

Lesson 6.2 Perpendicular and Angle Bisectors – Points of Concurrency

Tuesday, February 1, 2022 6:18 PM

Pear Deck Lesson

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Lesson 6.2
Geometry

Lesson 6.2 Perpendicular and Angle Bisectors

***Points of Concurrency**

Date: 2/2/22

Lesson 6.2 - Bisectors of Triangles

Learning Intent (Target): *Today I will be able to use the properties of the points of concurrency to solve problems involving bisectors of triangles.*

Success Criteria: *I'll know I'll have it when I can accurately use perpendicular and angle bisectors to determine the distance and location of the points of concurrency.*

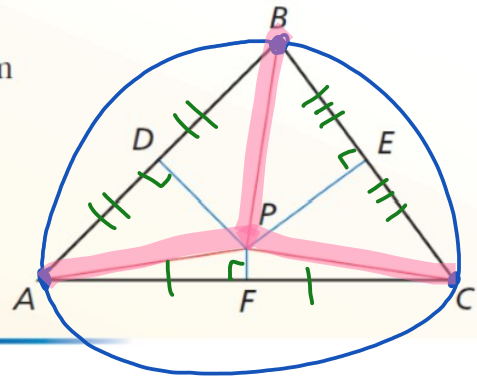
Accountable Team Task: *Therefore, I can practice using interactive Pear Deck Powerpoint for notes and geogebra investigations.*

Theorem 6.5 Circumcenter Theorem

The circumcenter of a triangle is equidistant from the vertices of the triangle.

If \overline{PD} , \overline{PE} , and \overline{PF} are perpendicular bisectors, then $PA = PB = PC$.

Proof p. 310



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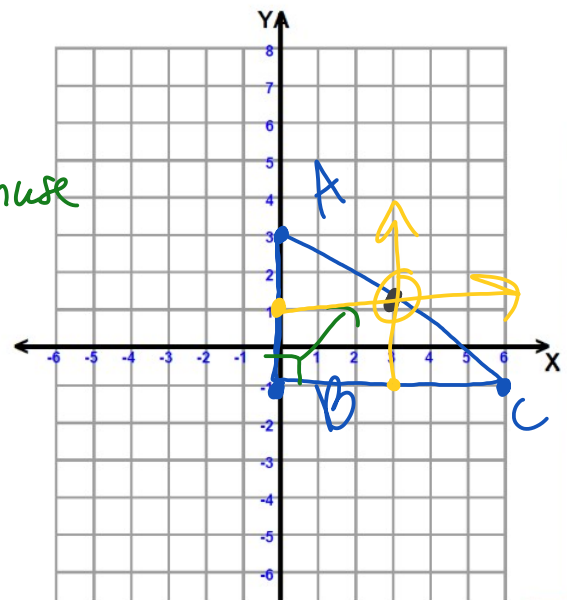


Find the coordinates of the circumcenter of $\triangle ABC$ with vertices $A(0, 3)$, $B(0, -1)$, and $C(6, -1)$.

Right Triangle
On the Midpoint of Hypotenuse

$$\begin{array}{r} 0+6 \\ \hline 2 \end{array}, \begin{array}{r} 3+(-1) \\ \hline 2 \end{array}$$

$$\left(\frac{6}{2}, \frac{2}{2} \right)$$



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Find the coordinates of the circumcenter of the triangle with the given vertices.

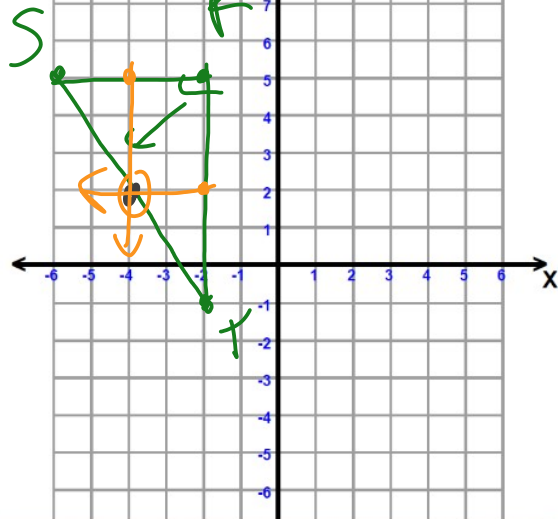
2. $B(-2, 5)$, $C(6, 5)$, $T(2, 3)$



2. $K(-2, 5), S(-6, 5), T(-2, -1)$

Midpoint $\frac{-6 + -2}{2}$
 $\frac{x_1 + x_2}{2}$
 $\frac{-8}{2}$
 $(-4, 2)$

Hypotenuse $\frac{5 + -1}{2}$
 $\frac{y_1 + y_2}{2}$
 $\frac{4}{2}$



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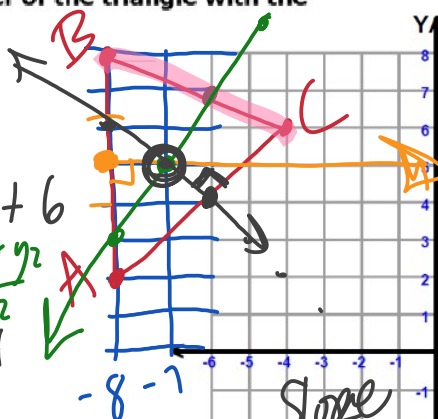
Find the coordinates of the circumcenter of the triangle with the given vertices.

3. $W(-1, 4), X(1, 4), Y(1, -6)$

$(-8, 2)$ A
 $(-8, 8)$ B
 $(-4, 6)$ C
 $(-7, 5)$

Midpoint $\frac{-8 + -4}{2}$
 $\frac{x_1 + x_2}{2}$
 $\frac{-12}{2}$
 $(-6, 7)$

$\frac{8 + 6}{2}$
 $\frac{y_1 + y_2}{2}$
 $\frac{14}{2}$



Slope BC $-\frac{1}{2}$

Slope AC $\frac{1}{1}$

new slope $-\frac{1}{1}$

new $\frac{2}{1}$

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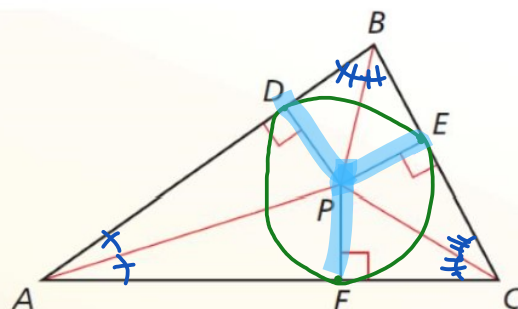


Theorem 6.6 Incenter Theorem

The incenter of a triangle is equidistant from the sides of the triangle.

If \overline{AP} , \overline{BP} , and \overline{CP} are angle bisectors of $\triangle ABC$, then $PD = PE = PF$.

Proof Ex. 38, p. 317





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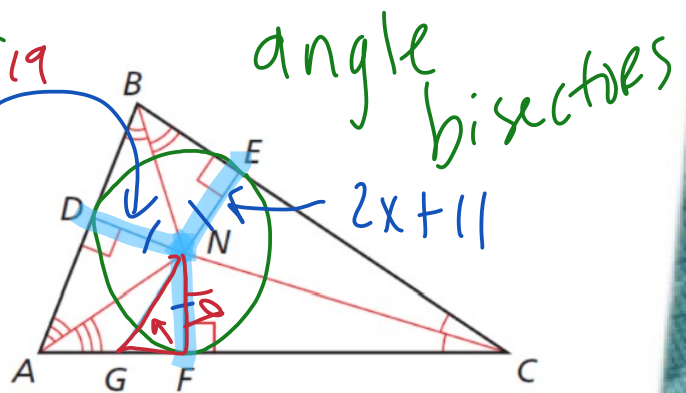


In the figure shown, $ND = 5x - 1$
and $NE = 2x + 11$.

a. Find NF .

$$\begin{array}{r} 2x + 11 = 5x - 1 \\ -2x \quad -2x \\ \hline 11 = 3x - 1 \\ +1 \quad +1 \\ \hline 12 = 3x \\ \div 3 \quad \div 3 \\ \hline 4 = x \end{array}$$

b. Can NG be equal to 18? Explain your reasoning.



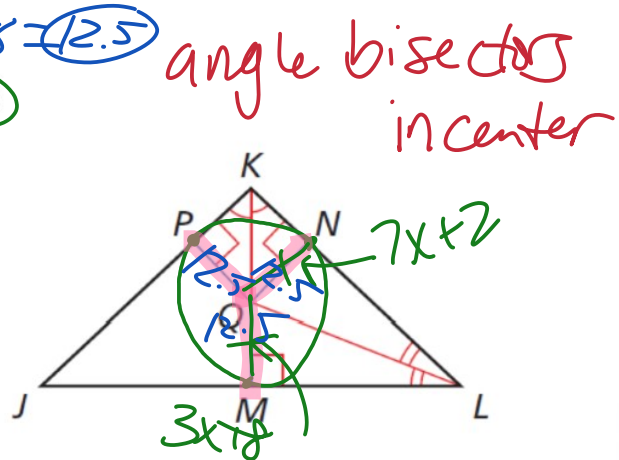
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4. In the figure shown, $QM = 3x + 8$
and $QN = 7x + 2$. Find QP .

$$\begin{array}{r} 7x + 2 = 3x + 8 \\ -3x \quad -3x \\ \hline 4x + 2 = 8 \\ -2 \quad -2 \\ \hline 4x = 6 \\ \div 4 \quad \div 4 \\ \hline x = 1.5 \end{array}$$

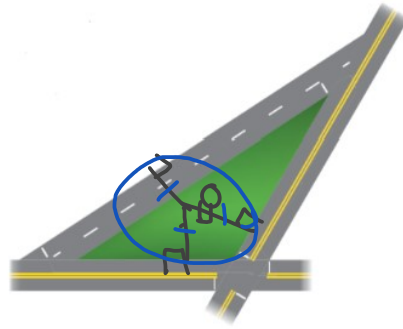


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A city wants to place a lamppost on the boulevard shown so that the lamppost is the same distance from all three streets. Should the location of the lamppost be at the *circumcenter* or *incenter* of the triangular boulevard? Explain.



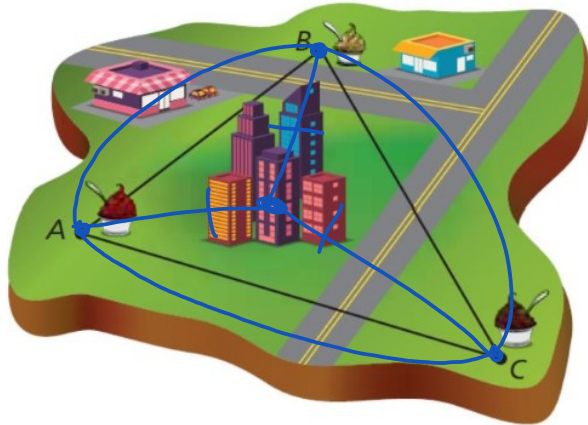
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Three snack carts sell frozen yogurt from points A , B , and C outside a city. Each of the three carts is the same distance from the frozen yogurt distributor.

Circumcenter



Which point of concurrency would be used to determine the location?



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