

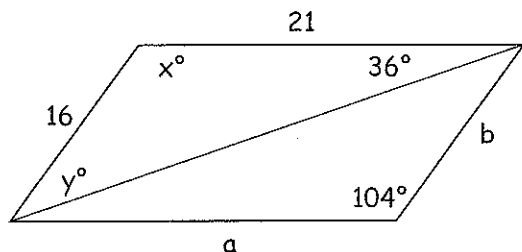
Geometry/Trig 2
Chapter 5 Practice

Name: KEY

Date: _____

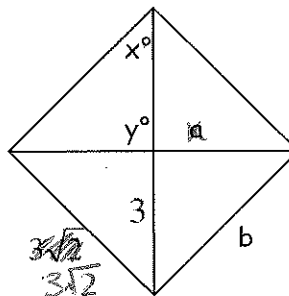
For each problems (1-4) a and b are segment lengths; x and y are angle measures.

1. Figure is a Parallelogram



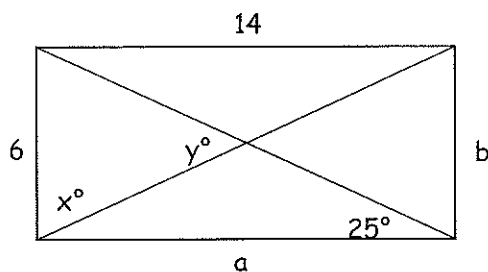
$$\begin{aligned} a &= \underline{21} \\ b &= \underline{16} \\ x &= \underline{104} \\ y &= \underline{40} \end{aligned}$$

2. Figure is a Square



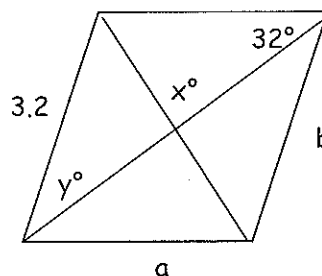
$$\begin{aligned} a &= \underline{\hspace{1cm}} \\ b &= \underline{3\sqrt{2}} \\ x &= \underline{45} \\ y &= \underline{90} \end{aligned}$$

3. Figure is a Rectangle



$$\begin{aligned} a &= \underline{14} \\ b &= \underline{6} \\ x &= \underline{65} \\ y &= \underline{50} \end{aligned}$$

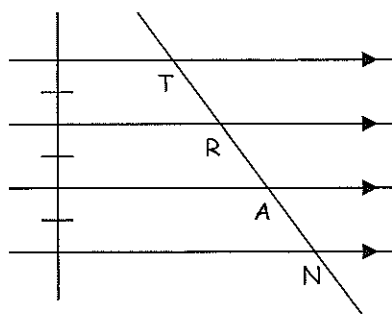
4. Figure is a Rhombus



$$\begin{aligned} a &= \underline{3.2} \\ b &= \underline{3.2} \\ x &= \underline{90} \\ y &= \underline{32} \end{aligned}$$

$$\begin{aligned} 5. \quad 2(2x) &= 5x - 9 \\ 4x &= 5x - 9 \\ -x &= -9 \\ x &= 9 \end{aligned}$$

$$\begin{aligned} 6. \quad 4x + 9 &= 9x - 1 \\ 10 &= 5x \\ 2 &= x \end{aligned}$$

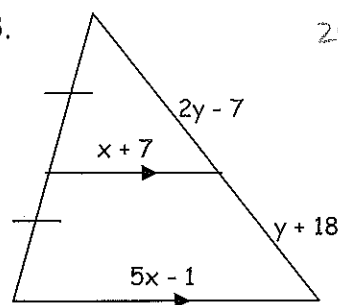


5. If $TR = 2x$ and $RN = 5x - 9$, then $x = \underline{9}$

6. If $TA = 4x + 9$ and $RN = 9x - 1$, then $x = \underline{2}$

7. If $TA = 16$, then $TN = \underline{24}$

8.

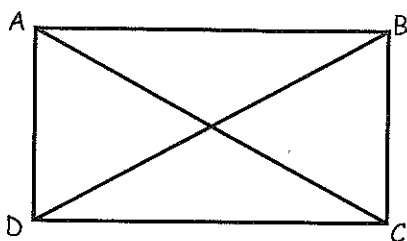


$$\begin{aligned} 2(x+7) &= 5x-1 \\ 2x+14 &= 5x-1 \\ 15 &= 3x \\ 5 &= x \end{aligned}$$

$$\begin{aligned} 2y-7 &= y+18 \\ y &= 25 \end{aligned}$$

$$\begin{aligned} x &= \underline{5} \\ y &= \underline{25} \end{aligned}$$

1.



ABCD is a rectangle

$$AB = x - 11$$

$$AD = 4y - 64$$

$$CD = 4x - 71$$

$$BC = 2y - 22$$

$$x - 11 = 4x - 71$$

$$-60 = 3x$$

$$20 = x$$

$$4y - 64 = 2y - 22$$

$$2y = 42$$

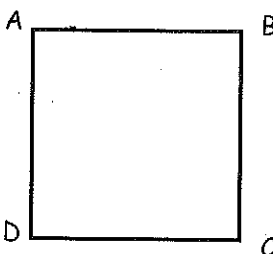
$$y = 21$$

$$x = \underline{20}$$

$$y = \underline{21}$$

Perimeter: 58

2.



ABCD is a square

$$m\angle DAB = 4x - 2$$

$$m\angle ADC = 8y + 18$$

$$4x - 2 = 90$$

$$4x = 92$$

$$x = 23$$

$$8y + 18 = 90$$

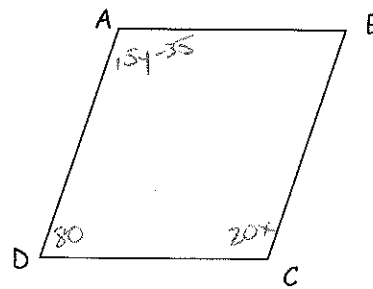
$$8y = 72$$

$$y = 9$$

$$x = \underline{23}$$

$$y = \underline{9}$$

3.



ABCD is a rhombus

$$m\angle DAB = 15y - 35$$

$$m\angle DCB = 20x$$

$$m\angle ADC = 80$$

$$20x + 80 = 180$$

$$20x = 100$$

$$x = 5$$

$$15y - 35 + 80 = 180$$

$$15y + 45 = 180$$

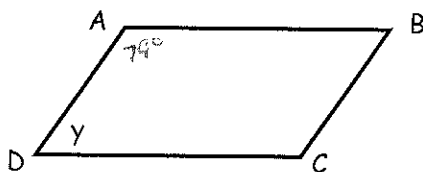
$$15y = 135$$

$$y = 9$$

$$x = \underline{5}$$

$$y = \underline{9}$$

4.



ABCD is a parallelogram

$$m\angle A = 5x + 9$$

$$m\angle B = 7x + 3$$

$$5x + 9 + 7x + 3 = 180$$

$$12x + 12 = 180$$

$$12x = 168$$

$$x = 14$$

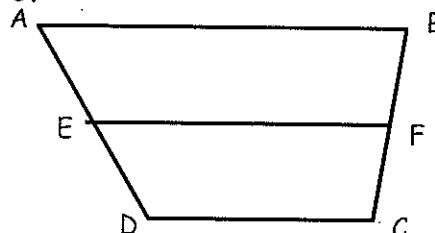
$$79 + y = 180$$

$$y = 101$$

$$x = \underline{14}$$

$$y = \underline{101}$$

5.



ABCD is a trapezoid; EF is the median

$$AE = 5x - 7 \quad BF = y$$

$$AD = 6x + 2 \quad FC = -y + 6$$

$$6x + 2 = 2(5x - 7)$$

$$6x + 2 = 10x - 14$$

$$16 = 4x$$

$$4 = x$$

$$y = -y + 6$$

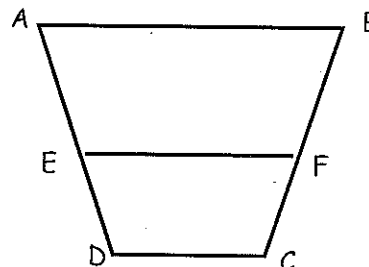
$$2y = 6$$

$$y = 3$$

$$x = \underline{4}$$

$$y = \underline{3}$$

6.



ABCD is an isosceles trapezoid

EF is the median

$$AB = 8x - 2$$

$$EF = 3x + 7$$

$$DC = 3x + 6$$

$$\frac{8x - 2 + 3x + 6}{2} = (3x + 7)2$$

$$11x + 4 = 6x + 14$$

$$5x = 10$$

$$x = 2$$

$$x = \underline{2}$$

- False 1. All quadrilaterals are parallelograms.
True 2. All parallelograms are quadrilaterals.
True 3. All squares are rhombi.
True 4. All rectangles are parallelograms.
False 5. If a parallelogram has $\perp$ diagonals and four congruent sides it must be a square.
False 6. An isosceles trapezoid has two congruent bases.
False 7. All trapezoids are parallelograms.
False 8. All parallelograms are rectangles.
True 9. All trapezoids are quadrilaterals.
False 10. All rhombi are squares.
True 11. The sum of the interior angles of a trapezoid is 360.
True 12. A square has congruent diagonals.
False 13. The diagonals of a rhombus are always congruent.
False 14. All rectangles have perpendicular diagonals.
True 15. Diagonals of a rhombus bisect one another.
True 16. An isosceles trapezoid has congruent legs.
False 17. The legs of a trapezoid are parallel.
-

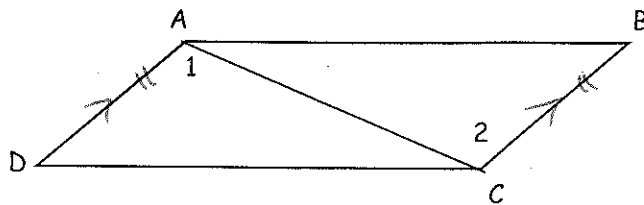
Complete the blank with the word always, sometimes or never.

1. A square is always a rhombus.
2. The diagonals of a parallelogram always bisect one another.
3. A rectangle always has opposite sides that are congruent.
4. A parallelogram sometimes has perpendicular diagonals.
5. A rectangle is sometimes a square.
6. A square is always a rectangle.
7. A parallelogram always has opposite congruent angles.
8. A rhombus always has perpendicular diagonals.
9. A trapezoid is never a parallelogram.
10. A square always has four congruent sides.
11. A parallelogram is sometimes a square.
12. A trapezoid never has two pairs of opposite parallel sides.
13. A square is always a rhombus.
14. A parallelogram with congruent diagonals and four right angles is sometimes a rectangle.
15. Opposite sides of a parallelogram are always congruent.
16. The legs of a trapezoid are sometimes congruent.
17. A parallelogram has interior angles that always add up to 360° .
18. The bases of a trapezoid are always parallel.
19. A trapezoid is never a rhombus.
20. The legs of a trapezoid are never parallel.

Chapter 5 Practice - page 4: Proof Practice.

Given: $\angle 1 \cong \angle 2$; $AD \cong BC$

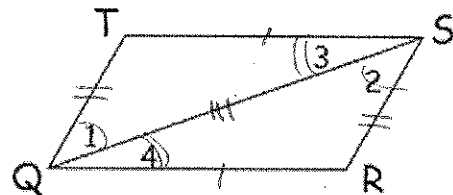
Prove: ABCD is a parallelogram



Statements	Reasons
1. $\angle 1 \cong \angle 2$	1. Given
2. $AD \parallel BC$	2. If alt. interior angles are $\cong$, then the lines are parallel
3. $\overline{AD} \cong \overline{BC}$	3. Given
4. ABCD is a parallelogram	4. If one pair of opposite sides are congruent & parallel, then it is a parallelogram

Given: $TS \cong QR$; $TQ \cong SR$

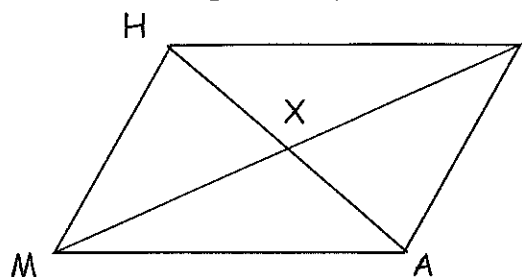
Prove: QRST is a Parallelogram



Statements	Reasons
1. $\overline{TS} \cong \overline{QR}$, $\overline{TQ} \cong \overline{SR}$	1. Given
2. $\overline{SQ} \cong \overline{SQ}$	2. Reflexive
3. $\triangle TQS \cong \triangle RSQ$	3. SSS
4. $\angle 1 \cong \angle 2$; $\angle 3 \cong \angle 4$	4. CPCTC
5. $\overline{QT} \parallel \overline{RS}$, $\overline{TS} \parallel \overline{QR}$	5. If alt. int. $\angle$ s are $\cong$, then lines are $\parallel$
6. QRST is a parallelogram	6. Definition of a parallelogram

Chapter 5 Practice - page 5

State if the figure is a parallelogram. If it is a parallelogram, state by what theorem or property.



1. $MA \cong TH$ and $MH \cong AT$: Both pairs of opp. sides $\cong$

2. $MA \parallel TH$ and $MA \cong TH$: one pair of opp. sides $\cong$ & $\parallel$

3. $TX \cong XM$ and $AX \cong HX$: Diagonals bisect

4. $HM \cong AT$ and $HT \parallel MA$: None

5. $\angle MAT \cong \angle MHT$ and $\angle HMA \cong \angle HTA$: Both pairs of opposite angles $\cong$

6. $\angle MXH \cong \angle TXA$ and $\angle HMA \cong \angle HTA$: None

7. X is the midpoint of MT and HA: Diagonals bisect

8. $\angle MHA \cong \angle HAT$ and $\angle THA \cong \angle MAH$: both pairs of alt. int. $\angle$'s $\cong$, so opp. sides parallel (Def of parallelogram)

9. $HA \cong MT$: None

10. $\angle MHA \cong \angle HAT$ and $HT \parallel MA$: Def of a parallelogram (same reasoning as in #8)

Classify each figure as specifically as you can based on the markings in the diagram.

1. Rectangle	2. Quadrilateral	3. Isosceles Trapezoid
4. Parallelogram	5. Parallelogram	6. Square

Complete the chart without looking at your notes.

Property	Parallelogram	Rectangle	Rhombus	Square
All angles are right angles		X		X
Both Pairs of Opposite sides are parallel	X	X	X	X
All sides are congruent			X	X
Both Pairs of Opposite angles are congruent	X	X	X	X
Diagonals bisect interior angles of quad.			X	X
Diagonals are perpendicular			X	X
Diagonals are congruent		X		X
Diagonals bisect one another	X	X	X	X
Both Pairs of Opposite sides are congruent	X	X	X	X

5-5 Trapezoids (continued)

Each diagram shows a trapezoid and its median. Find the value of x .

$$\frac{2x-1+4x+3}{2} = 10$$

$$\frac{x+7x-2}{2} = 3x+1$$

$$6x+2=20$$

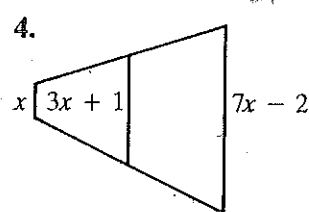
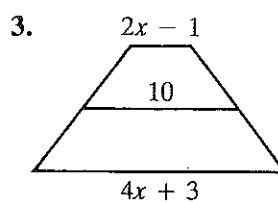
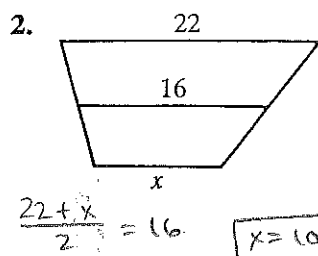
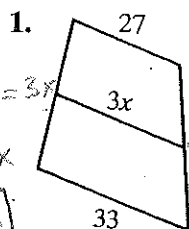
$$6x=18$$

$$x=3$$

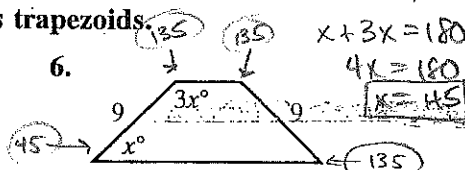
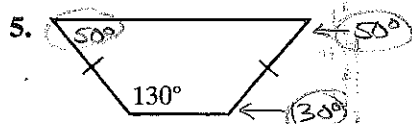
$$8x-2=6x+2$$

$$2x=4$$

$$x=2$$



Find the measure of each angle in the isosceles trapezoids.



7. One angle of an isosceles trapezoid has measure 48. Find the measures of the other angles.

$$48, 132, 132$$

8. Two congruent angles of an isosceles trapezoid have measures $5x - 17$ and $2x + 13$. Find the value of x and then give the measure of each angle of the trapezoid.

$$5x-17=2x+13$$

$$3x=30$$

$$x=10$$

$$33, 33, 147, 147$$

Example 2 In $\triangle ABC$, $AX = XM = MB$ and $AY = YN = NC$.

- a. If $XY = 6$, and $BC = 18$, find MN . $\frac{6+18}{2} = 12$

- b. If $XY = 12$, find MN .

$$12 \cdot 2 = 24$$

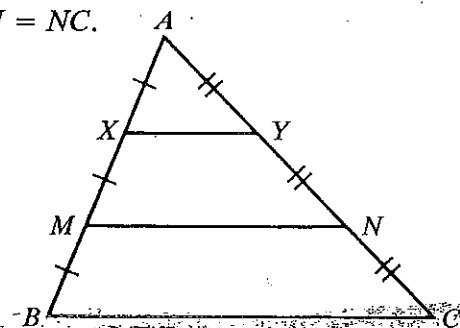
Solution

- a. $\overline{MN}$ is the median of trap. $BXYC$.

$$MN = \frac{1}{2}(XY + BC) = \frac{1}{2}(6 + 18) = 12$$

- b. $\overline{XY}$ joins the midpoints of two sides of $\triangle AMN$.

$$XY = \frac{1}{2}MN \quad 12 = \frac{1}{2}MN \quad 24 = MN$$



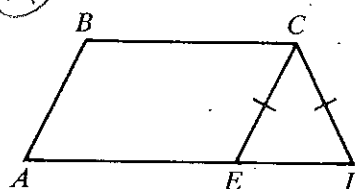
Use the diagram in Example 2. Complete.

9. If $XY = 9$, then $MN = 18$ and $BC = 27$.
10. If $MN = 32$, then $XY = 16$ and $BC = 48$.
11. If $XY = 8$ and $MN = x + 12$, then $x = 4$ and $BC = 24$.

$$\begin{aligned} 11. \quad 2(8) &= x+12 \\ 16 &= x+12 \\ 4 &= x \end{aligned}$$

12. Given: Isosceles trap. $ABCD$;
 $\overline{CD} \cong \overline{CE}$

Prove: $ABCE$ is a $\square$.



Practice 20

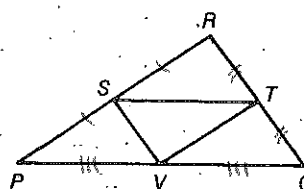
Chapter 5 Practice

Classify each statement as true or false.

1. The diagonals of a parallelogram must bisect each other. True
2. The diagonals of a rhombus must be congruent. False
3. Consecutive sides of a parallelogram must be congruent. False
4. A square is both a rhombus and a rectangle. True
5. The diagonals of a rectangle must be perpendicular. False

S, T, and V are the midpoints of $\overline{RP}$, $\overline{RQ}$, and $\overline{PQ}$. Complete the following.

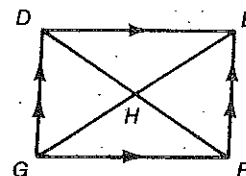
6. $m\angle RTS = m\angle RQP$
7. $SV = \frac{1}{2} \overline{RQ}$
8. If $TV = 3\frac{3}{4}$, $RP = 7.5$
9. If $PQ = 7.4$, $ST = 3.7$
10. The best name for $PSTQ$ is trapezoid



Exs. 6-10

$DEFG$ is a parallelogram. Complete each statement.

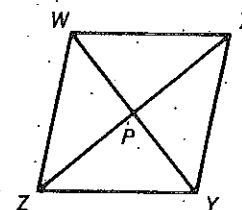
11. If $DE = 27$ and $GF = 5x - 3$, then $x = 6$. $5x - 3 = 27$
12. If $DH = 4x - 3$ and $HF = 8x - 15$, then $x = 3$ and $DF = 18$. $4x - 3 = 8x - 15$
 $12 = 4x$
13. If $m\angle GDE = 92$, then $m\angle GFE = 92^\circ$ and $m\angle DEF = 88^\circ$
14. If $\overline{DG} \perp \overline{GF}$, then $DEFG$ is a rectangle.



Exs. 11-14

What additional information is needed to prove that quadrilateral $WXYZ$ is a parallelogram?

15. $\angle XWZ \cong \angle XYZ$ $\angle WZY \cong \angle WXY$
16. $\overline{WZ} \parallel \overline{XY}$ $\overline{WX} \parallel \overline{ZY}$ or $\overline{WZ} \cong \overline{XY}$
17. $\overline{WX} \cong \overline{ZY}$ $\overline{WZ} \cong \overline{XY}$ or $\overline{WX} \parallel \overline{ZY}$
18. $\overline{WP} \cong \overline{PY}$ $\overline{ZP} \cong \overline{PX}$
19. Given: Quad. $WXYZ$; $\overline{WX} \parallel \overline{ZY}$; $\angle XWZ \cong \angle XYZ$
Prove: $WXYZ$ is a $\square$.



Exs. 15-19

