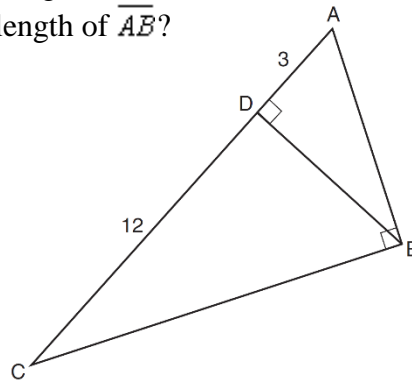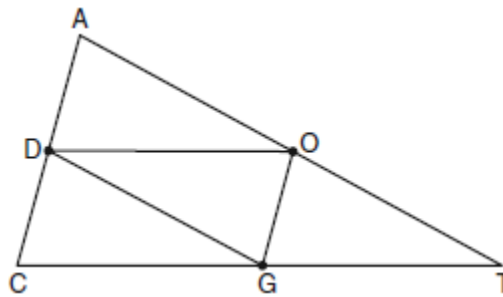1. In right triangle *ABC* shown in the diagram below, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$,
    CD = 12, and *AD* = 3. What is the length of $\overline{AB}$?

    1) $5\sqrt{3}$

    2) 6

    3) $3\sqrt{5}$

    4) 9

2. In the diagram below of $\triangle ACT$, *D* is the midpoint of $\overline{AC}$, *O* is the midpoint of $\overline{AT}$, and *G* is the midpoint
of $\overline{CT}$. If *AC* = 10, *AT* = 18, and *CT* = 22, what is the perimeter of parallelogram *CDOG*?

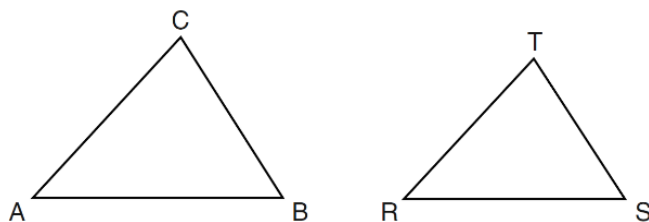   1) 21

    2) 25

    3) 32

    4) 40

3. A triangle has sides whose lengths are 5, 12, and 13. A similar triangle could have sides with lengths of

    1)   3, 4, and 5
    2)   6, 8, and 10
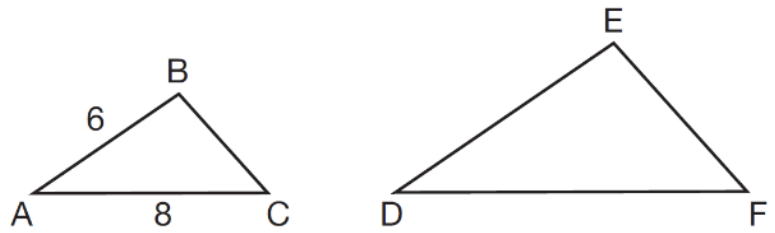   3)   7, 24, and 25
    4)   10, 24, and 26

4. In the diagram below, $\triangle ABC \sim \triangle RST$. Which statement is *not* true?

    1) $\angle A \cong \angle R$

    2) $\dfrac{AB}{RS} = \dfrac{BC}{ST}$

    3) $\dfrac{AB}{BC} = \dfrac{ST}{RS}$

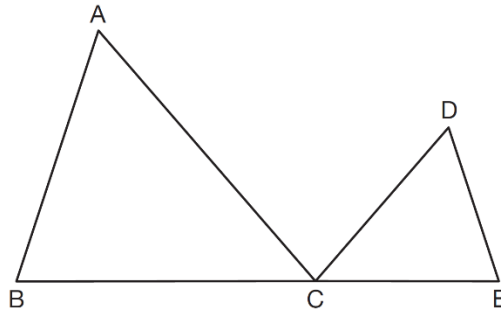   4) $\dfrac{AB + BC + AC}{RS + ST + RT} = \dfrac{AB}{RS}$

5. In the diagram below, $\triangle ABC \sim \triangle DEF$. If $AB = 6$ and $AC = 8$, which statement will justify similarity by SAS?

1) $DE = 9$, $DF = 12$, and $\angle A \cong \angle D$

2) $DE = 8$, $DF = 10$, and $\angle A \cong \angle D$

3) $DE = 36$, $DF = 64$, and $\angle C \cong \angle F$

4) $DE = 15$, $DF = 20$, and $\angle C \cong \angle F$

6. In the diagram below, $\triangle ABC \sim \triangle DEC$. If $AC = 12$, $DC = 7$, $DE = 5$, and the perimeter of $\triangle ABC$ is 30, what is the perimeter of $\triangle DEC$?

1) 12.5

2) 14.0

3) 14.8

4) 17.5

7. Delroy's sailboat has two sails that are similar triangles. The larger sail has sides of 10 feet, 24 feet, and 26 feet. If the shortest side of the smaller sail measures 6 feet, what is the length of the *longest side* of the smaller sail?
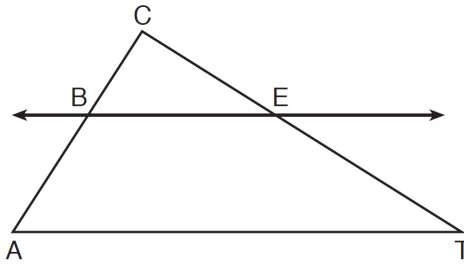
1)   14.4 ft

2)   15.6 ft

3)   36 ft

4)   43.3 ft

8. In the diagram below, $\overline{QM}$ is an altitude of right triangle PQR, $PM = 8$, and $RM = 18$. What is the length of $\overline{QM}$?

1) 20

2) 16

3) 12

4) 10
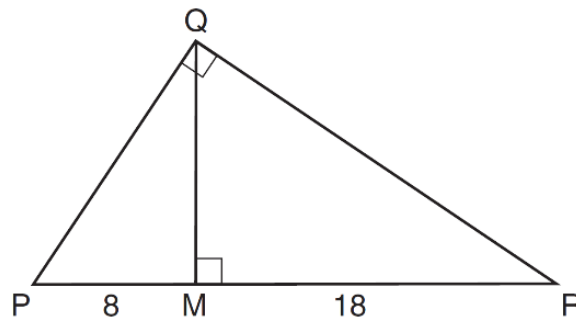
9. In the diagram below of $\triangle ACT$, $\overleftrightarrow{BE} \parallel \overline{AT}$. If $CB = 3$, $CA = 10$, and $CE = 6$, what is the length of $\overline{ET}$?
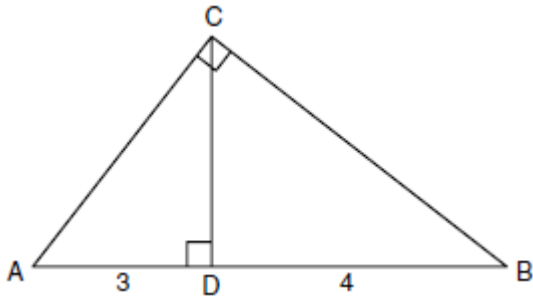
1) 5

2) 14

3) 20

4) 26

10. A three-inch line segment is dilated by a scale factor of 6 and centered at its midpoint. What is the length of its image?
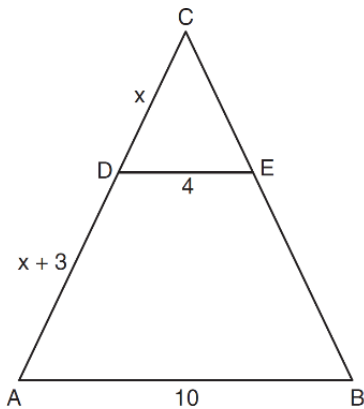
1) 9 inches

2) 2 inches

3) 15 inches

4) 18 inches

11. In the diagram below of right triangle ACB, altitude $\overline{CD}$ intersects $\overline{AB}$ at D. If $AD = 3$ and $DB = 4$, find the length of $\overline{CD}$ in simplest radical form.

12. In the diagram of $\triangle ABC$ shown below, $\overline{DE} \parallel \overline{BC}$. If $AB = 10$, $AD = 8$, and $AE = 12$, what is the length of $\overline{EC}$?
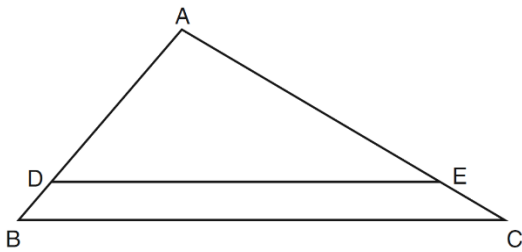
13. In the diagram below of $\triangle ABC$, $\overline{CDA}$, $\overline{CEB}$, $\overline{DE} \parallel \overline{AB}$, $DE = 4$, $AB = 10$, $CD = x$, and $DA = x + 3$. What is the value of x?

C

x

D   E
    4

x + 3

A   10   B

14. To find the distance across a pond from point B to point C, a surveyor drew the diagram below. The measurements he made are indicated on his diagram. Use the surveyor's information to determine and state the distance from point B to point C, to the *nearest yard*.

B

D

120 yd

A

230 yd

E

85 yd   C
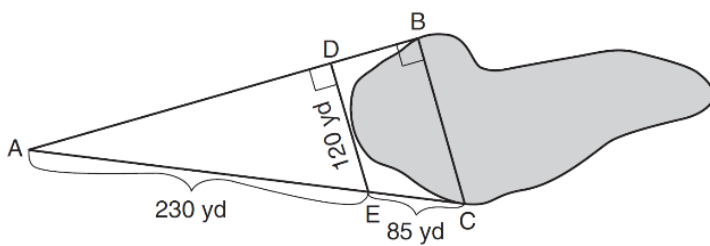
15. In right triangle FGH shown below, $m\angle GHF = 90$, altitude $\overline{HJ}$ is drawn to $\overline{FG}$, $FJ = 16$, and $HG = 15$. Determine and state the length of $\overline{JG}$. Determine and state the length of $\overline{HJ}$.

G

J

15

16

H   F
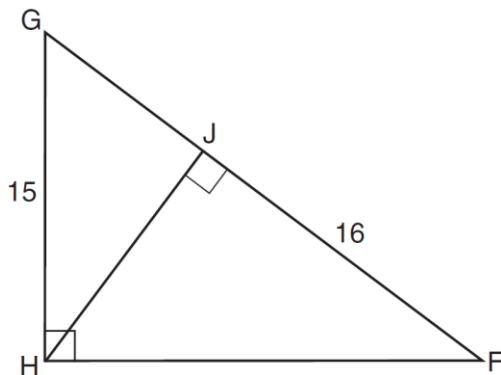
16. In the diagram of $\triangle ABC$ below, $AB = 10$, $BC = 14$, and $AC = 16$. Find the perimeter of the triangle formed by connecting the midpoints of the sides of $\triangle ABC$.
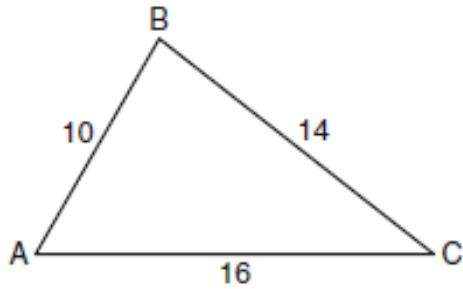
17. Triangle ABC and triangle ADE are graphed on the set of axes below. Describe a transformation that maps triangle ABC onto triangle ADE. Explain why this transformation makes triangle ADE similar to triangle ABC.
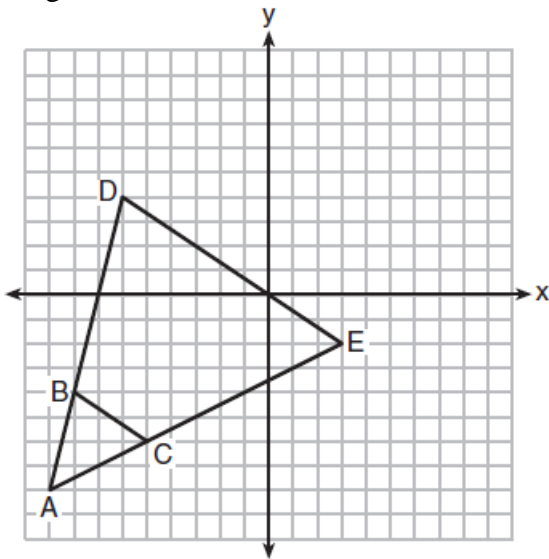
18. In $\triangle CED$ as shown below, points A and B are located on sides $\overline{CE}$ and $\overline{ED}$, respectively. Line segment AB is drawn such that $AE = 3.75$, $AC = 5$, $EB = 4.5$, and $BD = 6$. Explain why $\overline{AB}$ is parallel to $\overline{CD}$.