

Geometry Period 1 & 6 – Dr. Sargent – Weeks of April 13 & April 20

Trapezoids

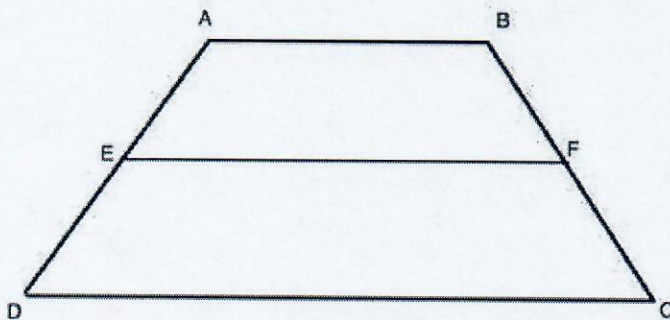
This week we are dealing with the final quadrilateral we will learn for this Unit of study, the Trapezoid. This is the only one of the quadrilaterals we have learned that is not also a parallelogram.

Please note that there are two types of trapezoids: 1) Non-isosceles trapezoids and 2) isosceles trapezoids.

Non-isosceles trapezoids have only one pair of sides that are parallel (we call these the bases); and consecutive angles between the parallel sides are supplementary. For example, look at problem 1 on the attached sheet about Trapezoids. Sides JK and ML are parallel. That means that angles J & M are supplementary and that angles K and L are supplementary. Angles J & K and angles M & L are NOT supplementary – if they were, you would have a parallelogram, not a trapezoid.

Isosceles trapezoids have additional properties beyond those above: non-parallel sides (which we call legs) are congruent, diagonals are congruent, base angles are congruent, and opposite angles are supplementary. So look, for example, at problem #5 on the attached sheet. Side DG is congruent to side EF, and diagonal DF is congruent to diagonal EG. And on problem #6, angle T is congruent to angle U, because they are base angles of an isosceles trapezoid, as are angles W and V.

The midsegment of a trapezoid is a line connecting the midpoints of the two legs. The midsegment is parallel to the two parallel sides, and its length is the average of the lengths of the bases.



The midsegment, EF, is parallel to sides AB and CD. The length of EF is the average of the lengths of AB and CD. In other words: $EF = \frac{AB+CD}{2}$ This will be true for both isosceles and non-isosceles trapezoids.

Please complete the worksheets on trapezoids and the midpoints of trapezoids. Answers to selected questions are included so you can check yourself as you go. Please do your own work before checking the answers, and use these to aid your understanding. You will NOT need to return this work to me.

I have also included an information sheet on the properties of Quadrilaterals to aid you in your understanding of such.

Please then do Homework 6 and return it to me. You can return it by taking a picture and attaching this to a message on Live Grades, by scanning and attaching to Live Grades, or by simply submitting answers in an email, clearly labelling your work. You can also return the paper to school.

Once you have completed your work on trapezoids, it will be time for a test on this unit. This test will be on ALEKS – I can also make it available in written form to anyone without internet access. This test will be available from Wed, April 15, through Friday, April 24. You will have three attempts to complete the test. My suggestion is that you use the first time as a review of the material, then go back and review anything you have missed, then try it for real. I will record your highest score of the three attempts. When you begin the test, you will have 90 minutes to complete it – please do not leave the test once you begin it or ALEKS may think you are finished and will assign you a grade based on what you have completed thus far. I am depending on you to do your own work on the test.

As always, your regular 12-topic weekly assignments on ALEKS continue.

Answers to selected questions:

Worksheet on Trapezoids:

Question 1: $m\angle K = 129^\circ$; $m\angle M = 93^\circ$

Question 3: $x = 15$

Question 5: $\overline{DG} \cong \overline{EF}$; $\overline{DF} \cong \overline{GE}$

Question 6: $\angle T \cong \angle U$; $\angle V \cong \angle W$

Question 8: $m\angle W = 47^\circ$; $m\angle Y = 133^\circ$; $m\angle Z = 133^\circ$

Question 11: $x = 14$; $m\angle J = 107^\circ$; $m\angle K = 107^\circ$; $m\angle L = 73^\circ$; $m\angle M = 73^\circ$

Question 13: $x = 7$; $m\angle C = 131^\circ$; $m\angle D = 131^\circ$; $m\angle E = 49^\circ$; $m\angle F = 49^\circ$

Midsegments of Trapezoids

Question 1: $EF = \frac{14+26}{2} = \frac{40}{2} = 20$

Question 3: $22 = \frac{AB+38}{2}$; $44 = AB + 38$; $AB = 6$

Question 6: $\frac{6x-1+2x+11}{2} = 25$; $\frac{8x+10}{2} = 25$; $4x + 5 = 25$; $4x = 20$; $x = 5$; $KJ = 6(5) - 1 = 29$

Unit 7 homework 6

Question 1: $m\angle C = 101^\circ$; $m\angle E = 46^\circ$

Question 3: $m\angle J = 83^\circ$; $m\angle L = 97^\circ$; $m\angle M = 97^\circ$

Question 5: $x = 4$

Question 7: $m\angle M = 128^\circ$; $m\angle N = 128^\circ$; $m\angle O = 52^\circ$; $m\angle P = 52^\circ$

Question 10: $x = 12$; $y = 5$

Question 11: $WX = \frac{27+39}{2} = 33$

Question 13: $45 = \frac{3x+11+10x-12}{2}$; $45 = \frac{13x-1}{2}$; $90 = 13x - 1$; $91 = 13x$; $x = 7$; $ML = 10(7) - 12 = 58$

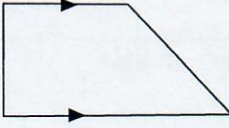
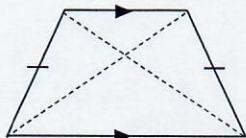
Question 15: $RS=47$

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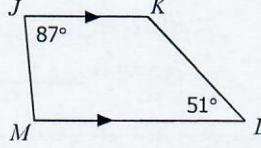
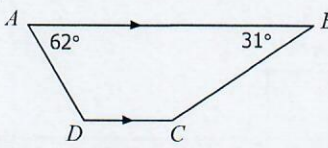
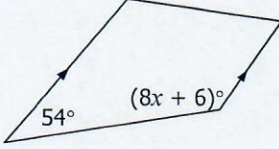
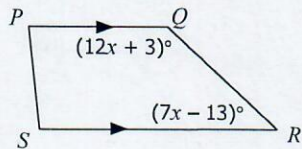
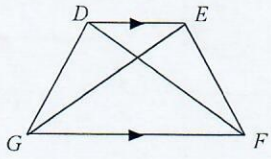
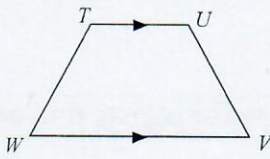
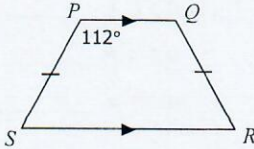
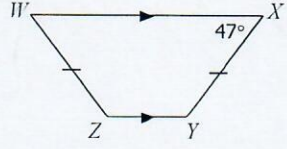
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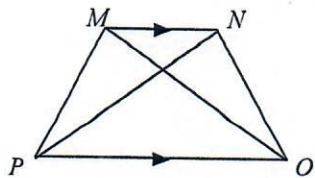
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Main Ideas/Questions	Notes
<p>NON-ISOSCELES <i>Trapezoids</i></p> 	<p>Properties of Non-Isosceles Trapezoids:</p> <ul style="list-style-type: none"> • Only ONE pair of opposite sides parallel. • Consecutive angles between parallel lines are supplementary.
<p>ISOSCELES <i>Trapezoids</i></p> 	<p>Isosceles trapezoids have the same properties as non-isosceles trapezoids, plus these:</p> <ul style="list-style-type: none"> • Non-parallel sides (legs) are congruent. • Diagonals are congruent. • Base angles are congruent. • Opposite angles are supplementary.

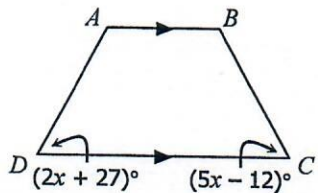
Practice! Find each missing value on the trapezoids below.

<p>1.</p>  <p>$m\angle K = \underline{\hspace{2cm}}$ $m\angle M = \underline{\hspace{2cm}}$</p>	<p>2.</p>  <p>$m\angle C = \underline{\hspace{2cm}}$ $m\angle D = \underline{\hspace{2cm}}$</p>
<p>3. Solve for x.</p> 	<p>4. Find $m\angle R$.</p> 
<p>5. $DEFG$ is an isosceles trapezoid.</p>  <p>$\overline{DG} \cong \underline{\hspace{2cm}}$ $\overline{DF} \cong \underline{\hspace{2cm}}$</p>	<p>6. $TUVW$ is an isosceles trapezoid.</p>  <p>$\angle T \cong \underline{\hspace{2cm}}$ $\angle V \cong \underline{\hspace{2cm}}$</p>
<p>7.</p>  <p>$m\angle Q = \underline{\hspace{2cm}}$ $m\angle R = \underline{\hspace{2cm}}$ $m\angle S = \underline{\hspace{2cm}}$</p>	<p>8.</p>  <p>$m\angle W = \underline{\hspace{2cm}}$ $m\angle Y = \underline{\hspace{2cm}}$ $m\angle Z = \underline{\hspace{2cm}}$</p>

9. If $MNOP$ is an isosceles trapezoid, $MP = 16x - 13$, $NO = 9x + 8$, $PN = 5y + 19$, and $MO = 12y - 37$, solve for x and y .



10. If $ABCD$ is an isosceles trapezoid, find each missing angle.



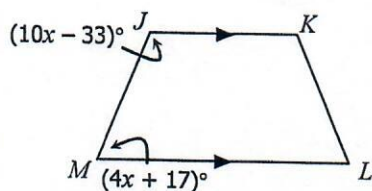
$$m\angle A = \underline{\hspace{2cm}}$$

$$m\angle B = \underline{\hspace{2cm}}$$

$$m\angle C = \underline{\hspace{2cm}}$$

$$m\angle D = \underline{\hspace{2cm}}$$

11. If $JKLM$ is an isosceles trapezoid, find each missing angle.



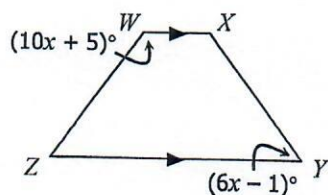
$$m\angle J = \underline{\hspace{2cm}}$$

$$m\angle K = \underline{\hspace{2cm}}$$

$$m\angle L = \underline{\hspace{2cm}}$$

$$m\angle M = \underline{\hspace{2cm}}$$

12. If $WXYZ$ is an isosceles trapezoid, find each missing angle.



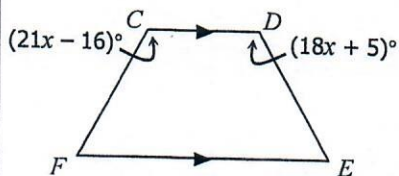
$$m\angle W = \underline{\hspace{2cm}}$$

$$m\angle X = \underline{\hspace{2cm}}$$

$$m\angle Y = \underline{\hspace{2cm}}$$

$$m\angle Z = \underline{\hspace{2cm}}$$

13. If $CDEF$ is an isosceles trapezoid, find each missing angle.



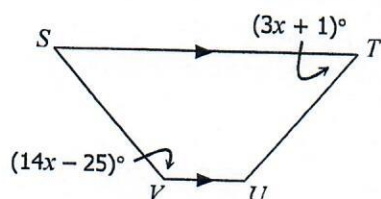
$$m\angle C = \underline{\hspace{2cm}}$$

$$m\angle D = \underline{\hspace{2cm}}$$

$$m\angle E = \underline{\hspace{2cm}}$$

$$m\angle F = \underline{\hspace{2cm}}$$

14. If $STUV$ is an isosceles trapezoid, find each missing angle.



$$m\angle S = \underline{\hspace{2cm}}$$

$$m\angle T = \underline{\hspace{2cm}}$$

$$m\angle U = \underline{\hspace{2cm}}$$

$$m\angle V = \underline{\hspace{2cm}}$$

Quadrilateral

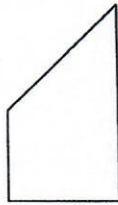
P R O P E R T I E S

Trapezoids

- Only ONE pair of opposite sides parallel (called bases).
- Consecutive angles are supplementary.

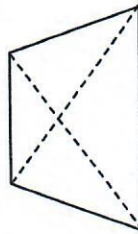
Midsegment of a Trapezoid:

A midsegment of a trapezoid connects the midpoints of the legs. This segment is equal to the average of the two bases.



Isosceles Trapezoids

- Non-parallel sides (legs) are congruent.
- Diagonals are congruent.
- Base angles are congruent.
- Opposite angles are supplementary.



Parallelograms

- Opposite sides parallel
- Opposite sides congruent.
- Opposite angles congruent.
- Consecutive angles supplementary.
- Diagonals bisect each other.



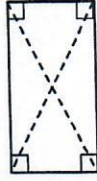
Rhombi

- Four congruent sides.
- Diagonals are perpendicular.
- Diagonals bisect opposite angles.



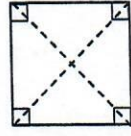
Rectangles

- Four right angles.
- Diagonals are congruent.



Squares

Squares have ALL the properties of parallelograms, rectangles, and rhombi!



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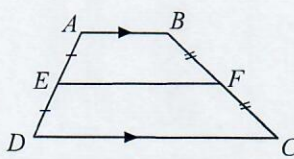
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Main Ideas/Questions **Notes**

MIDSEGMENT of a TRAPEZOID

The midsegment of a trapezoid connects the midpoints of the legs:



If \overline{EF} is the midsegment of trapezoid $ABCD$, then:

- _____
- _____

Practice! Use the trapezoid above for questions 1-4.

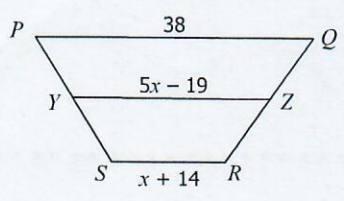
1. If $AB = 14$ and $DC = 26$, find EF .

2. If $AB = 7$ and $DC = 31$, find EF .

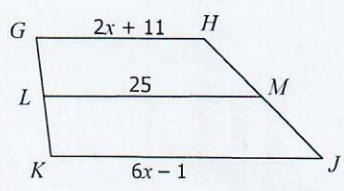
3. If $EF = 22$ and $DC = 38$, find AB .

4. If $AB = 41$ and $EF = 47$, find DC .

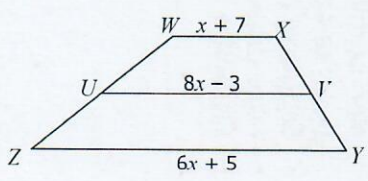
5. For trapezoid $PQRS$, Y and Z are midpoints of the legs. Find YZ .



6. For trapezoid $GHJK$, L and M are midpoints of the legs. Find KJ .

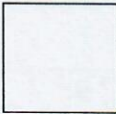


7. For trapezoid $WXYZ$, U and V are midpoints of the legs. Find UV .



Name: _____

Unit 7: Polygons & Quadrilaterals



Date: _____ Bell: _____

Homework 6: Trapezoids

**** This is a 2-page document! ****

Directions: If each quadrilateral below is a trapezoid, find the missing measures.

1.

$m\angle C = \underline{\hspace{2cm}}$
 $m\angle E = \underline{\hspace{2cm}}$

2.

$m\angle Q = \underline{\hspace{2cm}}$
 $m\angle S = \underline{\hspace{2cm}}$

3.

$m\angle J = \underline{\hspace{2cm}}$
 $m\angle L = \underline{\hspace{2cm}}$
 $m\angle M = \underline{\hspace{2cm}}$

4.

$m\angle W = \underline{\hspace{2cm}}$
 $m\angle X = \underline{\hspace{2cm}}$
 $m\angle Z = \underline{\hspace{2cm}}$

5. Solve for x.

6. Find $m\angle B$.

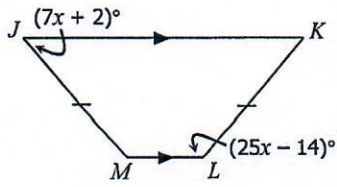
7.

$m\angle M = \underline{\hspace{2cm}}$
 $m\angle N = \underline{\hspace{2cm}}$
 $m\angle O = \underline{\hspace{2cm}}$
 $m\angle P = \underline{\hspace{2cm}}$

8.

$m\angle W = \underline{\hspace{2cm}}$
 $m\angle X = \underline{\hspace{2cm}}$
 $m\angle Y = \underline{\hspace{2cm}}$
 $m\angle Z = \underline{\hspace{2cm}}$

9.



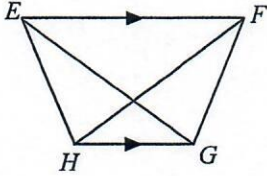
$m\angle J = \underline{\hspace{2cm}}$

$m\angle K = \underline{\hspace{2cm}}$

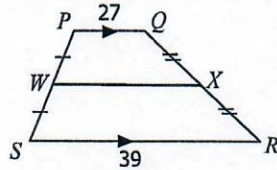
$m\angle L = \underline{\hspace{2cm}}$

$m\angle M = \underline{\hspace{2cm}}$

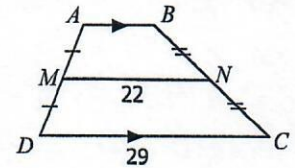
10. If $EFGH$ is an isosceles trapezoid, $EH = 4x - 27$, $FG = x + 9$, $EG = 3y + 19$, and $FH = 11y - 21$, solve for x and y .



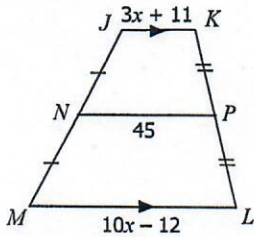
11. Find WX .



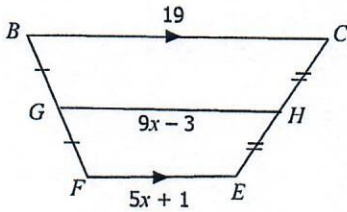
12. Find AB .



13. Find ML .



14. Find GH .



15. Find RS .

