1. Six steps of a two-column proof are shown. Copy and complete the proof.

Given T is the midpoint of $\overline{SU}$.

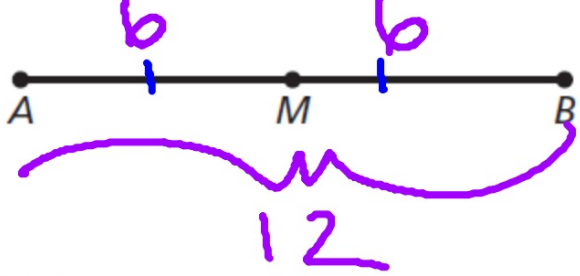
Prove $x = 5$

STATEMENTS	REASONS
1. T is the midpoint of $\overline{SU}$.	1. Given
2. $\overline{ST} \cong \overline{TU}$	2. Definition of midpoint
3. $ST = TU$	3. Definition of congruent segments
4. $7x = 3x + 20$	4. Substitution Property
5. $4x = 20$	5. Subtraction Property of Equality
6. $x = 5$	6. Division Property

Prove this property of midpoints: If you know that M is the midpoint of $\overline{AB}$, prove that AB is two times AM and AM is one-half AB.

Given M is the midpoint of $\overline{AB}$.

Prove $AM = \frac{1}{2}AB$

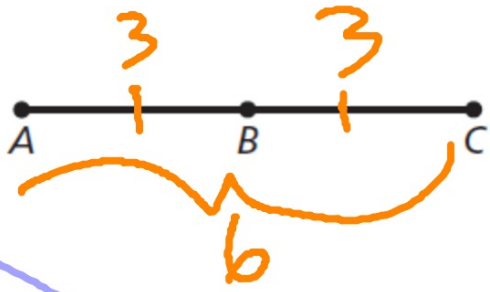


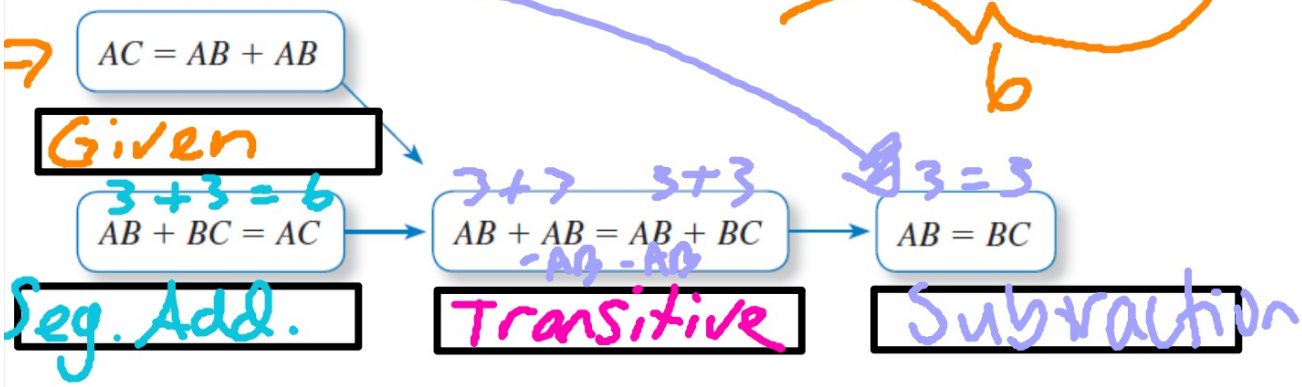
STATEMENTS	REASONS
1. M is the midpoint of $\overline{AB}$.	1. Given
2. $\overline{AM} \cong \overline{MB}$	2. Definition of midpoint
3. $AM = MB$	3. Definition of congruent segments
4. $AM + MB = AB$	4. Segment Addition Postulate (Post. 1.2)
5. $AM + AM = AB$	5. Substitution Property of Equality
6. $2AM = AB$	6. Distributive Property
7. $AM = \frac{1}{2}AB$	7. Division Property of Equality

Work with a partner. Match each reason with the correct step in the flowchart.

Given $AC = AB + AB$

Prove $AB = BC$





A. Segment Addition Postulate (Post. 1.2)

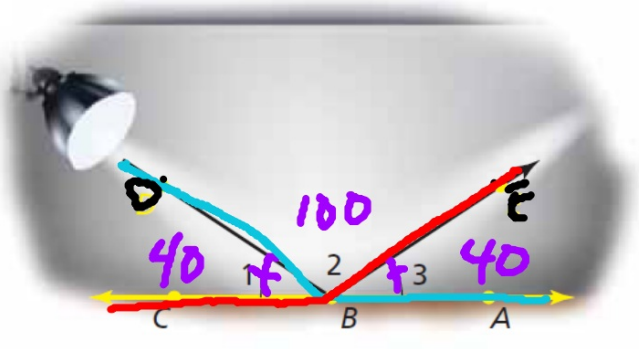
B. Given

C. Transitive Property of Equality

D. Subtraction Property of Equality

Answers: B, A, C, D

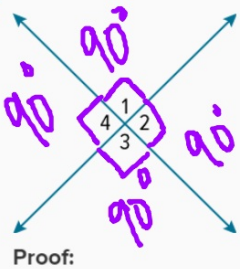
You reflect the beam of a spotlight off a mirror lying flat on a stage, as shown. Determine whether $m\angle DBA = m\angle EBC$.



Statements	Reasons
1. $m\angle 1 = m\angle 3$	Given
2. $m\angle DBA = m\angle 3 + m\angle 2$ $140 = 40 + 100$	Angle Addition Postulate
3. $m\angle DBA = m\angle 1 + m\angle 2$ $140 = 40 + 100$	Substitution Property of Equality
4. $m\angle 1 + m\angle 2 = m\angle EBC$ $40 + 100 = 140$	Angle Addition Postulate
5. $m\angle DBA = m\angle EBC$ $140 = 140$	Transitive Property of Equality

A = B
B = C
A = C

Prove: $\angle 1$ and $\angle 2$ are right angles.



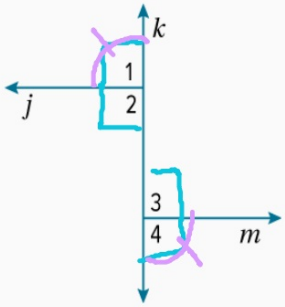
Proof:

Statements	Reasons
1. $\angle 1 \cong \angle 4$	1. Given
2. $\angle 2 \cong \angle 4$	2. vertical angles
3. $\angle 4 \cong \angle 2$	3. symmetric
4. $<1 = <2$	4. transitive
5. <1 & <2 are a linear pair	5. Def. of linear pair
6. <1 & <2 are right angles	6. If two congruent angles form a linear pair, then they are right angles.

Given: Lines j and k are perpendicular.

$\angle 1 \cong \angle 4$

Prove: $\angle 2 \cong \angle 4$



*now we know that lines j and m are parallel since all angles are 90 degrees.

Proof:

Statements	Reasons
1. Lines j and k are perpendicular.	1. Given
2. $\angle 2 \cong \angle 1$	2. Perpendicular lines form congruent adjacent angles
3. $\angle 1 \cong \angle 4$	3. Given
4. $\angle 2 \cong \angle 4$	4. Transitive Property of Congruence