1 If the diagonals of a quadrilateral do not bisect each other, then the quadrilateral could be a
1) rectangle  2) rhombus  3) square  4) trapezoid

2 In trapezoid $RSTV$ with bases $RS$ and $VT$, diagonals $RT$ and $SV$ intersect at $Q$.

If trapezoid $RSTV$ is not isosceles, which triangle is equal in area to $RSV$?
1) $\triangle RQV$  2) $\triangle RST$  3) $\triangle RVT$  4) $\triangle SVT$

3 Isosceles trapezoid $ABCD$ has diagonals $AC$ and $BD$. If $AC = 5x + 13$ and $BD = 11x - 5$, what is the value of $x$?
1) 28  2) $10\frac{3}{4}$  3) 3  4) $\frac{1}{2}$

4 In trapezoid $ABCD$ below, $AB \parallel CD$.

If $AE = 5.2$, $AC = 11.7$, and $CD = 10.5$, what is the length of $AB$, to the nearest tenth?
1) 4.7  2) 6.5  3) 8.4  4) 13.1

5 In the diagram below, $EF$ is the median of trapezoid $ABCD$.

If $AB = 5x - 9$, $DC = x + 3$, and $EF = 2x + 2$, what is the value of $x$?
1) 5  2) 2  3) 7  4) 8

6 In the diagram below of trapezoid $RSUT$, $RS \parallel TU$, $X$ is the midpoint of $RT$, and $V$ is the midpoint of $SU$.

If $RS = 30$ and $XV = 44$, what is the length of $TU$?
1) 37  2) 58  3) 74  4) 118
7. In trapezoid $LMNO$ below, median $PQ$ is drawn.

![Diagram of trapezoid LMNO with median PQ drawn]

If $LM = x + 7$, $ON = 3x + 11$, and $PQ = 25$, what is the value of $x$?

1) 1.75  2) 3.5  3) 8  4) 17

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

![Diagram of isosceles trapezoid LATE with altitudes LF and AG drawn]

What is the length of $LF$?

1) 6  2) 8  3) 3  4) 4

9. In the diagram below of isosceles trapezoid $ABCD$, $AB = CD = 25$, $AD = 26$, and $BC = 12$.

![Diagram of isosceles trapezoid ABCD]

What is the length of an altitude of the trapezoid?

1) 7  2) 14  3) 19  4) 24

10. In isosceles trapezoid $ABCD$, $AB \cong CD$. 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

11. In the diagram below, $AB$ and $CD$ are bases of trapezoid $ABCD$.

![Diagram of trapezoid ABCD with bases AB and CD drawn]

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

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

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

![Diagram of trapezoid ABCD with parallel sides AB and DC]

What is $m \angle D$?

1) 25  2) 35  3) 60  4) 90
13  In isosceles trapezoid $QRST$ shown below, $QR$ and $TS$ 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

14  In the diagram below of isosceles trapezoid $DEFG$, $DE \parallel GF$, $DE = 4x - 2$, $EF = 3x + 2$, $FG = 5x - 3$, and $GD = 2x + 5$. Find the value of $x$.

15  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 $AB$ to the nearest foot.

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

17  The diagram below shows isosceles trapezoid $ABCD$ with $AB \parallel DC$ and $AD \cong BC$. If $m\angle BAD = 2x$ and $m\angle BCD = 3x + 5$, find $m\angle BAD$.

18  Trapezoid $TRAP$, with median $MQ$, is shown in the diagram below. Solve algebraically for $x$ and $y$. 
G.CO.C.11: Trapezoids 1a

Answer Section

1. ANS: 4  REF: 061008ge

2. ANS: 2
   Isosceles or not, \( \triangle RSV \) and \( \triangle RST \) have a common base, and since \( RS \) and \( VT \) are bases, congruent altitudes.
   REF: 061301ge

3. ANS: 3
   The diagonals of an isosceles trapezoid are congruent. \( 5x + 3 = 11x - 5 \).
   \[ 6x = 18 \]
   \[ x = 3 \]
   REF: fall0801ge

4. ANS: 3
   \[
   \frac{6.5}{10.5} = \frac{5.2}{x}
   \]
   \[ x = 8.4 \]
   REF: 012006geo

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: 3
\[
\frac{x + 7 + 3x + 11}{2} = 25
\]
\[
4x + 18 = 50
\]
\[
x = 8
\]
REF: 011608ge

8  ANS: 1
\[
\frac{40 - 24}{2} = 8. \sqrt{10^2 - 8^2} = 6.
\]
REF: 061204ge

9  ANS: 4
\[
\sqrt{25^2 - \left(\frac{26 - 12}{2}\right)^2} = 24
\]
REF: 011219ge

10 ANS: 3
\[
\frac{36 - 20}{2} = 8. \sqrt{17^2 - 8^2} = 15
\]
REF: 061016ge

11 ANS: 1
\[
180 - 123 = 57
\]
REF: 061419ge

12 ANS: 3
\[
2(4x + 20) + 2(3x - 15) = 360. \angle D = 3(25) - 15 = 60
\]
\[
8x + 40 + 6x - 30 = 360
\]
\[
14x + 10 = 360
\]
\[
14x = 350
\]
\[
x = 25
\]
REF: 011321ge
13 ANS: 2
5x + 3 = 7x - 15  \quad 5(9) + 3 = 48
18 = 2x
9 = x

REF: 011515ge

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

REF: 080929ge

15 ANS:
12. Because the shape is an isosceles trapezoid, \( \overline{AB} = \frac{28 - 12}{2} = 8 \). Using Pythagoras, \( 8^2 + 9^2 = c^2 \)
\[ c \approx 12 \]

REF: 069933a

16 ANS:
Draw a line perpendicular to \( \overline{RP} \) at \( T \) to \( A \). \( \Delta RAT \) 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

17 ANS:
70. 3x + 5 + 3x + 5 + 2x + 2x = 180
10x + 10 = 360
10x = 350
x = 35
2x = 70

REF: 081029ge

18 ANS:
12x - 4 + 7x + 13 = 180. 16y + 1 = \( \frac{12y + 1 + 18y + 6}{2} \)
19x + 9 = 180
19x = 171
x = 9

19

32y + 2 = 30y + 7
2y = 5
y = \frac{5}{2}

REF: 081337ge