

NAME: \_\_\_\_\_

## Angle and $\perp$ Bisectors In Triangles

Open the file: *Bisectors In Triangles*

Definition of an angle bisector (in a triangle):

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### On Page 1.2

Draw an angle bisector from point C

- $\text{\textcircled{menu}}$ , Geometry, Construction, Angle Bisector
- Click on points A, then C, then B
- Then press  $\text{\textcircled{esc}}$

Find the point of intersection on the opposite side of the triangle, label it D

Grab and move  $\sphericalangle C$ , to make observations about point D.

### On Page 1.3

- Construct the angle bisectors through each vertex, to each side of  $\triangle ABC$ .
- Find the point of intersection, of the three angle bisectors and label it I.

This point is a *point of concurrency* and has a special name, **INCENTER**

Grab point C and move it while you make observations for answering the following questions:

1. Does the Incenter always appear inside the triangle? \_\_\_\_\_
2. Move C so that  $\triangle ABC$  is an acute triangle. Describe the placement of the Incenter:

\_\_\_\_\_

3. Move C so that  $\sphericalangle A$  or  $\sphericalangle B$  is obtuse. Describe the placement of the Incenter:

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4. Move C so that  $\sphericalangle C$  is the vertex angle of an isosceles triangle. Describe the placement of the Incenter:

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5. Move C so that  $\sphericalangle A$  is the right angle in a right triangle. Describe the placement of the Incenter:

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### On page 2.1:

Definition of a perpendicular bisector (in a triangle):

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### On Page 2.2

Find the midpoint of  $\overline{AB}$

- $\text{\textcircled{menu}}$ , Geometry, Construction, Midpoint
- Click  $\overline{AB}$ , then label the midpoint D

Draw a perpendicular bisector from point D

- $\text{\textcircled{menu}}$ , Geometry, Construction, Perpendicular
- Click on points D, twice
- Then press  $\text{\textcircled{esc}}$

Grab and move  $\sphericalangle A$  or  $\sphericalangle B$ , to make observations about point D.

### On Page 2.3

Construct the perpendicular bisectors for each side of  $\triangle ABC$ .

- $\text{\textcircled{menu}}$ , Geometry, Construction, Perpendicular Bisector
- Click on each side of the triangle
- Then press  $\text{\textcircled{esc}}$

Find the point of intersection, of the three angle bisectors and label it **C**.

This point is a **point of concurrency** and has a special name, **Circumcenter**

Grab point C and move it while you make observations for answering the following questions:

6. Does the Circumcenter always appear inside the triangle? \_\_\_\_\_
  7. Move C so that  $\triangle ABC$  is an acute triangle. Describe the placement of the Circumcenter:  
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  8. Move C so that  $\sphericalangle A$  or  $\sphericalangle B$  is obtuse. Describe the placement of the Circumcenter:  
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  9. Move C so that  $\sphericalangle C$  is the vertex angle of an isosceles triangle. Describe the placement of the Circumcenter:  
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  10. Move C so that  $\sphericalangle A$  is the right angle in a right triangle. Describe the placement of the Circumcenter:  
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