Questions on 5.1 HW?

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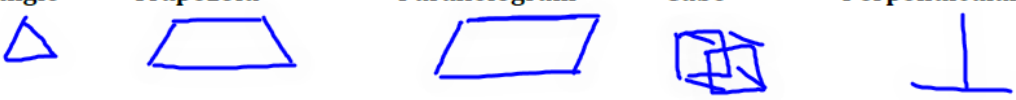
1. Look around your world and make a list of the things you see that have a geometric shape. Here are some shapes to begin with. Think of all you can and be prepared to share your lists with the class.

**Triangle** **Trapezoid** **Parallelogram** **Cube** **Perpendicular lines**



**Set**

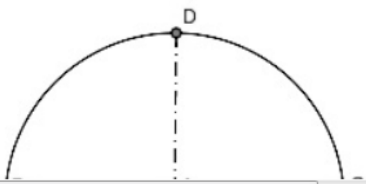
Topic: Linear pairs

2. Fold a piece of paper, making a smooth crease. Open the paper and examine the shape that you made. Is it a line? Will it always be a line? Justify your thinking.

3. Look at a wall where it meets the ceiling. How would you describe the intersection of the wall and the ceiling?

*Imagine folding a circle exactly in half so that the fold passes through the center of the circle. This fold is called the diameter of the circle. It is a line segment with a length, but it is also a special kind of angle called a* **straight angle**.

*In order to "see" the angle, think of the center of the circle. That point is the vertex of the angle. Either side of the vertex is a radius of the circle. Whenever you draw 2 radii of the circle you make an angle. When the two radii extend in exactly opposite directions and share a common*

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**Find the measure of the missing angle.**

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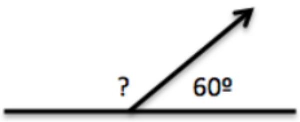


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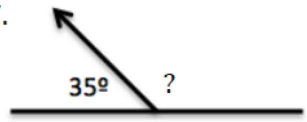


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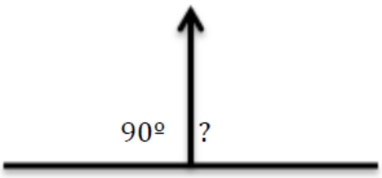


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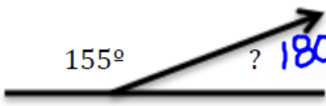


180-155
= 25°

10. Linear pairs could be defined as being **supplementary angles** because they always add up to 180°. Are all supplementary angles linear pairs? Explain your answer.

**Find the supplement of the given angle. Then draw the two angles as linear pairs. Label each angle with its measure.**

11. m∠ABC = 72° B will be the vertex.

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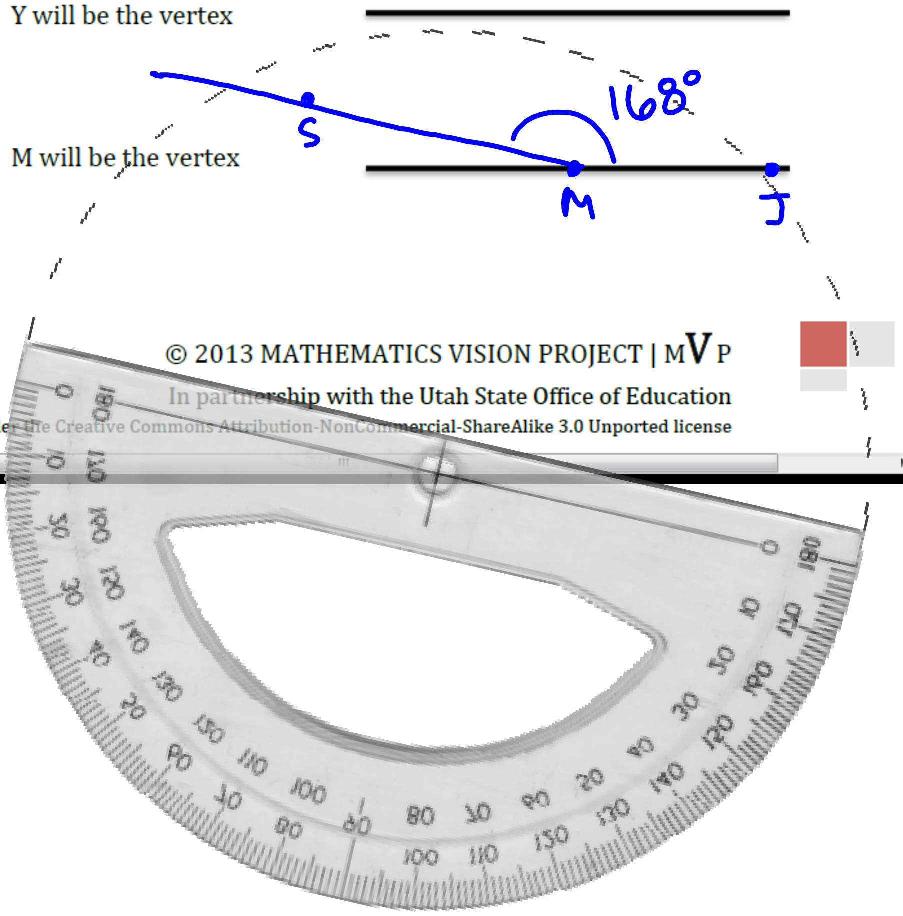
**each angle with its measure.**

11. m∠ABC = 72° B will be the vertex.

12. m∠GHK = 113° H will be the vertex.

13. m∠XYZ = 24° Y will be the vertex

14. m∠JMS = 168° M will be the vertex



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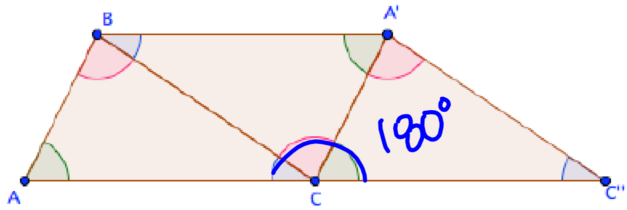
# 5.2 Do You See What I See?

*A Develop Understanding Task*

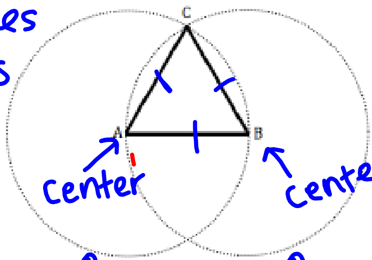
In the previous task, *How Do You Know That*, we saw how the following diagram could be constructed by rotating a triangle about the midpoint of two of its sides. The final diagram suggests that the sum of the three angles of a triangle is 180°. This diagram "tells a story" because you saw how it was constructed through a sequence of steps. You may even have carried out those steps yourself.




Sometimes we are asked to draw a conclusion from a diagram when we are given the last diagram in a sequence steps. We may have to mentally reconstruct the steps that got us to this last diagram, so we can believe in the claim the diagram wants us to see.

1. For example, what can you say about the triangle in the following diagram?

• $\overline{AB}$ is a radius of both circles
• $\overline{AC}$ is a radius of circle A, so $\overline{AB} \cong \overline{AC}$
• $\overline{AC}$ is a chord of circle B.




• 2 circles that intersect
• triangle
• $\overline{BC}$ is a radius of circle B, so $\overline{BC} \cong \overline{BA}$

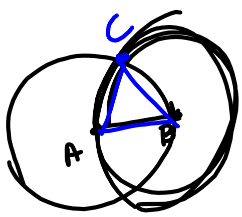
$\Rightarrow \overline{AC} \cong \overline{CB} \cong \overline{AB}$ EQUILATERAL △

2. What convinces you that you can make this claim? What assumptions, if any, are you making about the other figures in the diagram?

That $\overline{AB}$ is a radius of both circles and $\overline{AB}$ & $\overline{AC}$ are radii of ⊙A, $\overline{AB}$ & $\overline{BC}$ are radii of circle B, so all 3 sides of △ABC are ≅.

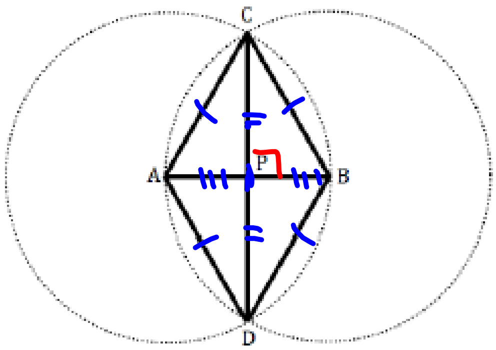
3. What is the sequence of steps that led to this final diagram?

→ draw ⊙A
→ draw ⊙B with radius $\overline{AB}$
→ label point where ⊙s intersect as C, draw $\overline{AC}$ & $\overline{BC}$



4. What can you say about the triangles, quadrilateral, or diagonals of the quadrilateral that appear in the following diagram? List several conjectures that you believe are true.

Given: $\odot A \cong \odot B$




$\triangle ABC$ is an equilateral $\triangle$

$\triangle ABD$ is an equilateral $\triangle$

$\triangle ABC \cong \triangle ABD$

$\overline{AC} \cong \overline{CB} \cong \overline{BD} \cong \overline{AD} \cong AB$

*Quad. ACBD is a rhombus

$\overline{AB} \perp \overline{CD}$

$\triangle APC \cong \triangle BPC \cong \triangle BPD \cong \triangle APD$

5. Select one of your conjectures and write a paragraph convincing someone else that your conjecture is true. Think about the sequence of statements you need to make to tell your story in a way that someone else can follow the steps and construct the images you want them to see.

* Quad. ACBD is a rhombus: AC & AB & AD all radii of $\odot A$ and are $\cong$; BC & BA & BD all radii of $\odot B$ and are congruent. All 4 sides, $\overline{AC} \cong \overline{BC} \cong \overline{BD} \cong \overline{DA}$ because they are all $\cong$ to $\overline{AB}$.

6. Now pick a second claim and write a paragraph convincing someone else that this claim is true. You can refer to your previous paragraph, if you think it supports the new story you are trying to tell.

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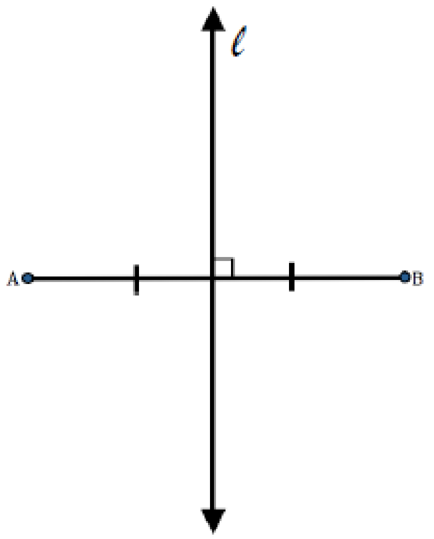
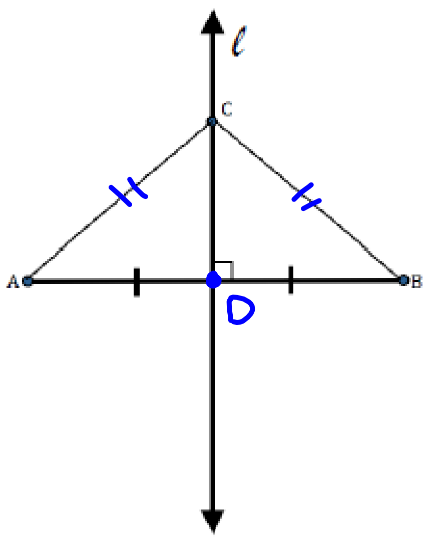
7. Here is one more diagram. Describe the sequence of steps that you think were used to construct this diagram beginning with the figure on the left and ending with the figure on the right.




Travis and Tehani are doing their math homework together. One of the questions asks them to prove the following statement.

*The points on the perpendicular bisector of a segment are equidistant from the endpoints of the segment?*

Travis and Tehani think the diagram above will be helpful to prove this statement, but they know they will need to say more than just describe how to create this diagram. Travis starts by describing the things they know, and Tehani tries to keep a written record by jotting notes down on a piece of paper.

8. In the table below, record in symbolic notation what Tehani may have written to keep track of Travis' statements.

| Tehani's Notes | Travis' Statements |
|---|---|
| $l \perp \overline{AB}$; $\overline{AD} \cong \overline{BD}$ | We need to start with a segment and its perpendicular bisector already drawn. |
| C is a pt. on $l$; | We need to show that *any* point on the perpendicular bisector is equidistant from the two endpoints, so I can pick any arbitrary point on the perpendicular bisector. Let's call it *C*. |
| show $\overline{CA} \cong \overline{CB}$ | We need to show that this point is the same distance from the two endpoints. |
| Show $\triangle ACD \cong \triangle BCD$ so then show $\overline{AC} \cong \overline{BC}$. | If we knew the two triangles were congruent, we could say that the point on the perpendicular bisector is the same distance from each endpoint. |
| | So, what do we know about the two triangles that would let us say that they are congruent? |
| $\angle ADC$ & $\angle BDC$ are rt. and $\cong$ | We know that both triangles contain a right angle. |
| $\overline{AD} \cong \overline{BD}$ | And we know that the perpendicular bisector cuts segment *AB* into two congruent segments. |
| $\overline{CD} \cong \overline{CD}$ | Obviously, the segment from *C* to the midpoint of segment *AB* is a side of both triangles. |
| $\triangle ACD \cong \triangle BCD$ by SAS | So, the triangles are congruent by the SAS triangle congruence criteria. |
| Then $\overline{AC} \cong \overline{BC}$ | Since the triangles are congruent, segments *AC* and *BC* are congruent. |
| So C is equidistant from A & B! | And, that proves that point *C* is equidistant from the two endpoints! |

9. Tehani thinks Travis is brilliant, but she would like the ideas to flow more easily from start to finish. Arrange Tehani's symbolic notes in a way that someone else could follow the argument and see the connections between ideas.

10. Would your justification be true regardless of where point C is chosen on the perpendicular bisector? Why?

Homework

Finish 5.2 "Ready, Set, Go"