, a right-angled triangle

C $BC = 35.4$, a right-angled triangle

D $BC = 40.2$, not a right-angled triangle

Q13: In triangle ABC point D lies on $\overline{BC}$ and $\overrightarrow{AD} \perp \overline{BC}$, $AC = 10.5$, $AD = 6$, and $AB = 7.69$. Find the length of $\overline{BC}$ to the nearest tenth, and then determine whether $\triangle ABC$ is a right-angled triangle or not.

A $BC = 4.4$, not a right-angled triangle

B $BC = 12.5$, a right-angled triangle

C $BC = 8.2$, a right-angled triangle

D $BC = 13.4$, not a right-angled triangle

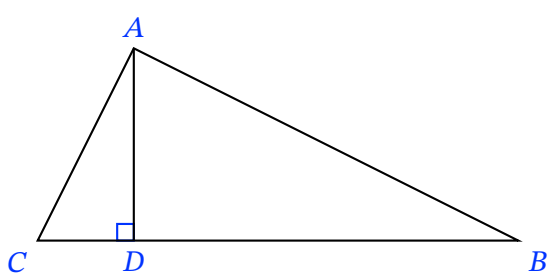
Q14: In triangle ABC, let D on BC be the foot of the altitude from A. If $AC = 118.9$, $AD = 69.618$, and $BD = 50.94$, is ABC right angled at A?

A no

B yes

Q15: In triangle ABC, $\overline{AD}$ is perpendicular to $\overline{BC}$, D lies between B and C, $BD = 8$, $CD = 2$, and $AD = 4$. Is ABC a right-angled triangle?

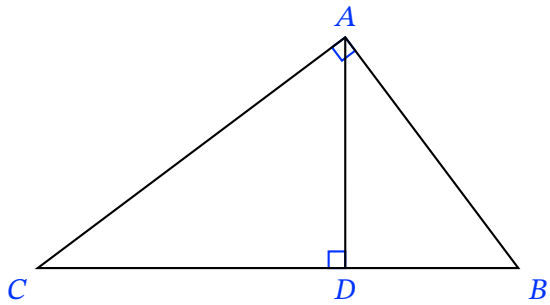
Question Video



A yes

B no

Q16: What does $(AC)^2$ equal to?



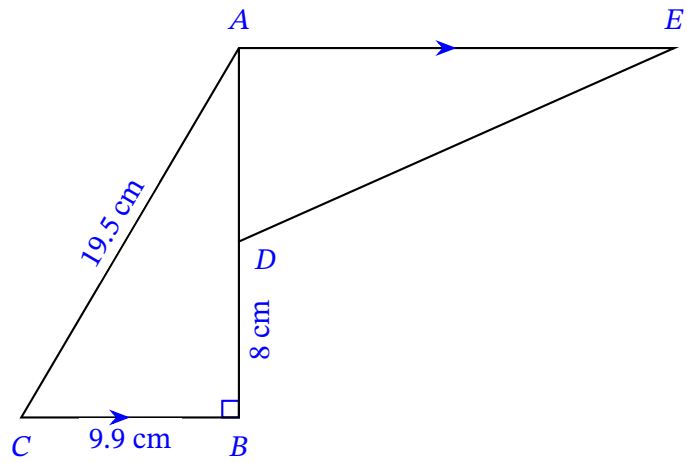
A $CB - AB$

B $(CD)^2 - (AD)^2$

C $CD - DB$

D $(CB)^2 - (AB)^2$

Q17: In the figure shown, suppose that $AE = 2BC$ and $BD = 8$. Determine $\overline{AD}$ and $\overline{ED}$ rounded to the nearest hundredth, if necessary.



A $AD = 13.87$ cm, $ED = 25.97$ cm

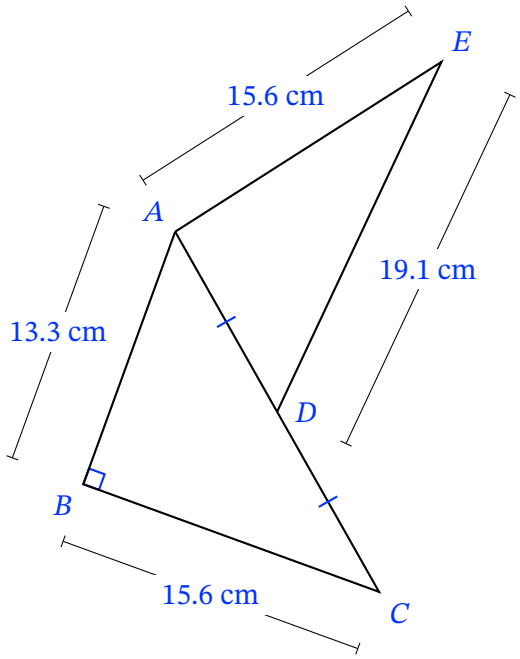
B $AD = 13.87$ cm, $ED = 24.17$ cm

C $AD = 8.8$ cm, $ED = 17.74$ cm

D $AD = 8.8$ cm, $ED = 21.67$ cm

Q18: Is $\triangle EAD$ a right-angled triangle at A?

Question Video



A no

B yes

Q19: ABC is a triangle where $AB = 3$ cm, $BC = 4$ cm and $AC = 5$ cm. Find the size of $\angle ABC$.

A 60°

B 45°

C 90°

D 30°

Q20: ABC is a triangle where $AB = AB = 5$ cm, $BC = 12$ cm and $AC = 13$ cm. Find the size of $\angle ABC$.

A $90°$

B $30°$

C $45°$

D $60°$

Q21: Two lines intersect at the point $A(0, 1)$. One line goes through the point $B(2, 3)$, and the other goes through the point $C(2, -1)$.

- Find the lengths of $\overline{AB}$, $\overline{AC}$, and $\overline{BC}$.

A $AB = 4, AC = 2\sqrt{2}, BC = 2\sqrt{2}$

B $AB = 2\sqrt{2}, AC = 2\sqrt{2}, BC = 2\sqrt{2}$

C $AB = 2\sqrt{2}, AC = 4, BC = 4$

D $AB = 2\sqrt{2}, AC = 2\sqrt{2}, BC = 4$

E $AB = 4, AC = 2\sqrt{2}, BC = 4$

- Using the Pythagorean theorem, decide: is triangle ABC a right triangle?

A Yes

B No

- Are the two lines perpendicular?

A Yes

B No

Q22: Two lines intersect at the point $A(3, -1)$. One line goes through the point $B(5, 1)$, and the other goes through the point $C(-2, 6)$.

- Find the lengths of $\overline{AB}$, $\overline{AC}$, and $\overline{BC}$

A $AB = 2\sqrt{2}, AC = \sqrt{74}, BC = \sqrt{74}$

B $AB = 2\sqrt{2}, AC = \sqrt{74}, BC = 2\sqrt{2}$

C $AB = 2\sqrt{2}, AC = \sqrt{74}, BC = 2$

D $AB = 2\sqrt{2}, AC = 2\sqrt{2}, BC = \sqrt{74}$

E $AB = \sqrt{74}, AC = 2\sqrt{2}, BC = \sqrt{74}$

- Using the Pythagorean theorem, decide: is triangle ABC a right triangle?

A No

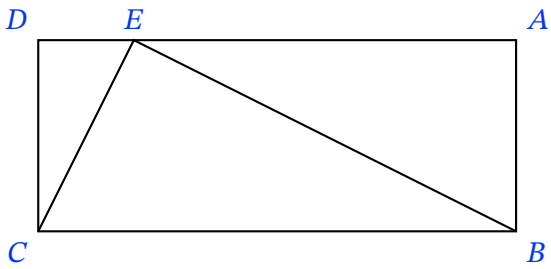
B Yes

- Hence, are the two lines perpendicular?

A No

B Yes

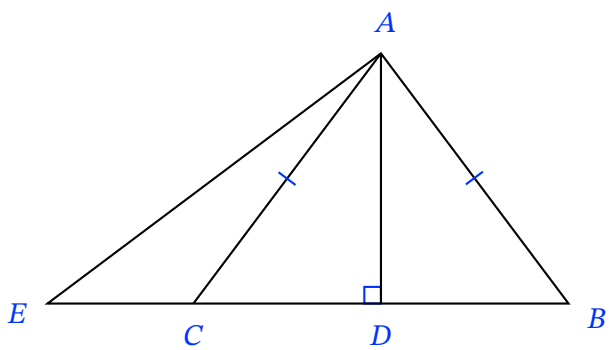
Q23: In rectangle $ABCD$, suppose $AE = 8$, $DE = 2$, and $DC = 4$. Is $\triangle BEC$ right angled?



A yes

B no

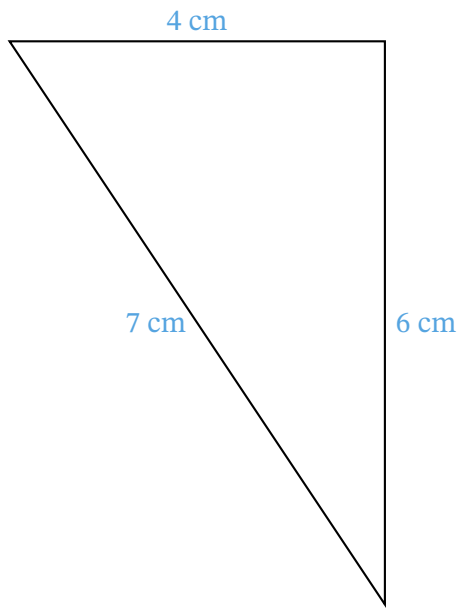
Q24: In the isosceles triangle ABC below, $AD = 36$ cm, $BC = 54$ cm, and $AE = 60$ cm. Is $\triangle BAE$ a right-angled triangle?



A yes

B no

Q25: Is this triangle a right triangle?



A No

B Yes