# Math 2B Properties and Proofs Review   Name: _____

Multiple Choice Practice

Find the value of *x*, by setting up the correct equation form the given diagram or information.
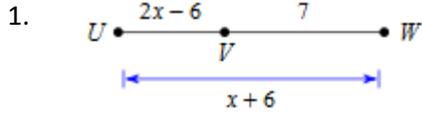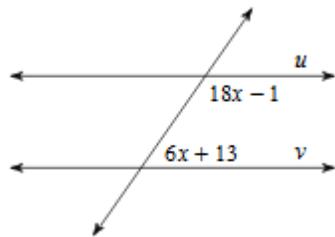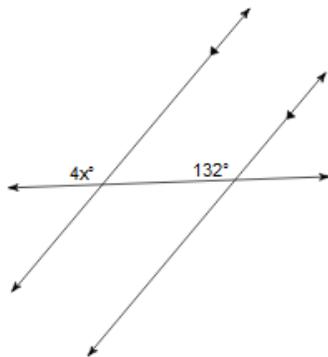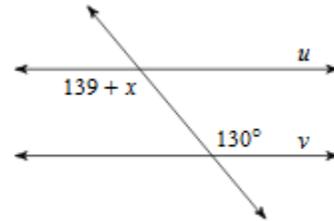
1.

$U \bullet \underset{V}{\overset{2x-6}{————\bullet————}} \overset{7}{} \bullet W$

$x+6$

A) -5
B) 5
C) 6
D) 10

2. to make $u \parallel v$

$139 + x$

$130°$ v

u

A) -11
B) -10
C) -9
D) 9

3. to make $u \parallel v$

u
$18x - 1$

$6x + 13$ v

A) -7
B) 5
C) 7
D) 9

4. to make $u \parallel v$

$22x + 2$ u

v

A) -7
B) -5
C) 4
D) 11

5.

$4x°$ $132°$

A) 32
B) 33
C) 35
D) 36

6.

$(6x + 1)°$

$145°$

A) 23
B) 24
C) 26
D) 27

7.

125°

(x - 7)°

A) 58
B) 61
C) 62
D) 63

8.

59°

(3x + 2)°

A) 18
B) 19
C) 20
D) 21

9. $m\angle 2 = 12x$

2   60°

A) -7
B) -5
C) -4
D) 5

10. $m\angle 2 = 6x - 2$

46°

2

A) -8
B) -6
C) 5
D) 8

11. $m\angle 2 = 15x + 3$

78°

2

A) -8
B) -7
C) 5
D) 7

12.

$2x - 18$ 6

A) -11
B) -6
C) 8
D) 12

13.

S   B   R

$x + 12$

A

$x + 18$

T
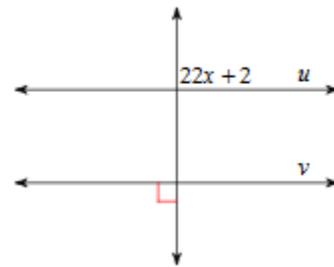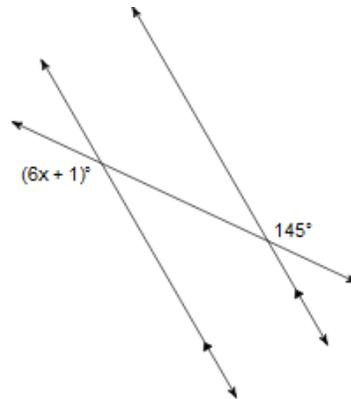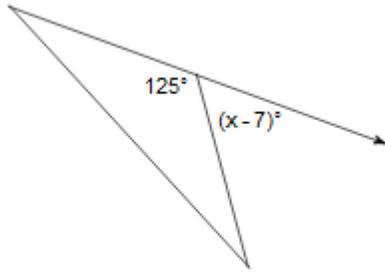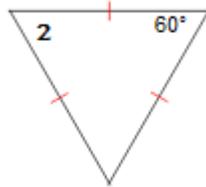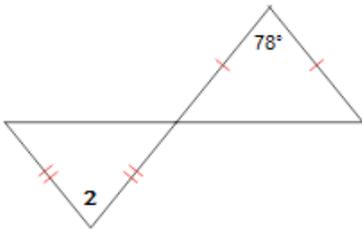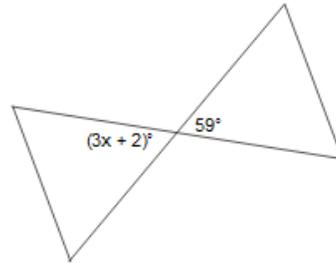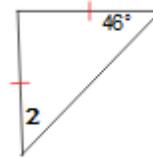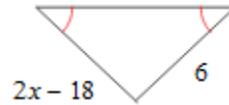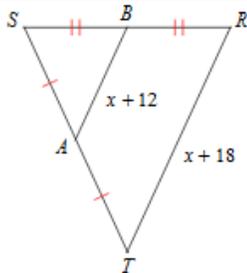
A) -9
B) -6
C) 8
D) 12

State if the two triangles can be proven congruent. If so, state how you know.

14.

15.
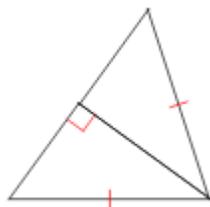
A) ASA
B) SSS
C) HL
D) not congruent
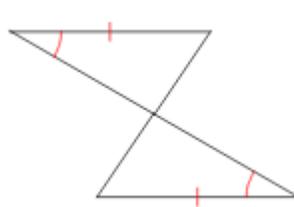
A) LA
B) SAS
C) ASA
D) AAS

What additional information is needed to show the triangles are congruent for the given postulate or theorem.

16. ASA
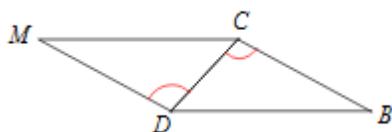
17. SAS

A) $\angle BDC \cong \angle MCD$
B) $\overline{BD} \cong \overline{MC}$
C) $\overline{DC} \cong \overline{CD}$ or $\overline{CB} \cong \overline{DM}$
D) $\angle DCB \cong \angle CDM$
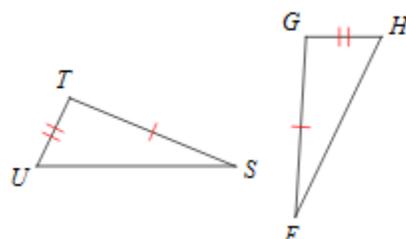
A) $\overline{TU} \cong \overline{GH}$
B) $\angle S \cong \angle F$ or $\angle T \cong \angle G$
C) $\angle T \cong \angle G$
D) $\overline{ST} \cong \overline{FG}$ or $\overline{US} \cong \overline{HF}$

In the triangle, *M*, *N*, and *P* are the midpoints of the sides. Name a segment parallel to the one given.

18. $\overline{NP} \parallel$ ___
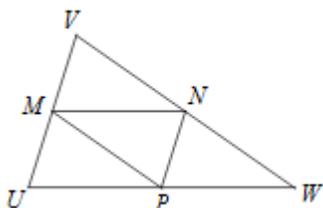
A) $\overline{MP}$
B) $\overline{UV}$
C) $\overline{VW}$
D) $\overline{UW}$

Each figure shows a triangle with one or more of its medians. Find the value of *x* from the given information

19.
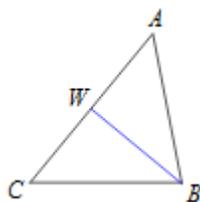
$WC = 2x - 5$ and $WA = x + 3$

A) 1
B) 3
C) 8
D) 9

20.
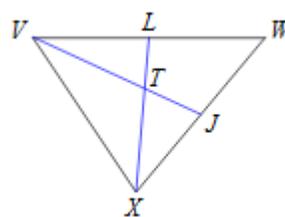
$XT = 3x + 3$ and $TL = 2x - 1$

A) 10
B) 9
C) 5
D) 3

Each figure shows a triangle with one or more of its medians. Find the value of *x* from the given information

21. $UK = 3x$ and $CK = 2x - 1$
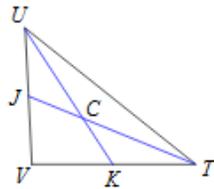
A) 1
B) 5
C) 6
D) 9

Each figure is a parallelogram. Find the value of *x*.

22.

$-7 + 11x$
$7 + 9x$

A) 2
B) 5
C) 6
D) 7

23.

$-10 + 13x$
$60°$

A) 12
B) 10
C) 5
D) 2

24.

17
$2x - 3$
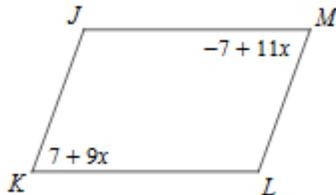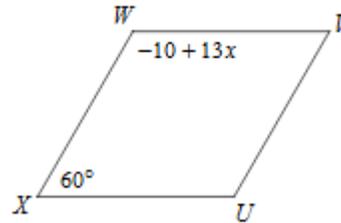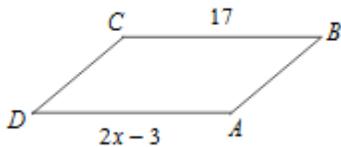
A) 2
B) 4
C) 9
D) 10

The figure below is a rhombus. Find the value of *x*.

25.

$(2x + 8)°$
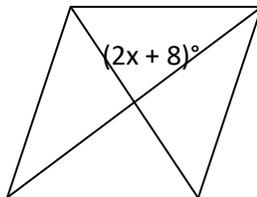
A) 31
B) 41
C) 58
D) 60

26. Which of these statements are true for all parallelograms?

A) Diagonals bisect each other.
B) Diagonals are congruent.
C) Consecutive angles are congruent.
D) All sides are congruent.

27. Find the value of *x* that proves *AB* is a midsegment.

6x-12
4x+16

A) 2
B) 2.8
C) 5
D) 14
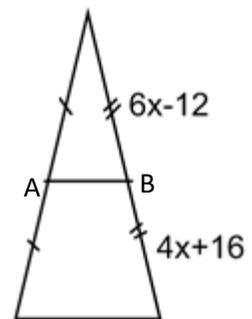
28. Given *MN* is a perpendicular bisector, find the value of x.

A) -2
b) 1
C) 3
D) 6

$2x + 1$ $4x - 5$

N
M
13
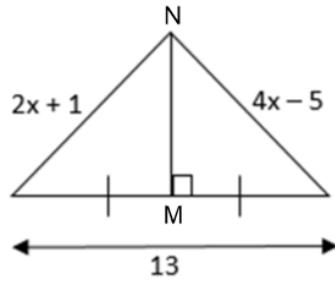
29. What is the relationship between $\angle a$ and $\angle b$.

A) Complimentary
B) Congruent
C) Supplementary
D) Cannot be determined

b
c
a
d
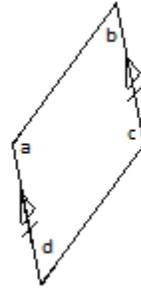
30. Given midsegment *AB* of the triangle below, find the values of $\angle c, \angle d, \angle e$ and $\angle f$.

e
A   f   c   B
142°
d
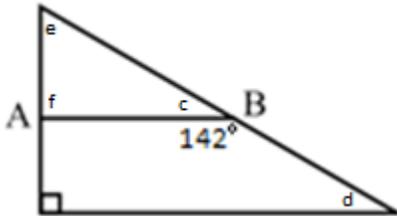
A) $c = 28°, d = 142°, e = 62°, f = 90°$
B) $c = 38°, d = 38°, e = 62°, f = 90°$
C) $c = 38°, d = 38°, e = 52°, f = 90°$
D) $c = 142°, d = 38°, e = 38°, f = 142°$

31. In the following parallelogram, find the value of Y.

14
2x+5
13   3x+4y
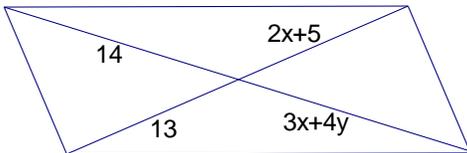
A) $\dfrac{1}{2}$

B) $\dfrac{1}{3}$

C) $\dfrac{1}{4}$

D) 4

**Name the property:**

32) If a = b and b = c then a = c _____

33) A = A _____

34) If a = b, then a + c = b + c _____

35) If a = b, then b = a _____

36) If two sides of a triangle are congruent, then the angles opposite those sides are congruent

_____

37) The larger segment is congruent to the sum of the segments that comprise it _____

38) Two angles that are adjacent and supplementary are called a _____

39) If alternate interior angles are congruent, then the lines are parallel _____

40) The exterior angle = the sum of the two remote interior angles _____

41) A segment connecting the midpoints of two sides of a triangle is called a _____

42) The centroid is _____ the distance from the vertex of a triangle to the midpoint of the opposite side

Math 2B Properties and Proofs Review

Free Response - Proof Practice

Complete the following Proofs, by filling in the blanks or by matching, if given options/choices.

1.

Given: $\triangle ABC$ is isosceles

$\overline{BD}$ bisects $\angle ABC$

Prove: $\triangle ABD \cong \triangle CBD$
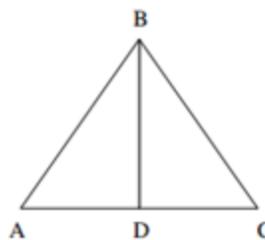
Statement	Reason
1. $\triangle ABC$ is isosceles	1.
2. $\overline{AB} \cong \overline{CB}$	2.
3. $\angle A \cong \angle C$	3.
4.	4. Given
5.	5. Definition of Angles Bisector
6. $\triangle ABD \cong \triangle CBD$	6.

2.

Given: $ABCD$ is a parallelogram

Proof: $\overline{AC}$ and $\overline{BD}$ bisect each other at E
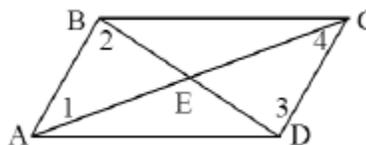
Statements	Reasons
1. $ABCD$ is a parallelogram	2. Given
3. $\overline{AB} \parallel \overline{DC}$	4.
5. $\angle 1 \cong \angle 4; \angle 2 \cong \angle 3$	6.
7. $\overline{AB} \cong \overline{DC}$	8. Opposite sides of a parallelogram are congruent
9. $\triangle \_\_\_\_ \cong \triangle \_\_\_\_$	10.
11. $\overline{AE} \cong \overline{CE}; \overline{BE} \cong \overline{DE}$	12.
13.	14.

3. Given: $m\angle T = 40°$

          $m\angle SUV = 145°$

   Prove: $m\angle S = 105°$
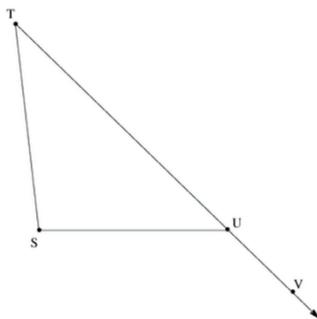
Statements	Reasons
1.	Given
$m\angle SUV = 145°$	2.
3.	Exterior Angles Theorem
4.	Substitution Property of Equality
$m\angle s = 105°$	5.

Possible Choices to fill in the above Proof

| Statements	Reasons
A. $m\angle SUV = 145°$	A. Subtraction Property of Equality
B. $m\angle SUT + m\angle UTS = 180°$	B. Given
C. $145° = m\angle S + 40°$	C. Definition of Linear Pairs
D. $m\angle SUV = m\angle S + m\angle T$	D. Vertical Angles are Congruent
E. $m\angle T = 40°$	E. Substitution Property of Equality

4. Given: $\triangle WOK$ is isosceles

        R is the midpoint of $\overline{WK}$

   Prove: $\angle OWR \cong \angle OKR$
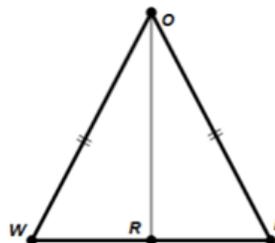
Statement	Reason
1. $\triangle WOK$ is isosceles	1. Given
2.	2. Definition of an isosceles Triangle
3. R is the midpoint of $\overline{WK}$	3.
4. $\overline{WR} \cong \overline{KR}$	4.
5.	5. Reflexive Property of Congruence
6. $\triangle WRO \cong \triangle KRO$	6.
7. $\angle OWR \cong \angle OKR$	7.

5. Given: $ABCD$ is a rectangle
   $AC = 6x - 15$
   $BD = x + 25$
   Prove: $x = 8$
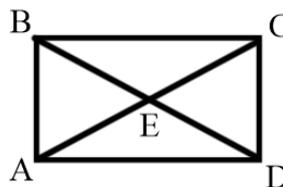
Statement	Reason
1. $ABCD$ is a rectangle	1. Given
2.	2. The diagonals of a rectangle are congruent
3. $AC = BD$	3.
4. $AC = 6x - 15, BD = x + 25$	4.
5.	5. Substitution
6.	6.
7.	7.
8.	8.

6. Given: Line ABCD
   $\angle 1$ and $\angle 4$ are supplementary
   Prove: $\overleftrightarrow{BF} \parallel \overleftrightarrow{CE}$
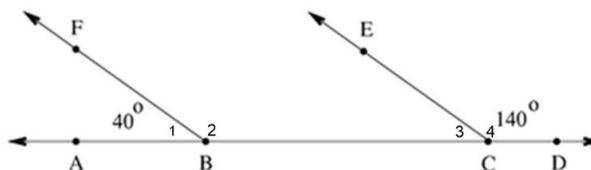
Statement	Reason
1.	Given
$\angle 1$ and $\angle 4$ are supplementary	2.
3.	Definition of Supplementary $\angle's$
$\angle 1$ and $\angle FBC$ are supplementary	4.
5.	Definition of Supplementary $\angle's$
$m\angle 4 + m\angle 1 = m\angle 1 + m\angle FBC$	6.
$m\angle 4 = m\angle FBC$	7.
8.	Definition of $\cong$
$\overleftrightarrow{BF} \parallel \overleftrightarrow{CE}$	9.

Possible Choices to fill in the above Proof

Statements	Reasons
A. $m\angle FBC = 140°$	A. if corresponding $\angle's \cong$, then lines $\parallel$
B. $m\angle 1 + m\angle FBC = 180°$	B. Given
C. $Ð4 \cong ÐFBC$	C. Definition of Linear Pairs
D. $mÐDCB = mÐ1 + mÐFBC$	D. Vertical Angles are Congruent
E. $m\angle 4 + m\angle 1 = 180°$	E. Substitution Property of Equality
F. $mÐ1 = mÐ4$	F. if same side interior $\angle's$ are supplementary, then lines $\parallel$
G. $\overleftrightarrow{AD}$	G. Subtraction Property of Equality