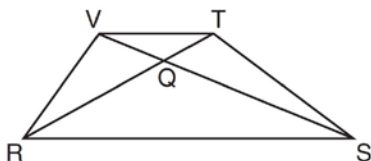


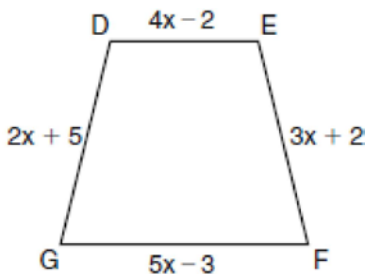
G.G.40: Trapezoids: Investigate, justify, and apply theorems about trapezoids (including isosceles trapezoids) involving their angles, sides, medians, and diagonals

- If the diagonals of a quadrilateral do *not* bisect each other, then the quadrilateral could be a
 - rectangle
 - rhombus
 - square
 - trapezoid
- In trapezoid $RSTV$ with bases \overline{RS} and \overline{VT} , diagonals \overline{RT} and \overline{SV} intersect at Q .

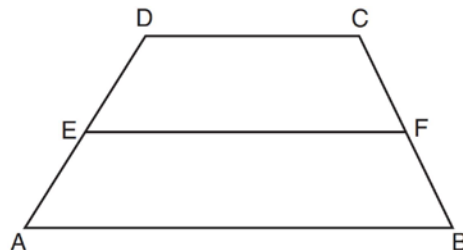


If trapezoid $RSTV$ is *not* isosceles, which triangle is equal in area to $\triangle RSV$?

- $\triangle RQV$
 - $\triangle RST$
 - $\triangle RVT$
 - $\triangle SVT$
- Isosceles trapezoid $ABCD$ has diagonals \overline{AC} and \overline{BD} . If $AC = 5x + 13$ and $BD = 11x - 5$, what is the value of x ?
 - 28
 - $10\frac{3}{4}$
 - 3
 - $\frac{1}{2}$
 - In the diagram below of isosceles trapezoid $DEFG$, $\overline{DE} \parallel \overline{GF}$, $DE = 4x - 2$, $EF = 3x + 2$, $FG = 5x - 3$, and $GD = 2x + 5$. Find the value of x .

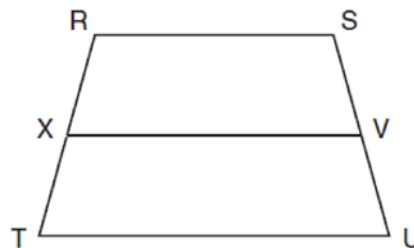


- In the diagram below, \overline{EF} is the median of trapezoid $ABCD$.



If $AB = 5x - 9$, $DC = x + 3$, and $EF = 2x + 2$, what is the value of x ?

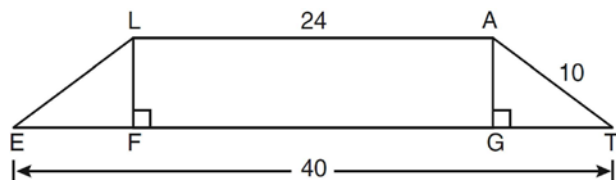
- 5
 - 2
 - 7
 - 8
- In the diagram below of trapezoid $RSUT$, $\overline{RS} \parallel \overline{TU}$, X is the midpoint of \overline{RT} , and V is the midpoint of \overline{SU} .



If $RS = 30$ and $XV = 44$, what is the length of \overline{TU} ?

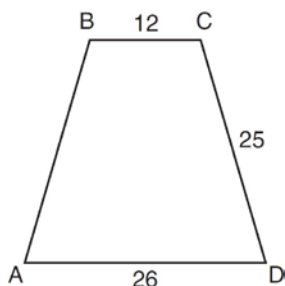
- 37
- 58
- 74
- 118

- 7 In the diagram below, $\triangle LATE$ is an isosceles trapezoid with $\overline{LE} \cong \overline{AT}$, $\overline{LA} = 24$, $ET = 40$, and $AT = 10$. Altitudes \overline{LF} and \overline{AG} are drawn.



What is the length of \overline{LF} ?

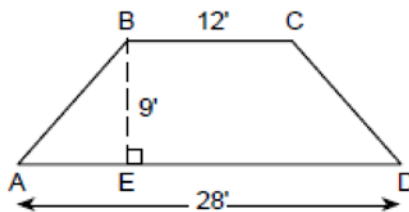
- 1) 6
 - 2) 8
 - 3) 3
 - 4) 4
- 8 In the diagram below of isosceles trapezoid $ABCD$, $AB = CD = 25$, $AD = 26$, and $BC = 12$.



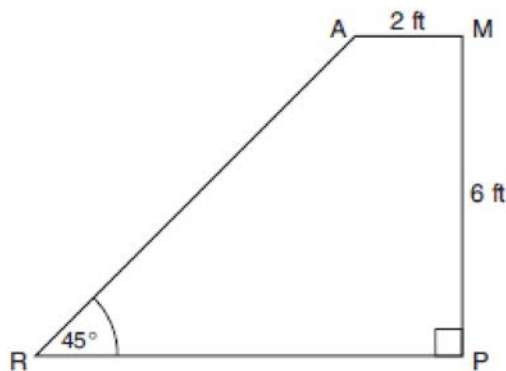
What is the length of an altitude of the trapezoid?

- 1) 7
 - 2) 14
 - 3) 19
 - 4) 24
- 9 In isosceles trapezoid $ABCD$, $\overline{AB} \cong \overline{CD}$. If $BC = 20$, $AD = 36$, and $AB = 17$, what is the length of the altitude of the trapezoid?
- 1) 10
 - 2) 12
 - 3) 15
 - 4) 16

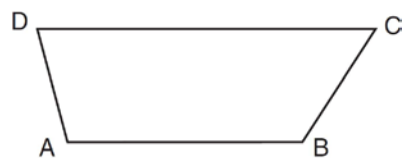
- 10 The cross section of an attic is in the shape of an isosceles trapezoid, as shown in the accompanying figure. If the height of the attic is 9 feet, $BC = 12$ feet, and $AD = 28$ feet, find the length of \overline{AB} to the nearest foot.



- 11 The accompanying diagram shows ramp \overline{RA} leading to level platform \overline{AM} , forming an angle of 45° with level ground. If platform \overline{AM} measures 2 feet and is 6 feet above the ground, explain why the exact length of ramp \overline{RA} is $6\sqrt{2}$ feet.



- 12 In the diagram below, \overline{AB} and \overline{CD} are bases of trapezoid $ABCD$.

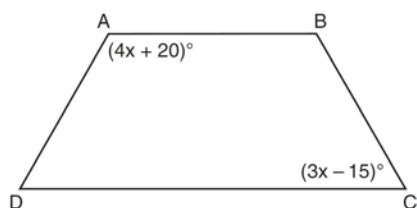


(Not drawn to scale)

If $m\angle B = 123$ and $m\angle D = 75$, what is $m\angle C$?

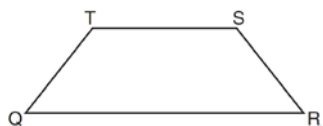
- 1) 57
- 2) 75
- 3) 105
- 4) 123

- 13 In the diagram of trapezoid $ABCD$ below, $\overline{AB} \parallel \overline{DC}$, $\overline{AD} \cong \overline{BC}$, $m\angle A = 4x + 20$, and $m\angle C = 3x - 15$.



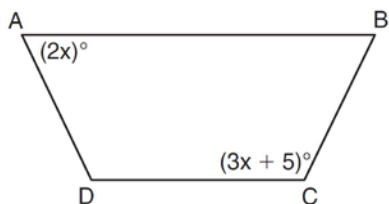
What is $m\angle D$?

- 1) 25
 - 2) 35
 - 3) 60
 - 4) 90
- 14 In isosceles trapezoid $QRST$ shown below, \overline{QR} and \overline{TS} are bases.

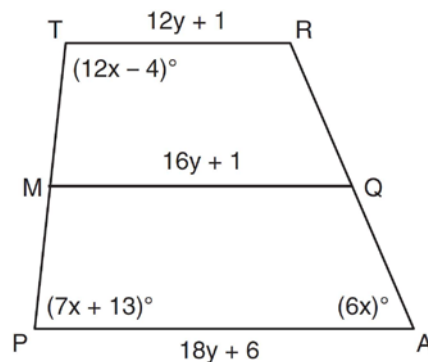


If $m\angle Q = 5x + 3$ and $m\angle R = 7x - 15$, what is $m\angle Q$?

- 1) 83
 - 2) 48
 - 3) 16
 - 4) 9
- 15 The diagram below shows isosceles trapezoid $ABCD$ with $\overline{AB} \parallel \overline{DC}$ and $\overline{AD} \cong \overline{BC}$. If $m\angle BAD = 2x$ and $m\angle BCD = 3x + 5$, find $m\angle BAD$.



- 16 Trapezoid $TRAP$, with median \overline{MQ} , is shown in the diagram below. Solve algebraically for x and y .



G.G.40: Trapezoids: Investigate, justify, and apply theorems about trapezoids (including isosceles trapezoids) involving their angles, sides, medians, and diagonals
Answer Section

1 ANS: 4 REF: 061008ge

2 ANS: 2

Isosceles or not, $\triangle RSV$ and $\triangle RST$ have a common base, and since \overline{RS} and \overline{VT} are bases, congruent altitudes.

REF: 061301ge

3 ANS: 3

$$5x + 13 = 11x - 5$$

The diagonals of an isosceles trapezoid are congruent. $18 = 6x$

$$x = 3$$

REF: fall0801ge

4 ANS:

3. The non-parallel sides of an isosceles trapezoid are congruent. $2x + 5 = 3x + 2$
 $3 = x$

REF: 080929ge

5 ANS: 1

The length of the midsegment of a trapezoid is the average of the lengths of its bases. $\frac{x + 3 + 5x - 9}{2} = 2x + 2$.

$$6x - 6 = 4x + 4$$

$$2x = 10$$

$$x = 5$$

REF: 081221ge

6 ANS: 2

The length of the midsegment of a trapezoid is the average of the lengths of its bases. $\frac{x + 30}{2} = 44$.

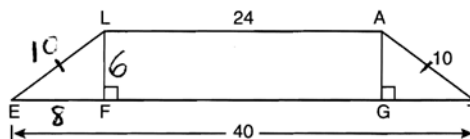
$$x + 30 = 88$$

$$x = 58$$

REF: 011001ge

7 ANS: 1

$$\frac{40 - 24}{2} = 8. \quad \sqrt{10^2 - 8^2} = 6.$$



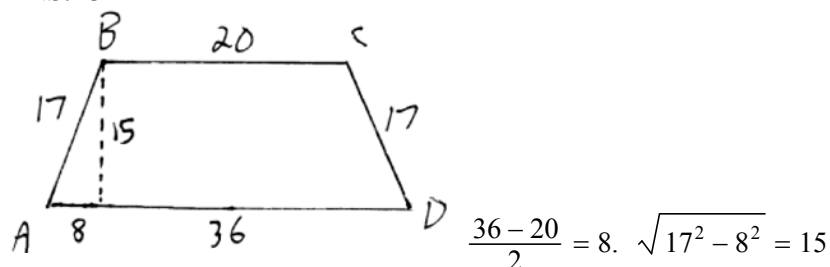
REF: 061204ge

8 ANS: 4

$$\sqrt{25^2 - \left(\frac{26-12}{2}\right)^2} = 24$$

REF: 011219ge

9 ANS: 3



REF: 061016ge

10 ANS:

12. Because the shape is an isosceles trapezoid, $\overline{AE} = \frac{28-12}{2} = 8$. Using Pythagoras, $8^2 + 9^2 = c^2$
 $c \approx 12$

REF: 069933a

11 ANS:

Draw a line perpendicular to \overline{RP} at T to A . $\triangle RAT$ is an isosceles right triangle with legs of 6. $6^2 + 6^2 = c^2$
 $72 = c^2$
 $\sqrt{72} = c$
 $6\sqrt{2} = c$

REF: 080726b

12 ANS: 1

$$180 - 123 = 57$$

REF: 061419ge

13 ANS: 3

$$2(4x + 20) + 2(3x - 15) = 360. \quad \angle D = 3(25) - 15 = 60$$

$$8x + 40 + 6x - 30 = 360$$

$$14x + 10 = 360$$

$$14x = 350$$

$$x = 25$$

REF: 011321ge

14 ANS: 2

$$5x + 3 = 7x - 15 \quad 5(9) + 3 = 48$$

$$18 = 2x$$

$$9 = x$$

REF: 011515ge

15 ANS:

$$70. \quad 3x + 5 + 3x + 5 + 2x + 2x = 180$$

$$10x + 10 = 360$$

$$10x = 350$$

$$x = 35$$

$$2x = 70$$

REF: 081029ge

16 ANS:

$$12x - 4 + 7x + 13 = 180. \quad 16y + 1 = \frac{12y + 1 + 18y + 6}{2}$$

$$19x + 9 = 180$$

$$32y + 2 = 30y + 7$$

$$19x = 171$$

$$2y = 5$$

$$x = 9$$

$$y = \frac{5}{2}$$

REF: 081337ge