Properties of Trapezoids and Kites

No ‖ sides so this is not a trap.

Points *J*, *K*, *L*, and *M* are the vertices of a quadrilateral. Determine whether *JKLM* is a trapezoid.

1. $J(-1, -1), K(0, 3), L(3, 3), M(4, -1)$

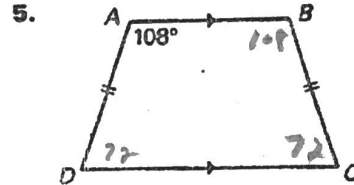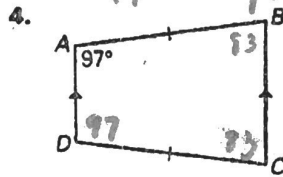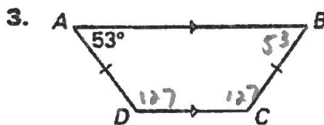$m_{\overline{KL}} = \frac{3-3}{3-0} = \frac{0}{3} = 0$

$m_{\overline{JM}} = \frac{-1+1}{4+1} = \frac{0}{5} = 0$

★ JKLM is a trap b/c it has 1 set of opp sides ‖.

2. $J(-4, -2), K(-4, 3), L(2, 3), M(3, -5)$

$m_{\overline{KJ}} = \frac{3+2}{-4+4} = \frac{5}{0}$ undefined

$m_{\overline{LM}} = \frac{-5-3}{3-2} = \frac{-8}{1} = -8$

Find m∠*B*, m∠*C*, and m∠*D*.

3.

53° , 53, 127, 127

4.

97°, 83, 97, 83

5.

108°, 108, 72, 72

Find the length of the midsegment $\overline{RT}$.

6.

$x = \frac{7+13}{2} = 10$

7.

$x = \frac{12+9}{2} = \frac{21}{2}$

8.
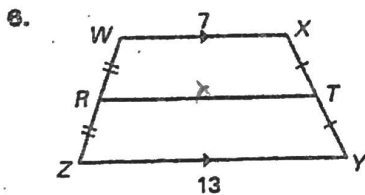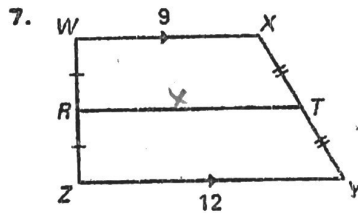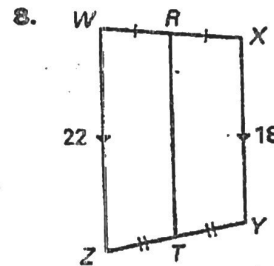
$x = \frac{22+18}{2} = 20$

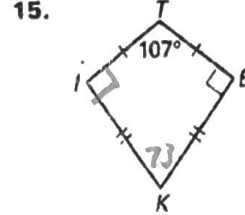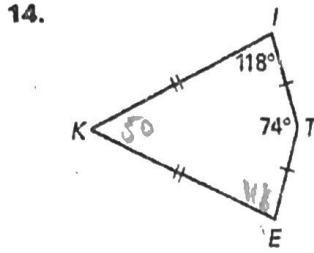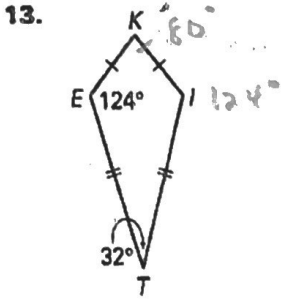Tell whether the statement is *always*, *sometimes*, or *never* true.

9. A trapezoid is a parallelogram. N

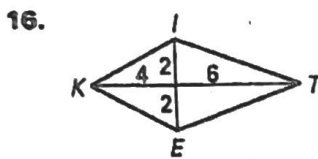**10.** The bases of a trapezoid are parallel. A

11. The base angles of an isosceles trapezoid are congruent. A

12. The legs of a trapezoid are congruent. S

KITE is a kite. Find $m\angle K$.

13.

K, 80° (handwritten), E 124°, I 124° (handwritten), 32°, T

14.

I 118°, K 50 (handwritten), 74° T, E

15.

T 107°, I, E, 73 (handwritten), K

Use Theorem 5.33 and the Pythagorean Theorem to find the side lengths of the kite. Write the lengths in simplest radical form.

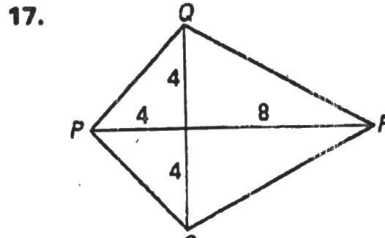$3^2 + 5^2 = x^2$
$34 = x^2$
$\sqrt{34} = x$

16.

K, I, 4 2 6, 2, E, T

$2^2 + 4^2 = x^2$
$20 = x^2$
$\sqrt{20} = x$
$\boxed{2\sqrt{5}}$

$2^2 + 6^2 = y^2$
$40 = y^2$
$\sqrt{40} = y$
$\boxed{2\sqrt{10}}$

17.

Q, 4, 4, 8, R, P, 4, S

$4^2 + 4^2 = x^2$
$32 = x^2$
$\sqrt{32} = x$
$\boxed{4\sqrt{2} = x}$

$4^2 + 8^2 = y^2$
$80 = y^2$
$\sqrt{80} = y$
$\boxed{4\sqrt{5} = y}$
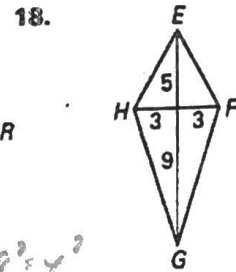
18.

E, H 5 F, 3 3, 9, G

$9^2 + 3^2 = y^2$
$90 = y^2$
$\sqrt{90} = y$
$\boxed{3\sqrt{10} = y}$

Find the value of x.
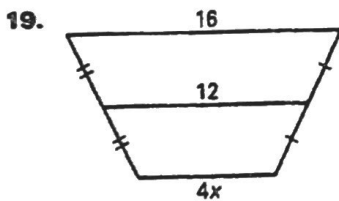
$12 = \dfrac{16 + 4x}{2}$

$24 = 16 + 4x$

$8 = 4x$

$\boxed{x = 2}$

19.

16, 12, 4x

20.

17, 20, 7x − 5

$20 = \dfrac{17 + 7x - 5}{2}$

$40 = 7x + 12$

$28 = 7x$

$\boxed{x = 4}$

21.

3x + 1, 14.5, 19
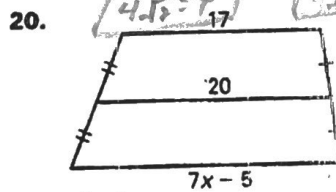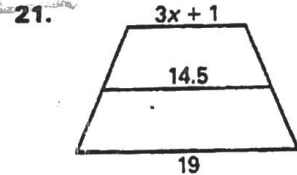
$14.5 = \dfrac{19 + 3x + 1}{2}$

$29 = 3x + 20$

$9 = 3x$

$\boxed{3 = x}$

22. Complete the proof.

GIVEN: $\overline{DE} \parallel \overline{AV}$,
$\triangle DAV \cong \triangle EVA$

PROVE: DAVE is an isosceles trapezoid.

D, E, F, A, V

Statements	Reasons
1. $\overline{DE} \parallel \overline{AV}$	1. Given
2. DAVE is a trapezoid.	2. Def. of Trap
3. $\triangle DAV \cong \triangle EVA$	3. Given
4. $\overline{DA} \cong \overline{EV}$	4. Corresponding parts of $\cong$ $\triangle$ are $\cong$. CPCTC
5. DAVE is an isosceles trapezoid.	5. Def of Trap.

5.5