

Triangles, Similarity & Special Triangles

Foundation to Challenge

Practice should make the test feel easier, not merely familiar.

Work without the answer key first. Check answers through the SAT Practice Library after completing the set.

STANDARD

- 1 Rectangle ABCD has width 16 and height 12. Point E on BC is 4 units below B . What is the perimeter of triangle BDE?

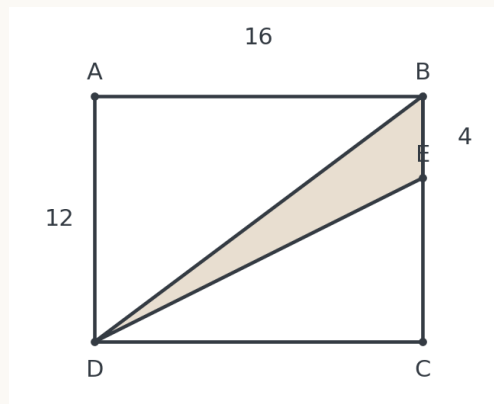


Diagram not drawn to scale.

FOUNDATION

- 2 In the same rectangle, what is the area of triangle BDE?

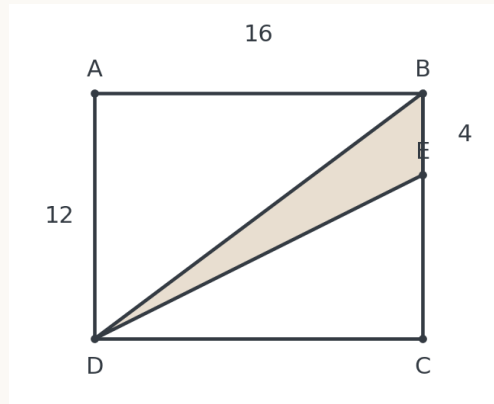


Diagram not drawn to scale.

STANDARD

- 3 What is the area of an equilateral triangle with altitude 9?

- A. $18\sqrt{3}$
- B. $24\sqrt{3}$
- C. $27\sqrt{3}$
- D. $36\sqrt{3}$

FOUNDATION

- 4 In a $30 - 60 - 90$ triangle, the hypotenuse is 18. What is the longer leg?

- A. 9
- B. $9\sqrt{2}$
- C. $9\sqrt{3}$
- D. $18\sqrt{3}$

- 5 In a $30 - 60 - 90$ triangle, the shorter leg is 10. What is the hypotenuse?
- A. 20
 - B. $10\sqrt{3}$
 - C. $20\sqrt{3}$
 - D. $10\sqrt{2}$

ADVANCED

- 6 In a right triangle, one acute angle is 30° and the side opposite it is 8. What is the perimeter?
- A. 24
 - B. $16 + 8\sqrt{3}$
 - C. $24 + 8\sqrt{3}$
 - D. $32 + 8\sqrt{3}$

- 7 A $45 - 45 - 90$ triangle has a leg of 6. Its hypotenuse is used as the shorter leg of a $30 - 60 - 90$ triangle. What is the longer leg of the $30 - 60 - 90$ triangle?
- A. $6\sqrt{2}$
 - B. $6\sqrt{6}$
 - C. $12\sqrt{3}$
 - D. 18

CHALLENGE

- 8 In triangle ABC, AD bisects $\angle A$. If $AB=10$, $AC=15$, and $BD=6$, what is DC?

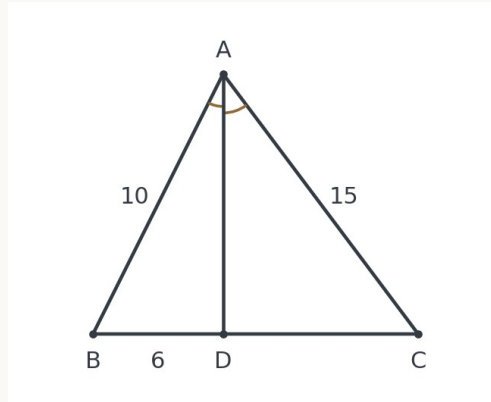


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FOUNDATION

- 9 An equilateral triangle sits on a square of side 4. What is the area of the equilateral triangle?
- A. $4\sqrt{3}$
 B. $2\sqrt{3}$
 C. $8\sqrt{3}$
 D. $16\sqrt{3}$

STANDARD

- 10 An isosceles triangle has equal sides 10 and base 12. What is its area?

ADVANCED

- 11** Right triangle ABC has $\angle A = 90^\circ$, $AB = 12$, and $AC = 16$. Point D lies on AC and point E lies on BC so that $DE \parallel AB$. If $DE = 9$, what is CE ?

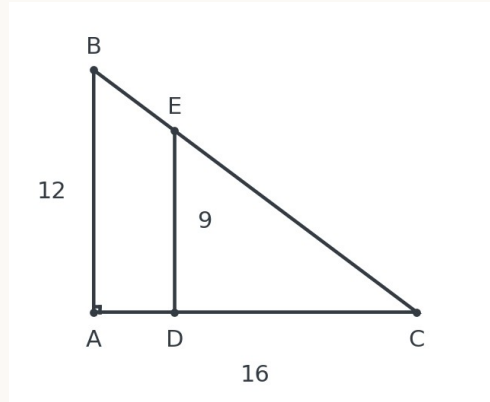
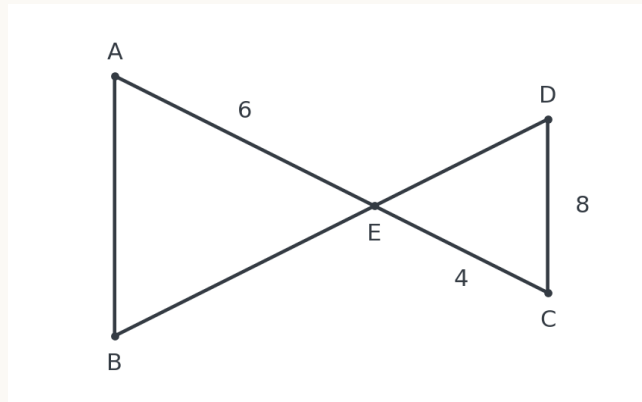


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- A. 9
- B. 10
- C. 12
- D. 15

STANDARD

- 12** Segments AC and BD intersect at E , with A, E, C collinear and B, E, D collinear. If $AB \parallel CD$, $CE = 4$, $EA = 6$, and $CD = 8$, what is AB ?



$AB \parallel CD$. Diagram not drawn to scale.

ADVANCED

- 13** A right triangle has legs 8 and 15 and hypotenuse 17. The altitude from the right angle meets the hypotenuse at E . What is the length of the projection of the 15-unit leg onto the hypotenuse?

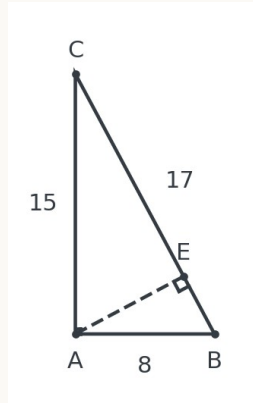


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- 14** In right triangle QRT , $\angle Q = 90^\circ$, $QT = 12$, and $RT = 20$. The altitude from Q meets hypotenuse RT at S . What is RS to the nearest tenth?

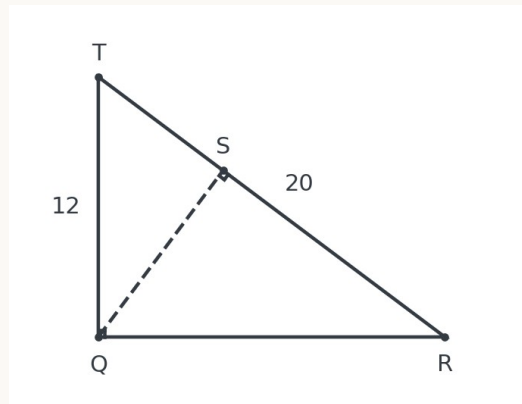
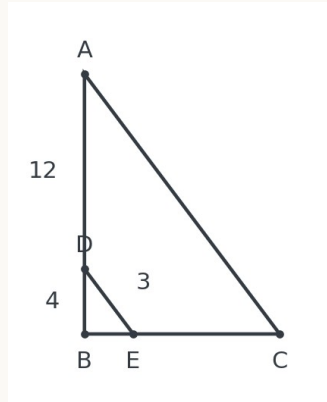


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- A. 11.2
- B. 12.0
- C. 12.8
- D. 14.4

STANDARD

- 15 In triangle ABC, D lies on AB and E lies on BC, with $DE \parallel AC$. $AD = 12$, $DB = 4$, and $DE = 3$.
I. Find AC. II. Find $\text{area}(BDE):\text{area}(BAC)$.



$DE \parallel AC$. Diagram not drawn to scale.

FOUNDATION

- 16 Triangle ABC is similar to DEF. Sides of ABC are 5,7,8 and side corresponding to 5 is 10. What is perimeter of DEF?

- A. 20
- B. 30
- C. 40
- D. 50

ADVANCED

- 17 A right triangle has legs 5 and 12 and hypotenuse 13. The altitude from the right angle meets the hypotenuse. What is the projection of the 5-unit leg onto the hypotenuse?

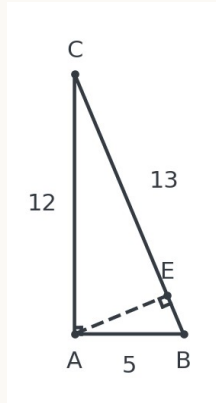


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STANDARD

- 18 Two right triangles are similar. The larger triangle has legs 9 and 12. The 9-unit leg corresponds to a 6-unit leg in the smaller triangle. What is the area of the smaller triangle?

CHALLENGE

- 19 Square DBCE has side 4. Point O lies 6 units left of E on the same horizontal line, and O, D, A are collinear with A directly above B . What is AD ?

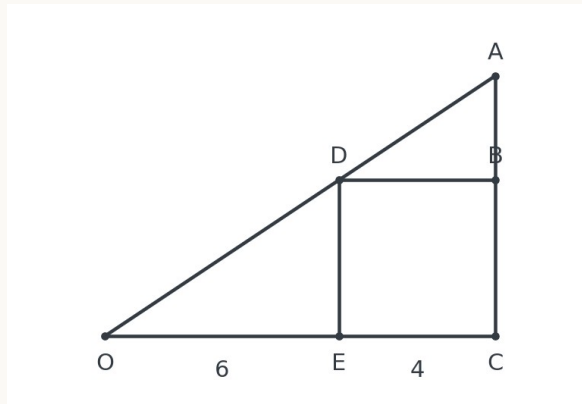


Diagram not drawn to scale.

FINISHED?

Check your answers online

aryalanupme.github.io/sat-triangles-similarity.html

Do not stop at “wrong.” Identify why it was wrong: concept, algebra, arithmetic, interpretation, calculator choice, or timing.

I do not correct the answer first. I correct the reason.

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