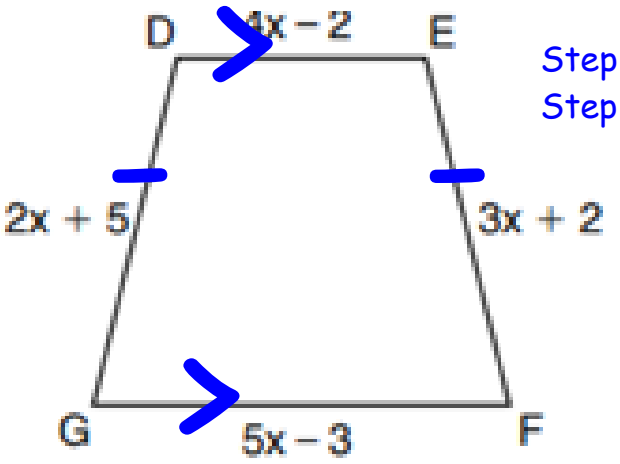
August 2009

29 In the diagram below of isosceles trapezoid $DEFG$, $\overline{DE} \parallel \overline{GF}$, $DE = 4x - 2$, $EF = 3x + 2$, $FG = 5x - 3$, and $GD = 2x + 5$. Find the value of x.



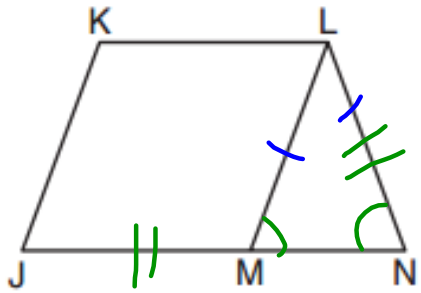
Step 1: Label parallel sides as bases
Step 2: Label legs as congruent

$3x+2 = 2x+5$
$-2x \quad -2x$
$x+2 = 5$
$-2 \quad -2$
$x = 3$

Jan 14-10:18 AM

January 2010

36 Given: $JKLM$ is a parallelogram.
$\overline{JM} \cong \overline{LN}$
$\angle LMN \cong \angle LNM$
Prove: $JKLM$ is a rhombus.



hint: A parallelogram with any 2 consecutive sides congruent is a rhombus.

Jan 13-10:48 PM

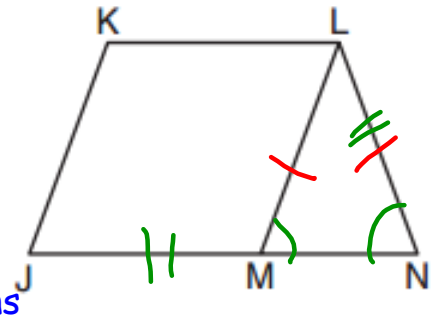
January 2010

36 Given: $JKLM$ is a parallelogram.

1b $\overline{JM} \cong \overline{LN}$

1c $\angle LMN \cong \angle LNM$

Prove: $JKLM$ is a rhombus.



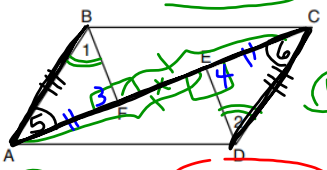
statements	reasons
1) (see above)	1) given
2) $\overline{LM} \cong \overline{LN}$	2) If two angles of a triangle are congruent, then the sides opp. are congruent. (Converse of base angles of an isosceles triangle theorem.)
3) $\overline{LM} \cong \overline{JM}$	3) Transitive Property OR Substitution Post.
4) JKLM is a rhombus	4) A parallelogram with congruent consecutive sides is a rhombus.

Jan 14-3:54 PM

August 2009

38 Given: Quadrilateral $ABCD$, diagonal $\overline{AFEC}$, $\overline{AE} \cong \overline{FC}$, $\overline{BF} \perp \overline{AC}$, $\overline{DE} \perp \overline{AC}$, $\angle 1 \cong \angle 2$ (1a, 1c, 1d, 1e; (A))

Prove: $ABCD$ is a parallelogram.



1) given

2) $\overline{AE} \cong \overline{AF}+\overline{FE}$, $\overline{CF} \cong \overline{FE}+\overline{EC}$ — Partition Postulate

3) $\overline{AF}+\overline{FE} \cong \overline{FE}+\overline{EC}$ — Substitution Postulate

4) $\overline{FE} \cong \overline{FE}$ — Reflexive property

5) $\overline{AF} \cong \overline{EC}$ — Subtraction Postulate

6) $\angle 3 \cong \angle 4$ — Perpendicular lines form $\cong$ right angles

7) $\triangle ABF \cong \triangle CDE$ — AAS$\cong$AAS

8a) $\overline{AB} \cong \overline{CD}$ — C.P.C.T.C.

8b) $\angle 5 \cong \angle 6$ — If two lines cut by a transversal form congruent alternate interior angles then the lines are parallel

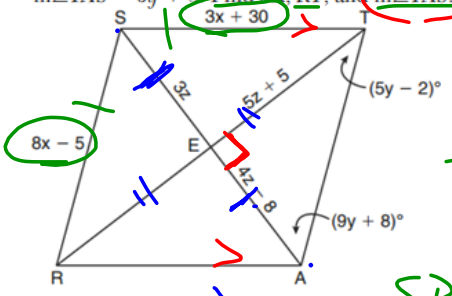
9) $\overline{AB} \parallel \overline{CD}$

10) ABCD is a ▱ — If a quadrilateral has one pair of opposite sides both congruent and parallel then it is a parallelogram.

Jan 13-10:49 PM

June 2010

38 In the diagram below, quadrilateral $STAR$ is a rhombus with diagonals $\overline{SA}$ and $\overline{TR}$ intersecting at E. $ST = 3x + 30$, $SR = 8x - 5$, $SE = 3z$, $TE = 5z + 5$, $AE = 4z - 8$, $m\angle RTA = 5y - 2$, and $m\angle TAS = 9y + 8$. Find SR, RT, and $m\angle TAS$.



$8x - 5 = 3x + 30$

$-3x + 5 \quad -3x + 5$

$\frac{5x}{5} = \frac{35}{5}$ $x = 7$

$SR = 8(7) - 5 = 51$ units

$3z = 4z - 8$

$+8 \quad -3z \quad -3z + 8$

$z = 2$

$RT = 2(ET)$

$5(8) + 5$

$RT = 2(45) = 90$ units

$9y + 8 + 5y - 2 = 90$

$14y + 6 = 90$

$-6 \quad -6$

$\frac{14y}{14} = \frac{84}{14}$ $y = 6$

$m\angle TAS = 9(6) + 8 = 62°$

Jan 13-10:50 PM

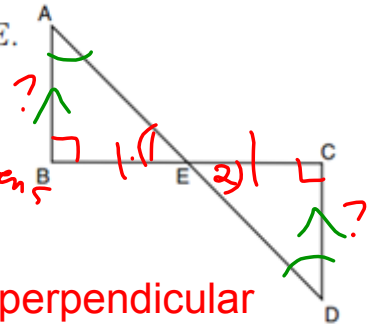
June 2012

35 Given: $\overline{AD}$ bisects $\overline{BC}$ at E.

$\overline{AB} \perp \overline{BC}$

$\overline{DC} \perp \overline{BC}$

Prove: $\overline{AB} \cong \overline{DC}$



1) Given

2) $\angle B$ & $\angle C$ are right angles — perpendicular lines form right angles.

3) $\angle B \cong \angle C$ — ALL right angles are $\cong$.

4) $\overline{BE} \cong \overline{EC}$ — The bisector of a segment divides it into 2 $\cong$ segments.

5) $\angle 1 \cong \angle 2$ — When 2 lines intersect they form congruent vertical angles

6) $\triangle ABE \cong \triangle DCE$ ASA$\cong$ASA

7) $\overline{AB} \cong \overline{DC}$ C.P.C.T.C.

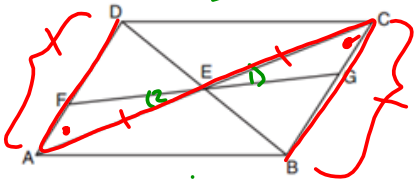
Jan 13-10:50 PM

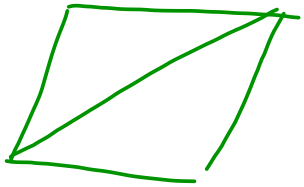
January 2012

38 In the diagram below of quadrilateral $ABCD$, $\overline{AD} \cong \overline{BC}$ and $\angle DAE \cong \angle BCE$.

Line segments AC, DB, and FG intersect at E.

Prove: $\triangle AEF \cong \triangle CEG$





2. $\overline{AD} \parallel \overline{BC}$

2) If 2 lines cut by a transversal form $\cong$ alt. int. angles, then the lines are parallel.

3. ABCD ▱

3) If a quadrilateral has one pair of opp. both $\cong$ & parallel, then it is a parallelogram.

4. AC & BD bisect each other

4) The diagonals of a parallelogram bisect each other.

5. $\overline{AE} \cong \overline{EC}$

5) def. of segment bisector

6. $\angle 1 \cong \angle 2$

6) When 2 lines intersect they form $\cong$ vertical angles

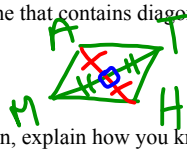
7. $\triangle AEF \cong \triangle CEG$

7) ASA≅ASA

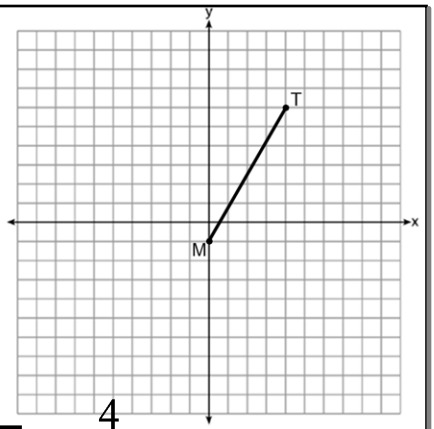
Jan 13-10:51 PM

1) In rhombus $MATH$, the coordinates of the endpoints of the diagonal $\overline{MT}$ are $M(0,-1)$ and $T(4,6)$.

Write an equation of the line that contains diagonal $\overline{AH}$.



Using the given information, explain how you know that your line contains diagonal $\overline{AH}$



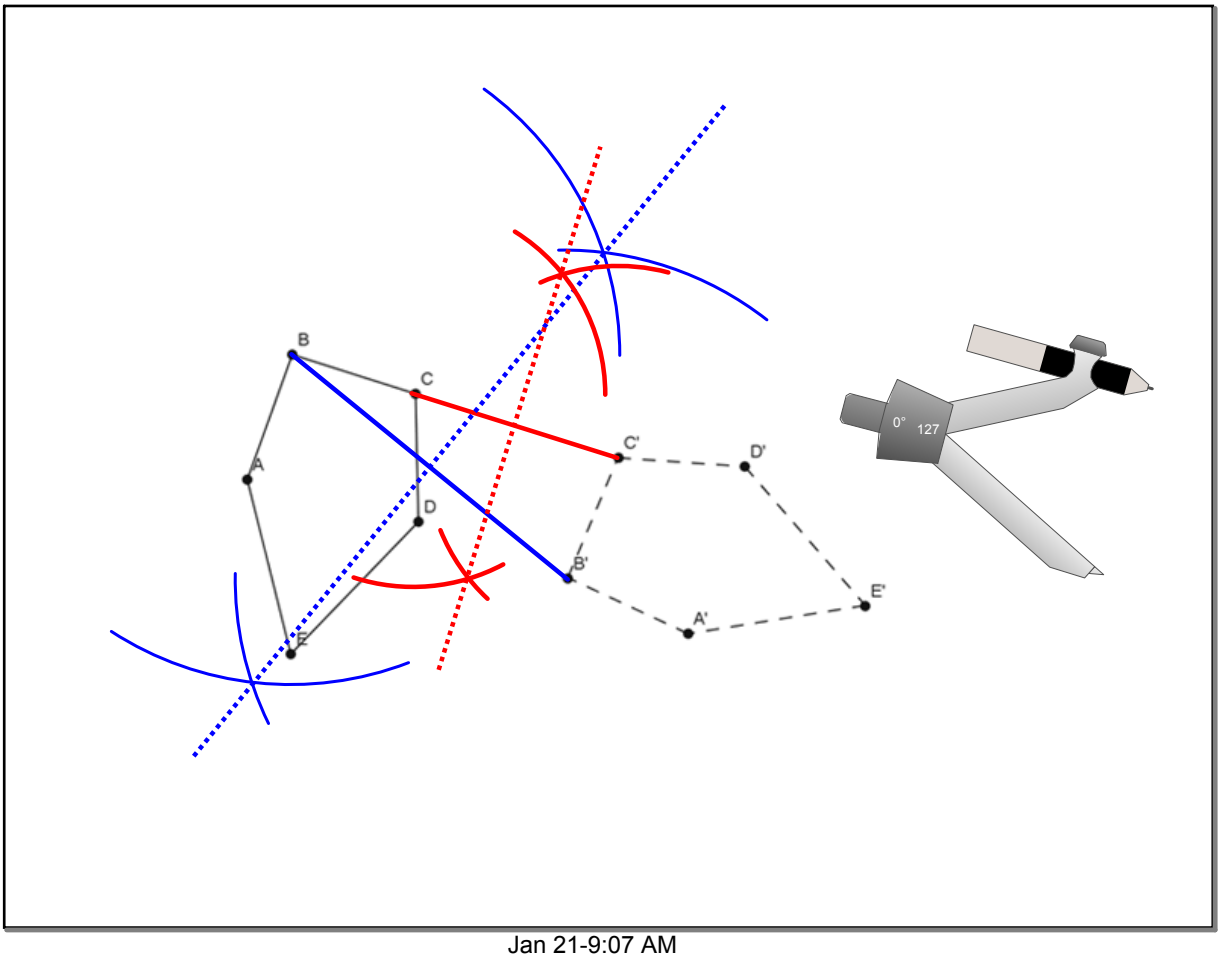
$m_{MT} = \frac{6-(-1)}{4-0} = \frac{7}{4}$ $m_{AH} = -\frac{4}{7}$

So slope of AH is negative reciprocal since diagonals are perpendicular.

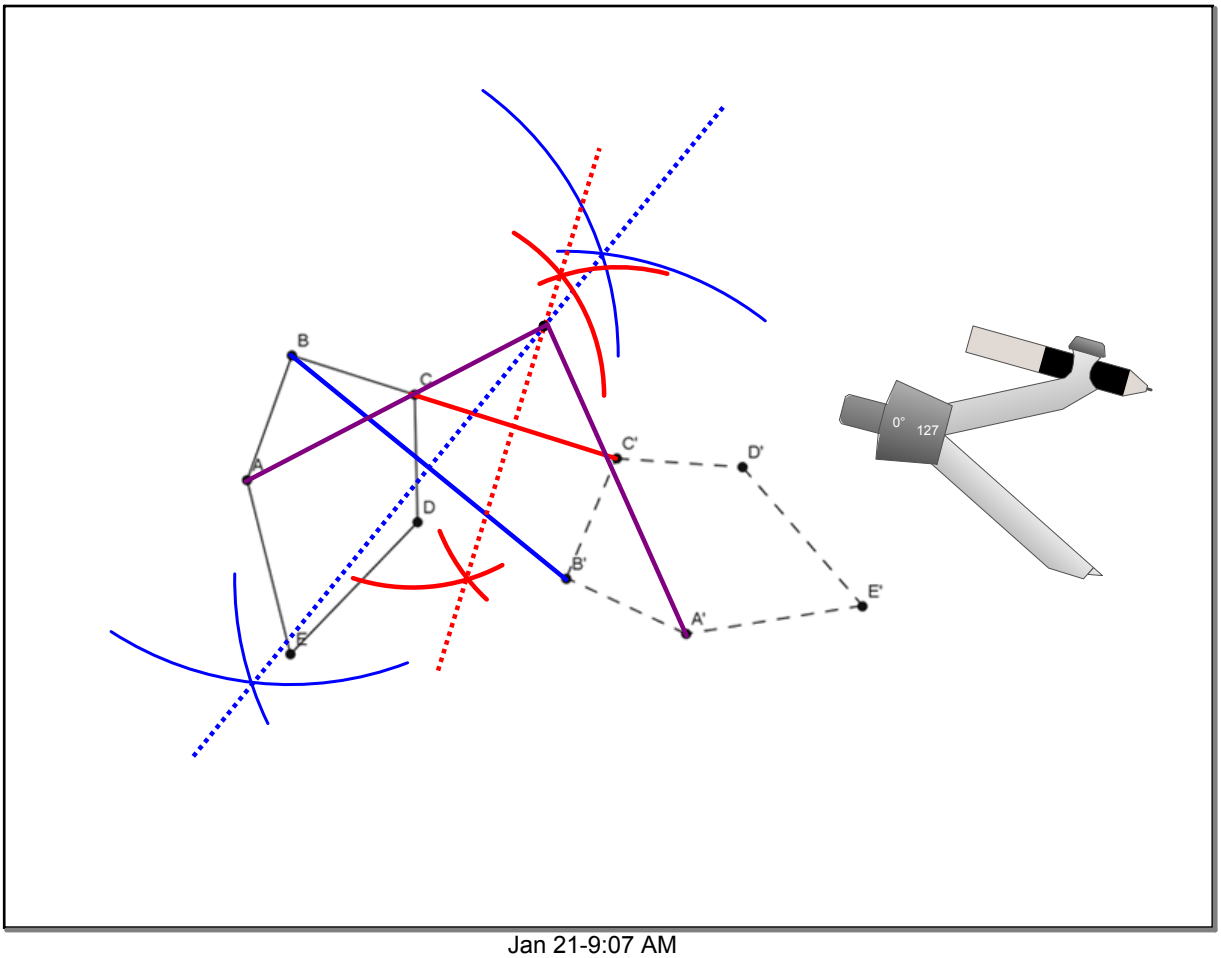
Since a rhombus is a parallelogram, the diagonals bisect each other. So the midpoint of MT is on the line of the diagonal AH.

$M_{MT} = (\frac{0+4}{2}, \frac{-1+6}{2}) = (2, 2.5)$ $y - 2.5 = -\frac{4}{7}(x-2)$

Jan 21-8:58 AM

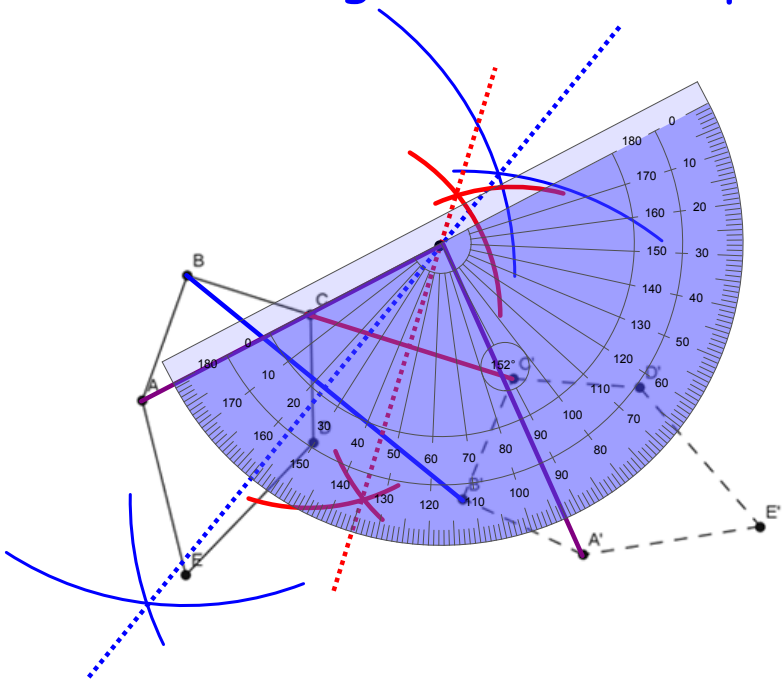


Jan 21-9:07 AM



Jan 21-9:07 AM

85, 86, or 87 degrees are acceptable



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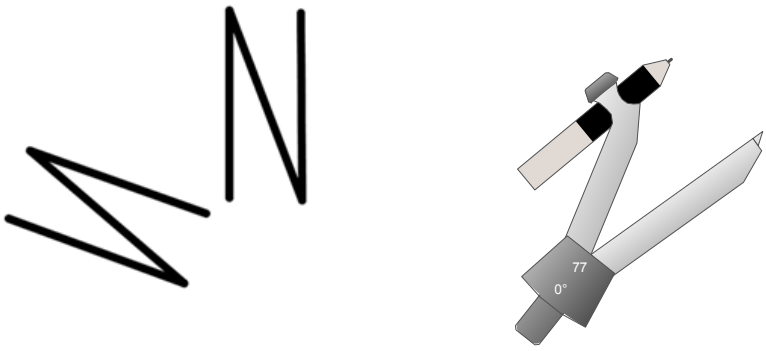

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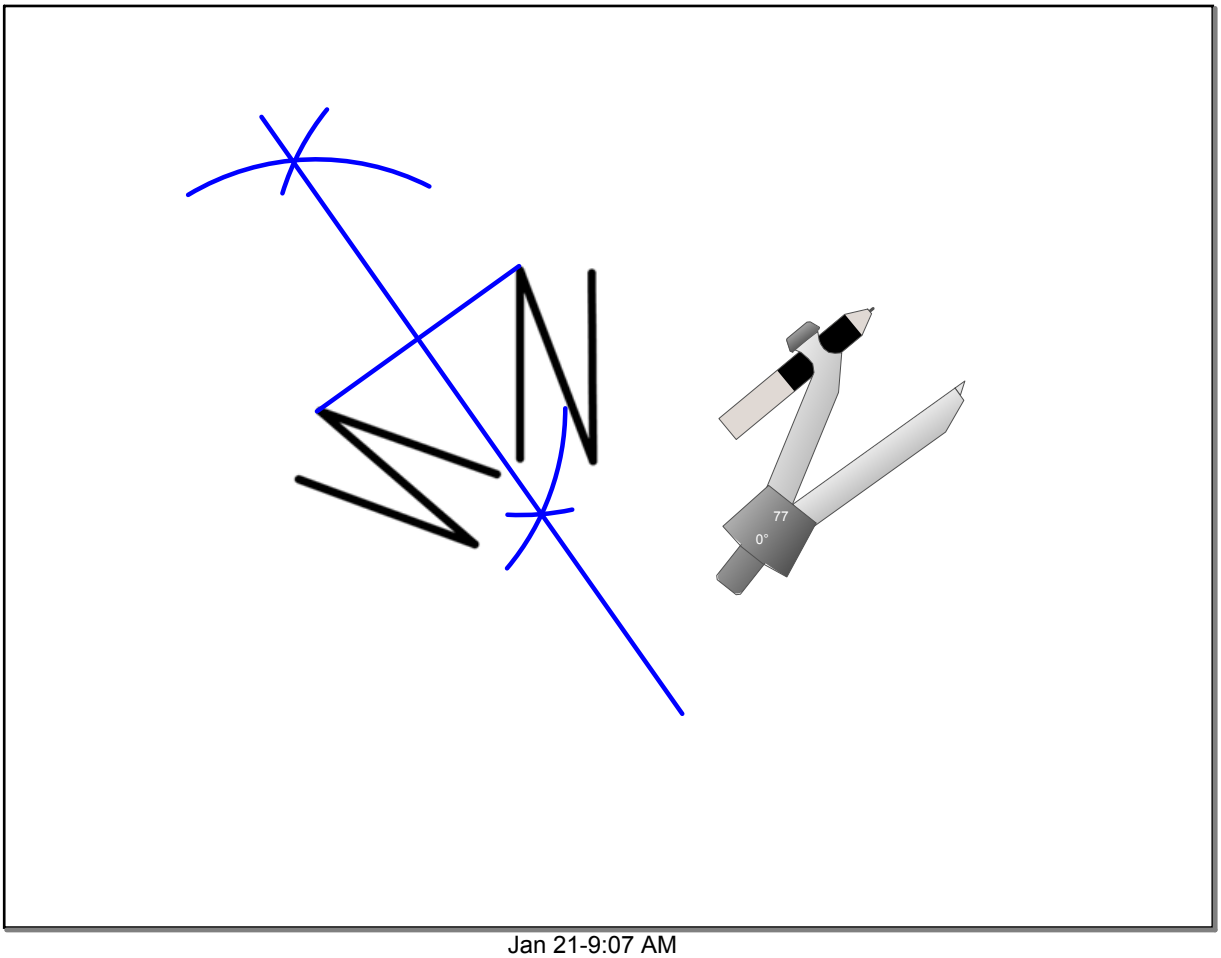

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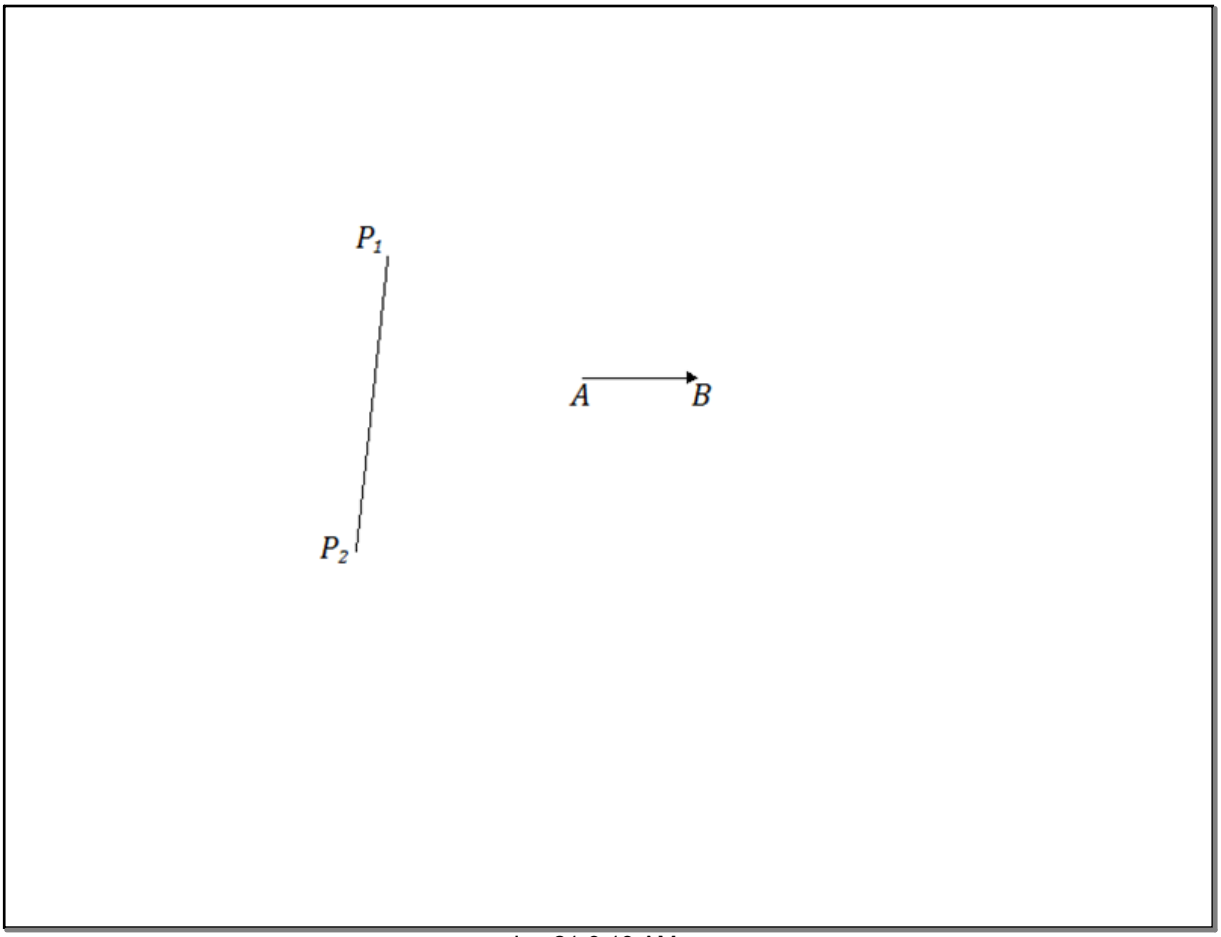

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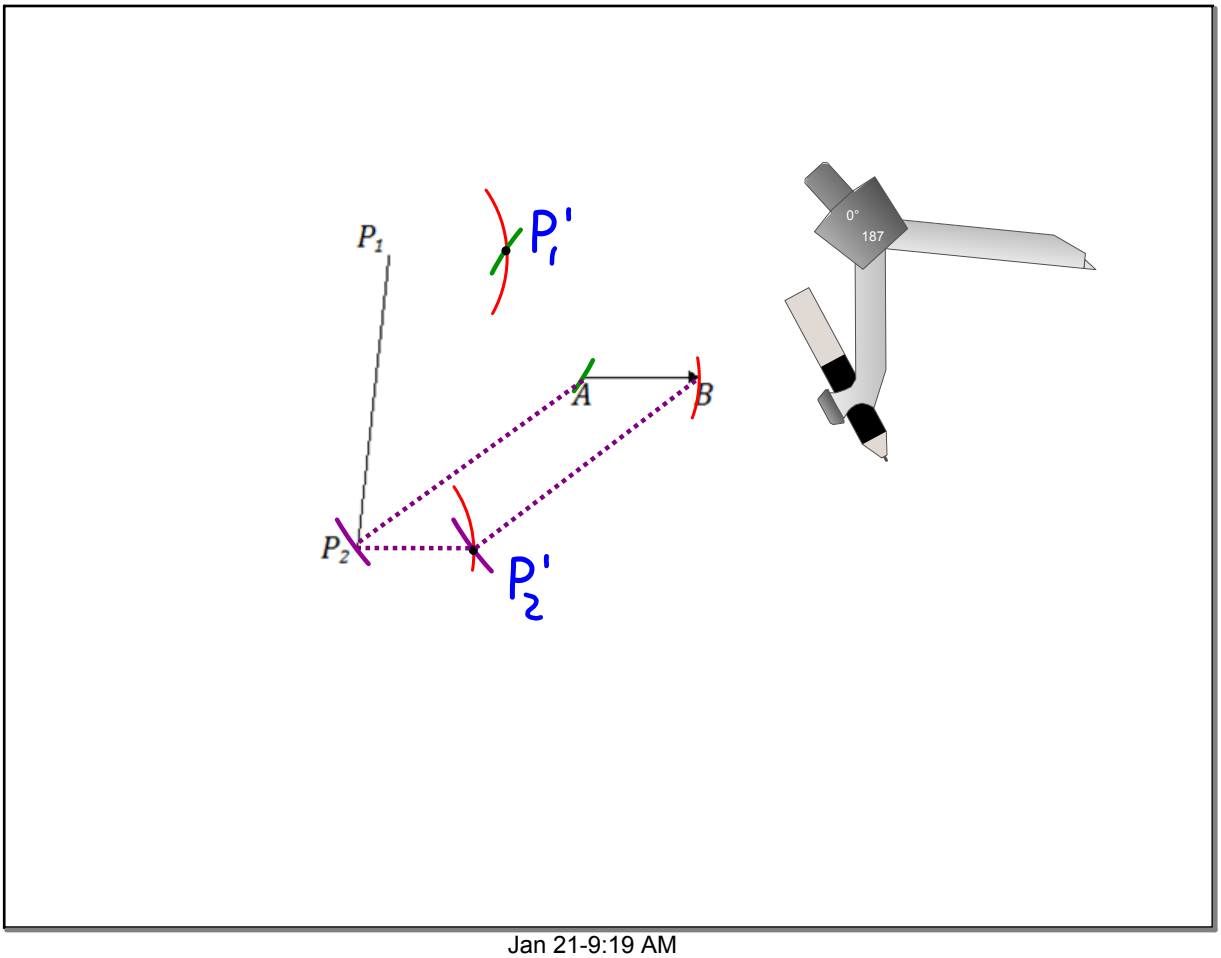

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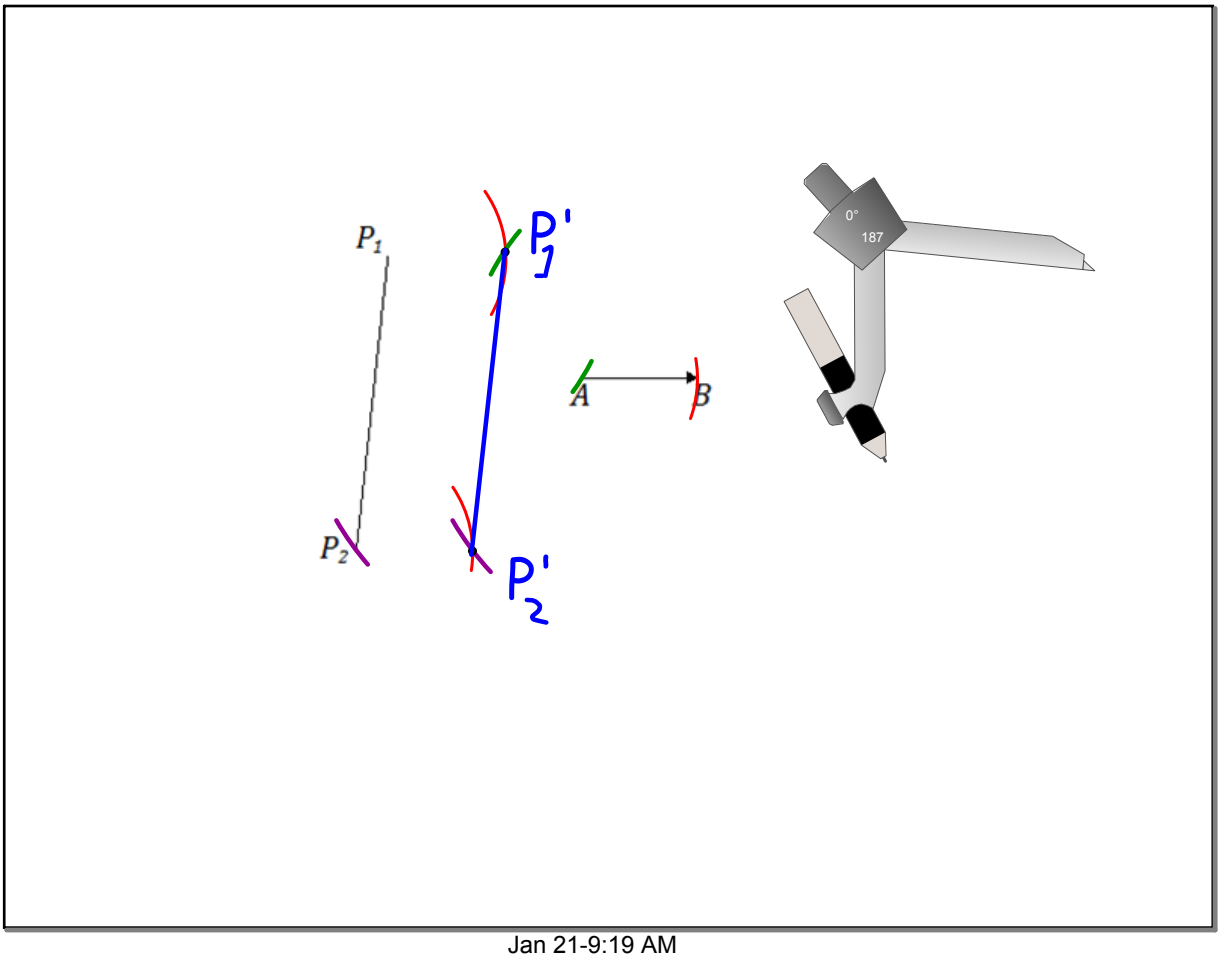

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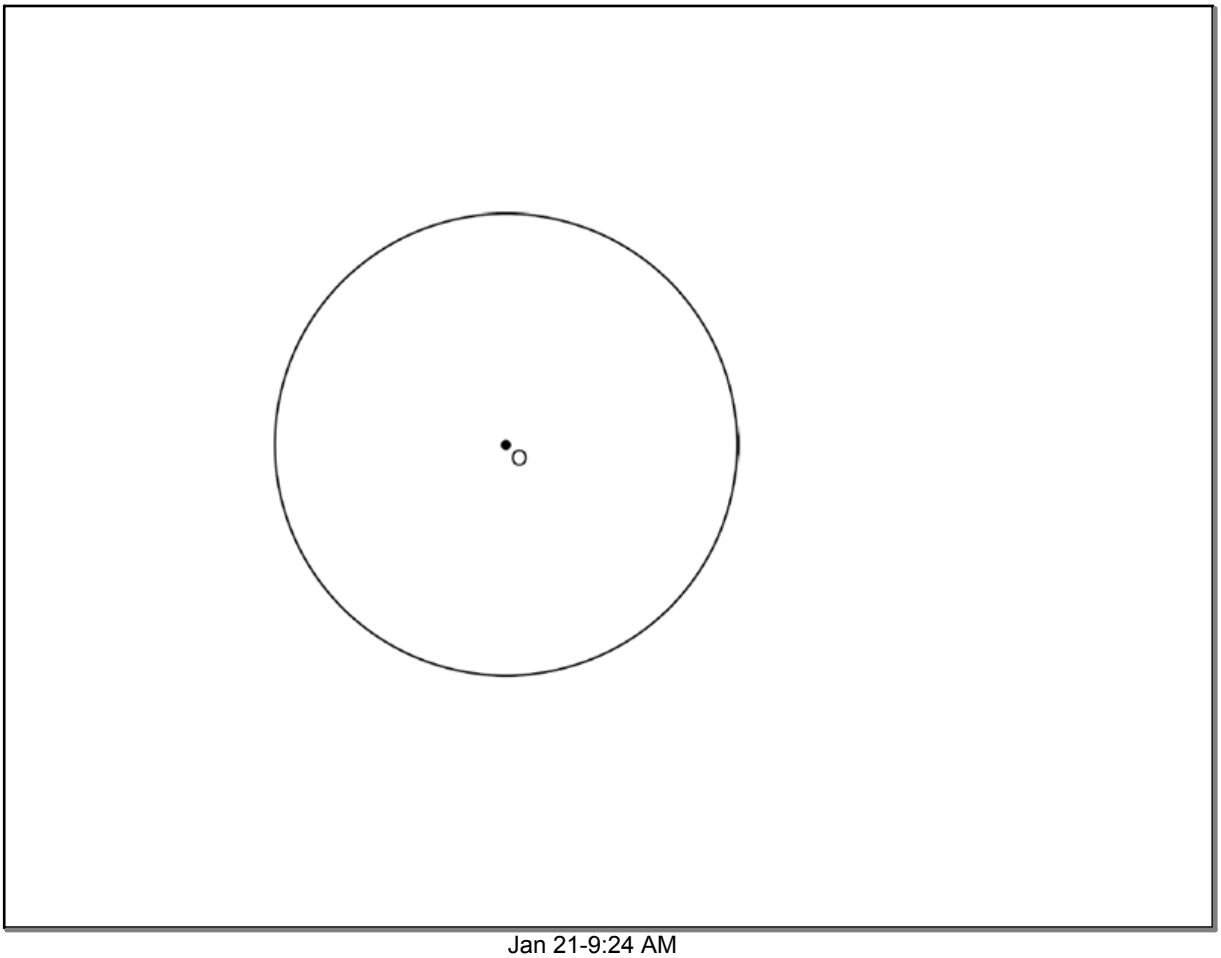

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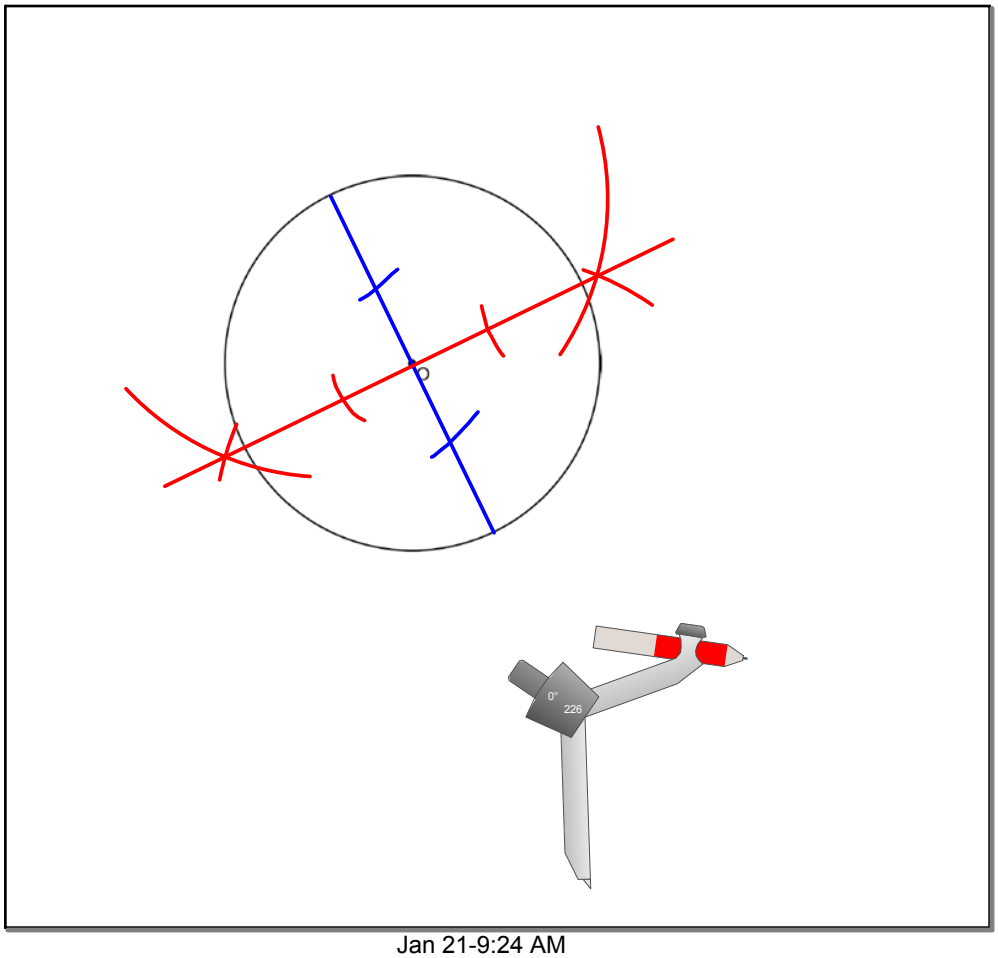

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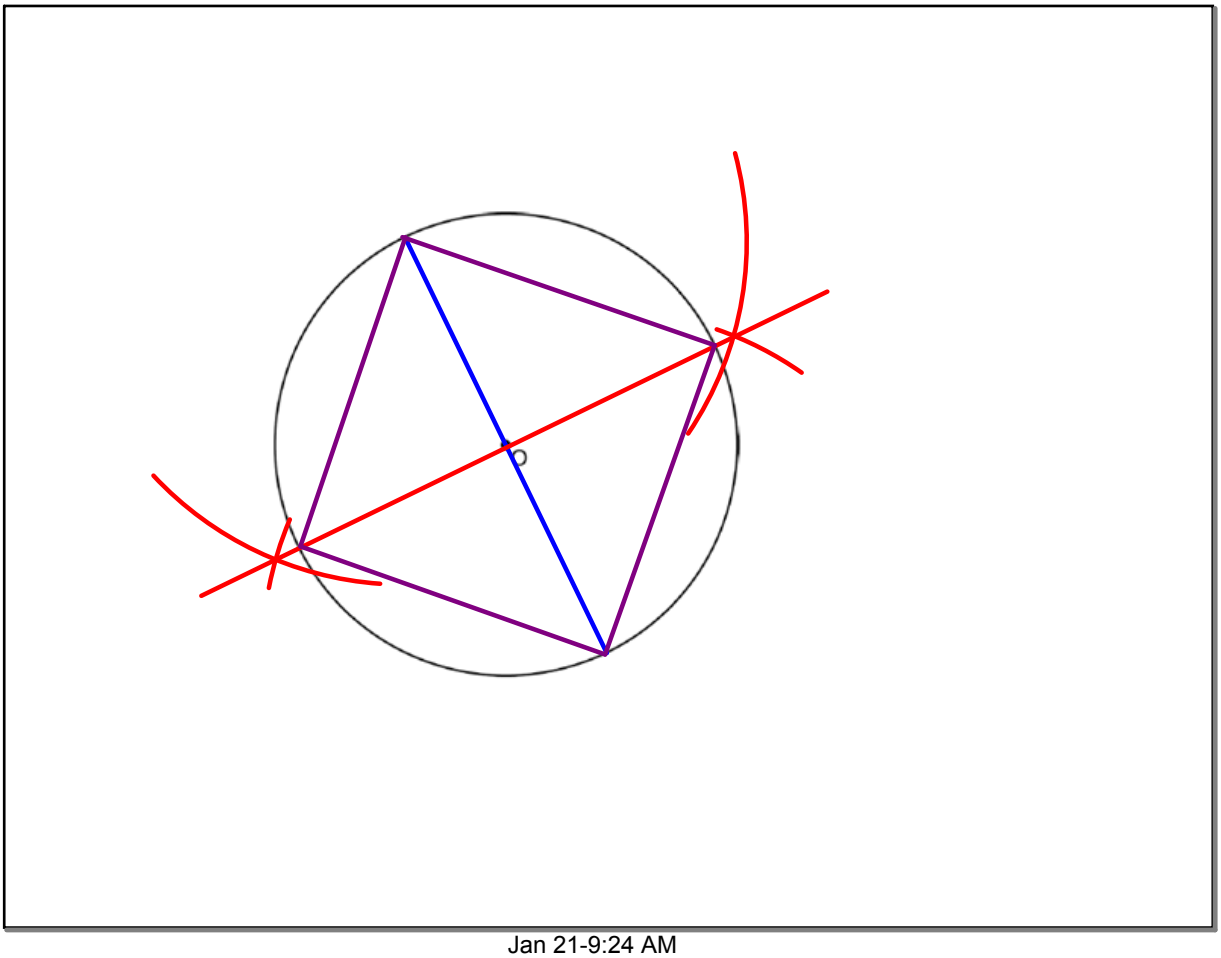

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