Name_____   Must pass MC by:_____

Write your questions here!

Parallelograms are quadrilaterals with both pairs of opposite sides parallel. But what other characteristics do these figures have? Let's look at some pretty important theorems about parallelograms to find out:
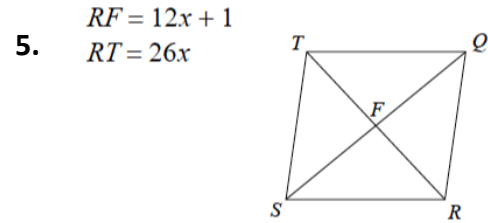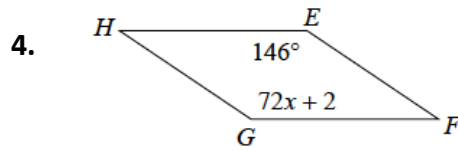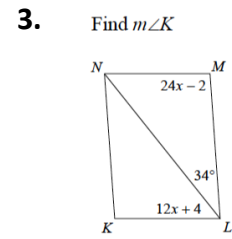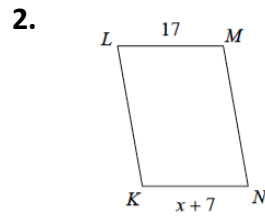
Parallelogram Theorems

Theorem: Visual Representation:

Examples:

Find x in each parallelogram figure.

1.

X U
$94°$
$22x - 2$
W V

2.

L 17 M
K $x + 7$ N

3. Find $m\angle K$

N M
$24x - 2$
$34°$
$12x + 4$
K L

4.

H E
$146°$
$72x + 2$
G F

5.

$RF = 12x + 1$
$RT = 26x$

T Q
F
S R
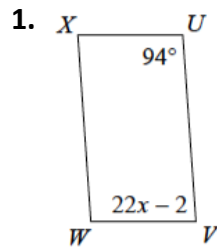
You try two! Find the measurement indicated in each parallelogram.

5.

S R
$4x + 10$
$7x + 9$
$95°$
T U

6.

$FW = 5x$
$WH = 6x - 3$
Find FW

H E
W
G F

.

_____

_____

_____

_____

Geometry
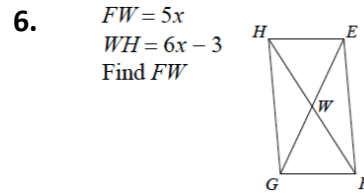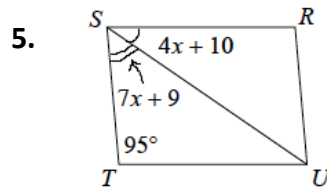
Solve for x. Each figure is a parallelogram.

1)
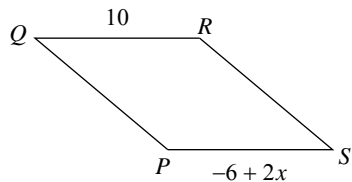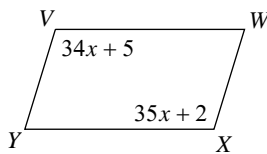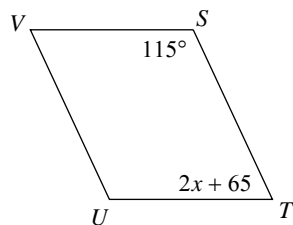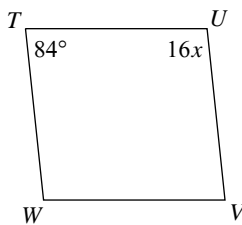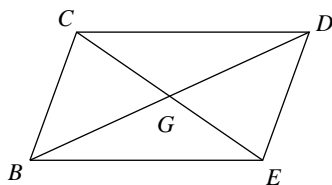
$$Q \quad 10 \quad R$$
$$P \quad -6 + 2x \quad S$$

2)

V W
$34x + 5$
$35x + 2$
Y X

3)

V S
$115°$
$2x + 65$
U T

4)

T U
$84°$ $16x$
W V

5) $CE = 46$
$ GE = 3x - 10$

C D
G
B E

6) $RH = 12$
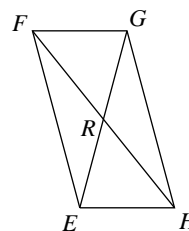$ FH = 13x - 2$

F G
R
E H

7) $XE = 2x + 2$
$ EV = 3x - 4$

W V
E
X Y

8) $XZ = 28$
$ BZ = 2x - 6$

Z W
B
Y X
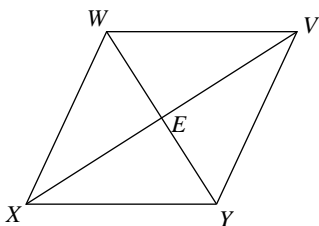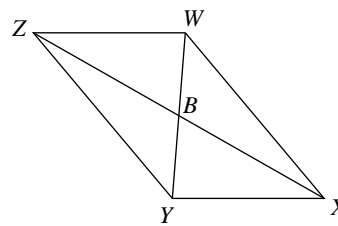
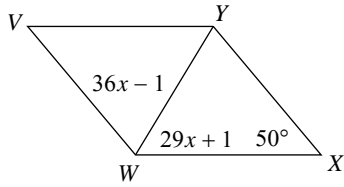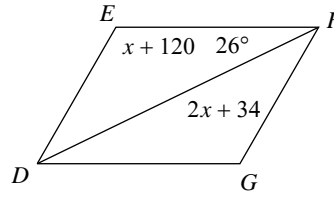**Find the measurement indicated in each parallelogram.**

9) Find $m\angle V$

V Y

$36x - 1$

$29x + 1$ $50°$

W X

10) Find $m\angle EFG$

E F

$x + 120$ $26°$

$2x + 34$

D G

11) $SQ = 2x - 2$
   $QU = x + 7$
   Find SU

S T

Q

R U

12) Find $m\angle G$

D E

$5x + 10$

$44°$

$4x + 18$

G F

13) Find $m\angle KMN$

K L

$10x + 5$

$38°$

$4x - 3$

N M

14) Find $m\angle CDE$

D E

$15°$

$5x$

$29x - 5$

C B
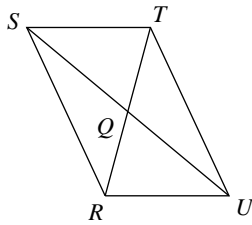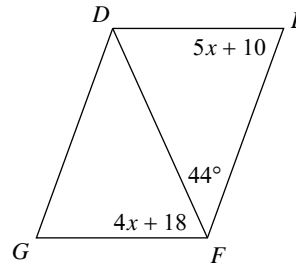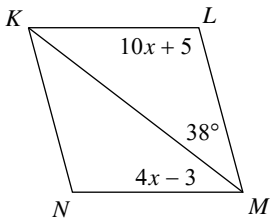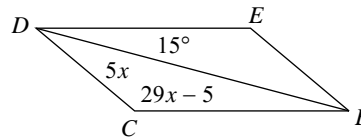
15) $UA = 3x + 3$
   $AS = 4x - 4$
   Find UA

S V

A

T U
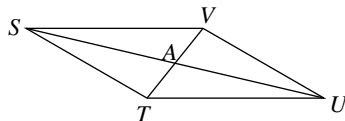
16) $QW = 2x - 1$
   $WS = x + 4$
   Find QW

S P

W

R Q
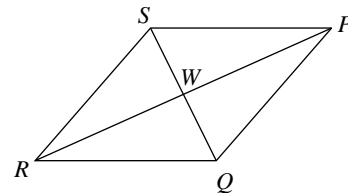
5.2 Application and Extension

1. Find $m\angle TVW$

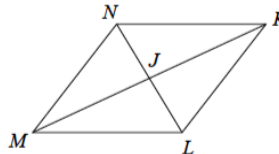
$11x - 4$
$42°$
$5x - 2$
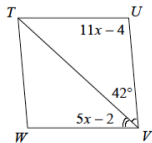
2. Solve for x:

$LJ = 17$
$JN = 4x - 3$

This is the coolest parallelogram puzzle you will do all day. Mr. Brust does these every weekend. Each figure below is a parallelogram. (They are not drawn to scale.) Use the properties of parallelograms to solve for *x*. Then, list all labeled points of that figure (including the intersection of the diagonals) in the blanks for the matching *x* value. There may be two or three figures for each *x* value. Finally, unscramble the letters to spell a word associated with parallelograms.

P O
$(10 + 3x)°$ $(30 + 4x)°$
$(6x - 10)°$
$(5x - 30)°$
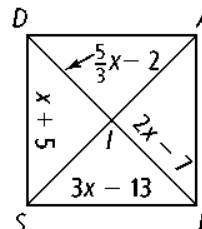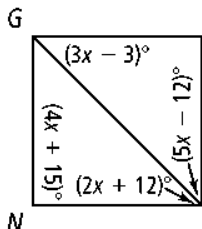I T

L M
$7x - 3$
$6x - 2$ E $8x - 7$
$5x + 6$
T R

G U
$3x + 2$
$x + 3$ $1.5x$
$5x - 10$
R N

U P
$(14.5x)°$ $(10 + 18x)°$
$(4 + 9x)°$
$(20x + 2)°$
Y A

L T
$(25x - 2)°$ $(14 + 18x)°$
U
$(23x)°$
R $(20x + 8)°$ A

D E
$7x + 4$
$6x + 3$ R $10x - 5$
$9x$
A I

C N
$4x + 4$ $6x - 11$
$3x + 7$ O
E $5x - 2$ T

P O
$(x + 35)°$
$(3.5x)°$ $(4x - 10)°$
$(3x - 5)°$
S E

G O
$(3x - 3)°$ $(5x - 12)°$
$(4x + 15)°$ $(2x + 12)°$
N A

D A
$\frac{5}{3}x - 2$
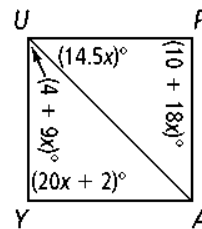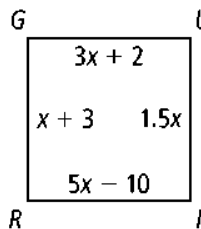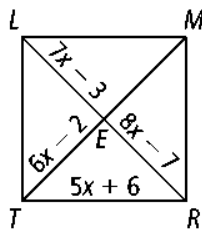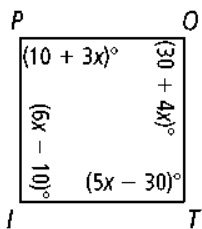$x + 5$ I $2x - 7$
$3x - 13$
S L

N P
$(14 + 16x)°$
$(18x + 6)°$ $(26x - 2)°$
S E

Q A
$10x + 7$
$11x + 11$ $13x + 5$
$14x - 1$
S L
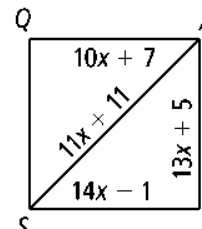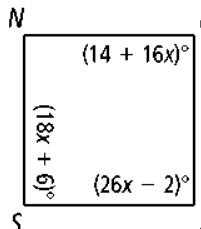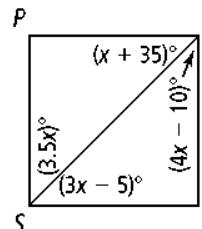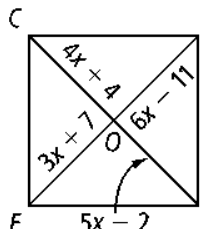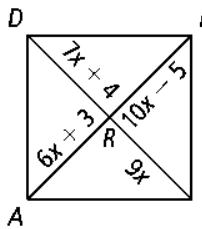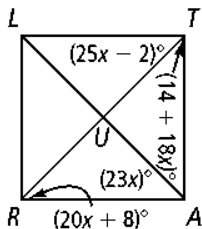
1. $x = 4$ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

2. $x = 15$ ___ ___ ___ ___ ___ ___ ___ ___ ___

3. $x = 20$ ___ ___ ___ ___ ___ ___ ___ ___

4. $x = 2$ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

5. $x = 6$ ___ ___ ___ ___ ___ ___ ___ ___

Complete the following proof of the theorem:

"If a quadrilateral is a parallelogram, then its diagonals bisect each other."

Given: ▱ ABCD
Prove: $\overline{AC}$ and $\overline{BD}$ bisect each other at E

Statements	Reason
1. $ABCD$ is a ▱	1. _____
2. $\overline{AB} \parallel \overline{DC}$	2. _____
3. $\angle 1 \cong \angle 4 ; \angle 2 \cong \angle 3$	3. _____
4. $\overline{AB} \cong \overline{DC}$	4. _____
5. _____	5. $ASA \cong ASA$
6. $\overline{AE} \cong \overline{CE} ; \overline{BE} \cong \overline{DE}$	6. _____
7. _____	7. Definition of Bisector
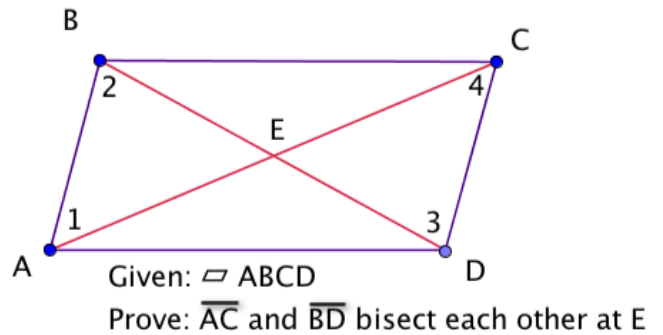
Solve each equation for x!
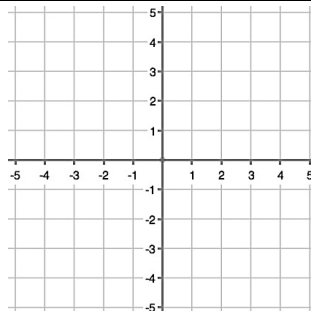
1.
$$-2x - 100 = 1x - 400$$

2.
$$2(x - 5) + 33 = 33$$

Multiply!

3.
$$(2x - 1)(x + 2)$$

Factor!

4.
$$(x^2 - 6x + 8)$$

5. Graph the equation:

$y = 1 + x$

6. Graph the equation:

$y = -x$