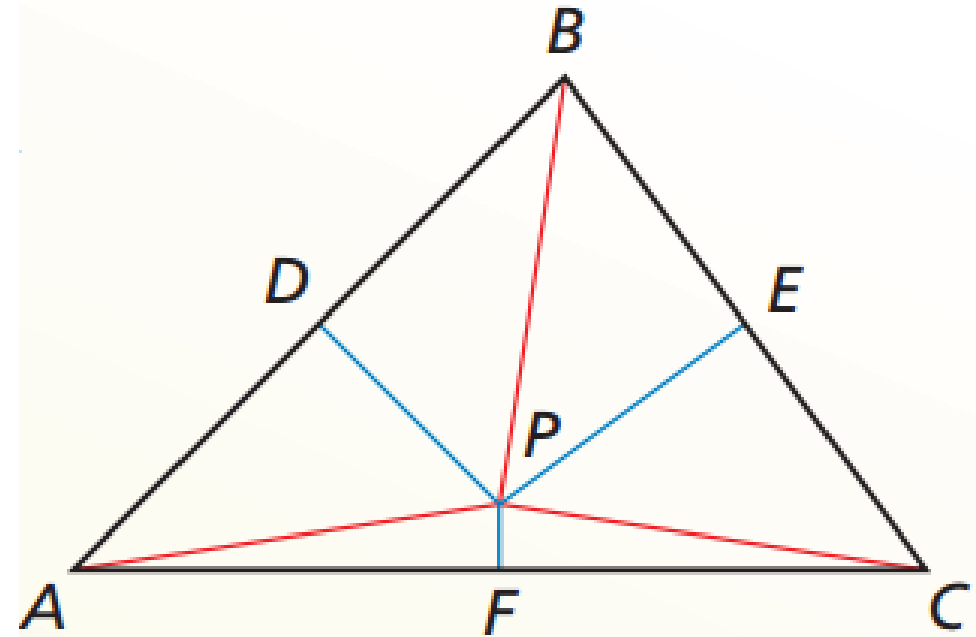


Bisectors of Triangles

Lesson 6.2



Incenter of a
Triangle

Circumcenter
of a Triangle



Incenter
Examples

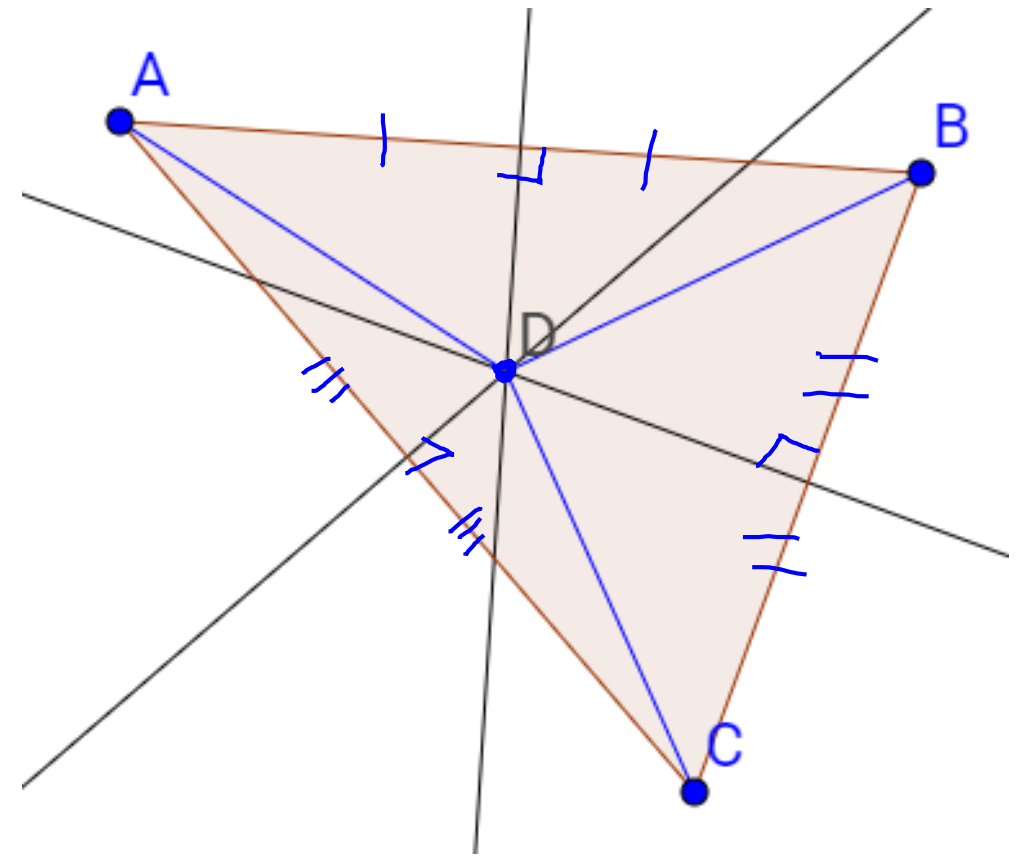
Circumcenter
Examples



The Circumcenter of a Triangle

When three or more lines, rays, or segments intersect in the same point they are called **concurrent**. The point of intersection of the lines, rays or segments is called the **point of concurrency**.

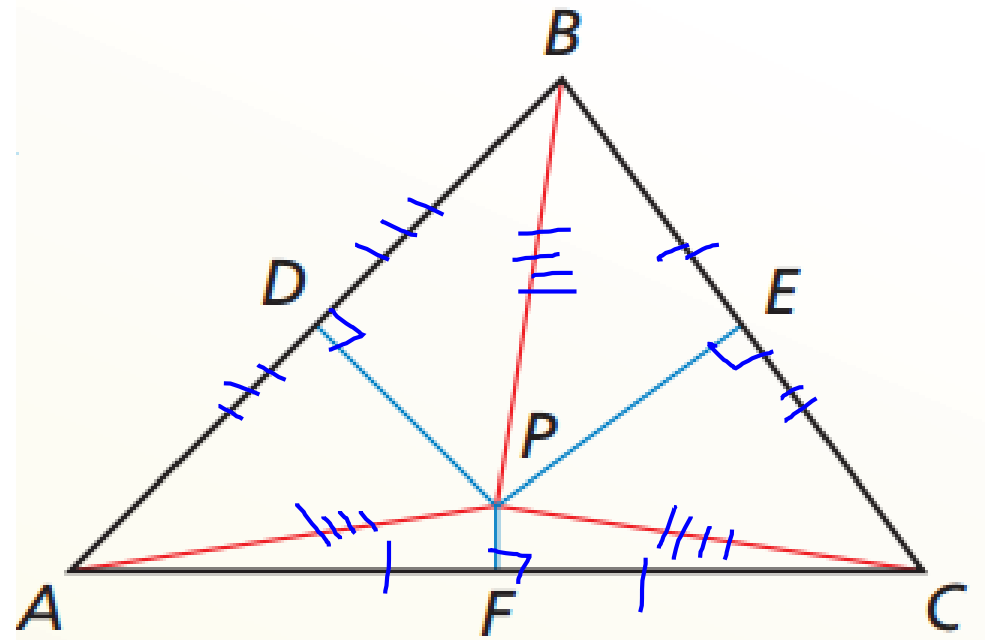
In a triangle, the three perpendicular bisectors are concurrent. The point of concurrency is the **circumcenter** of the triangle.



Circumcenter Theorem

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

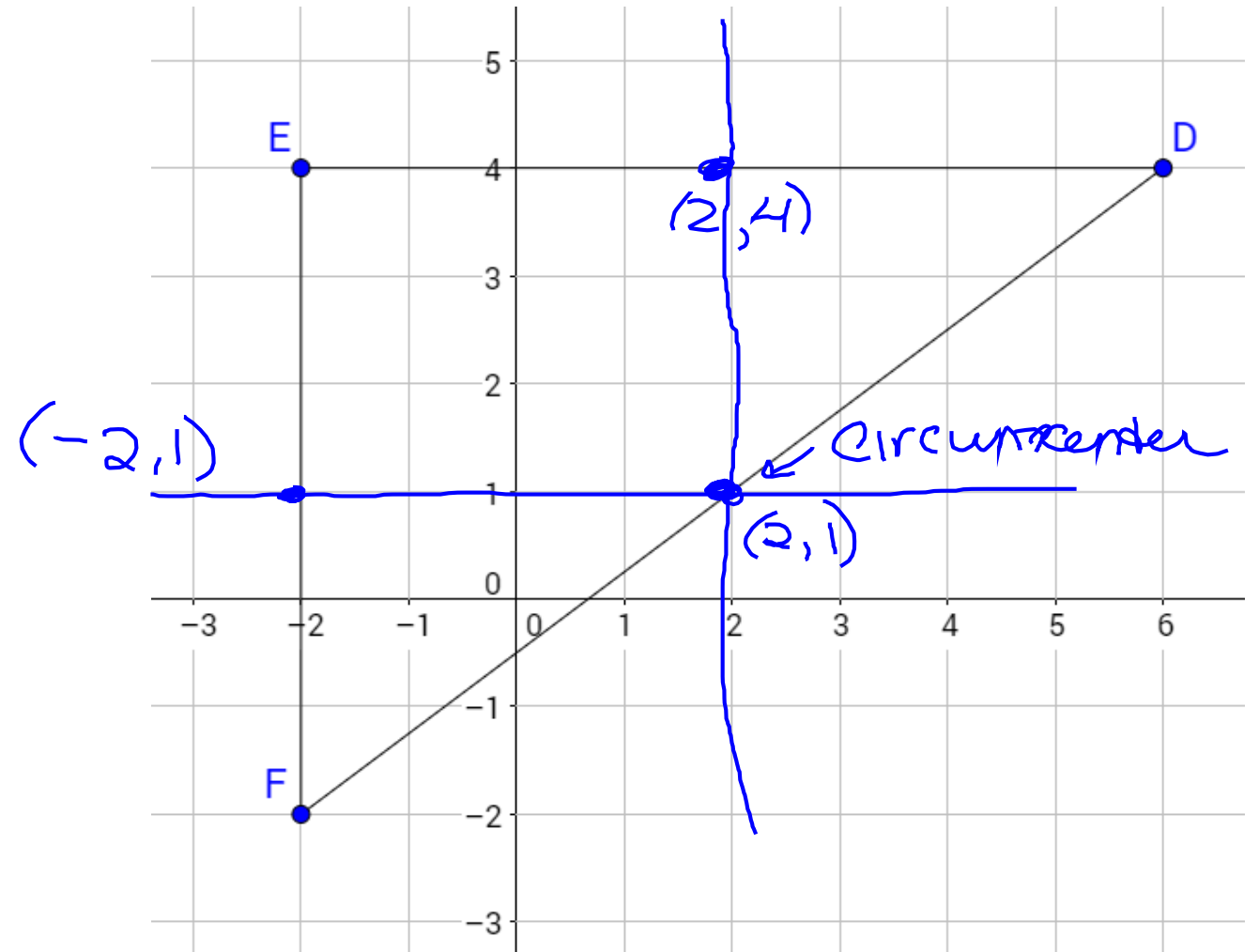
If \overline{PD} , \overline{PE} , and \overline{PF} are perpendicular bisectors of $\triangle ABC$, then $PA = PB = PC$.



If the Omaha Zoo wanted to place a beverage cart equidistant from the Skyfari Landing, the Future Elephant Family Quarters and the Future Elephant Amphitheater, where should it be located?

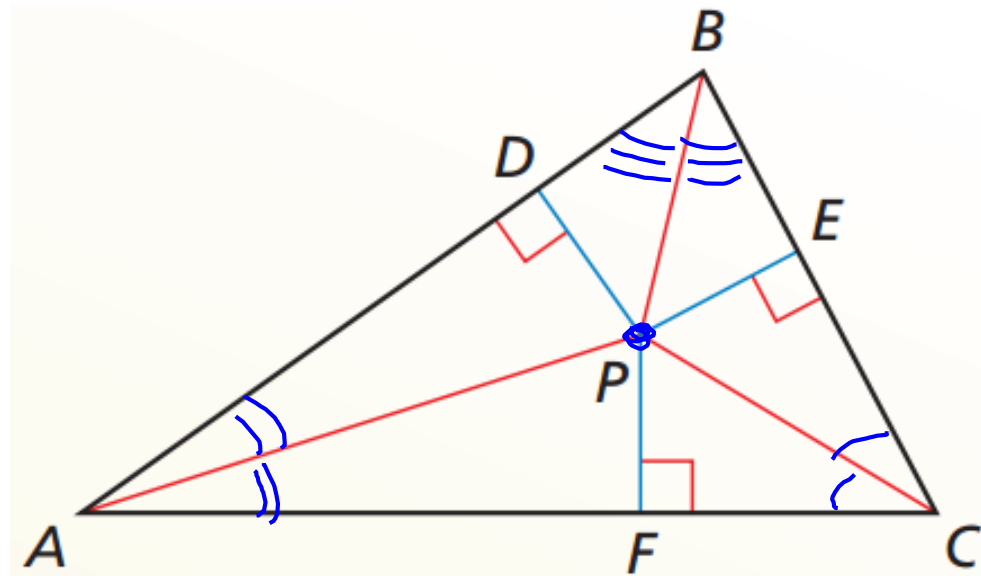


Find the coordinates of the circumcenter of $\triangle DEF$ with vertices D (6, 4), E(-2, 4), and F(-2, -2).



Incenter of a Triangle

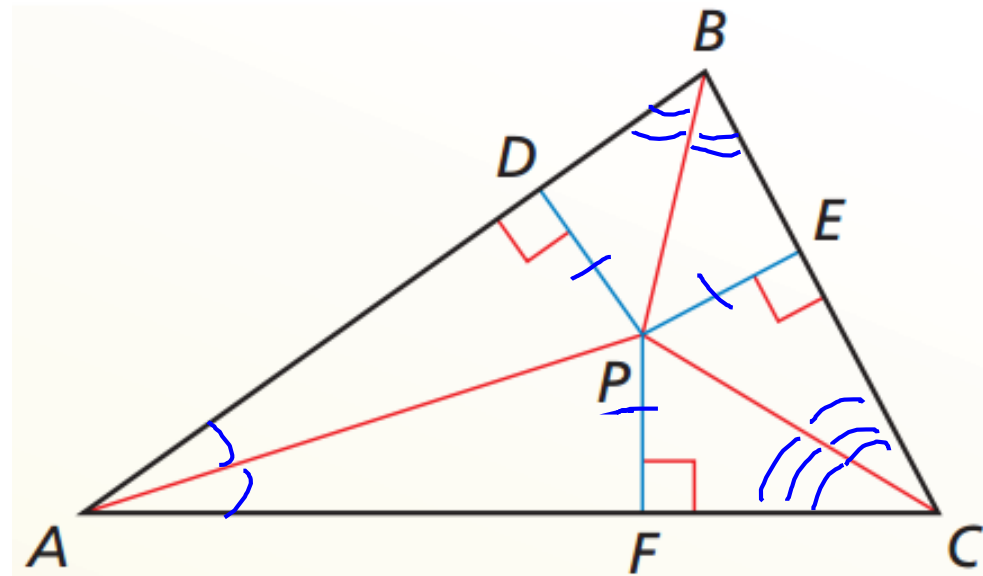
The three **angle bisectors** of a triangle are concurrent. Their point of concurrency is the **incenter** of the triangle. The incenter always lies **inside** the triangle.



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 $PD = PE = PF$.



In the figure shown, $NE = 6x + 1$ and $NF = 4x + 15$.

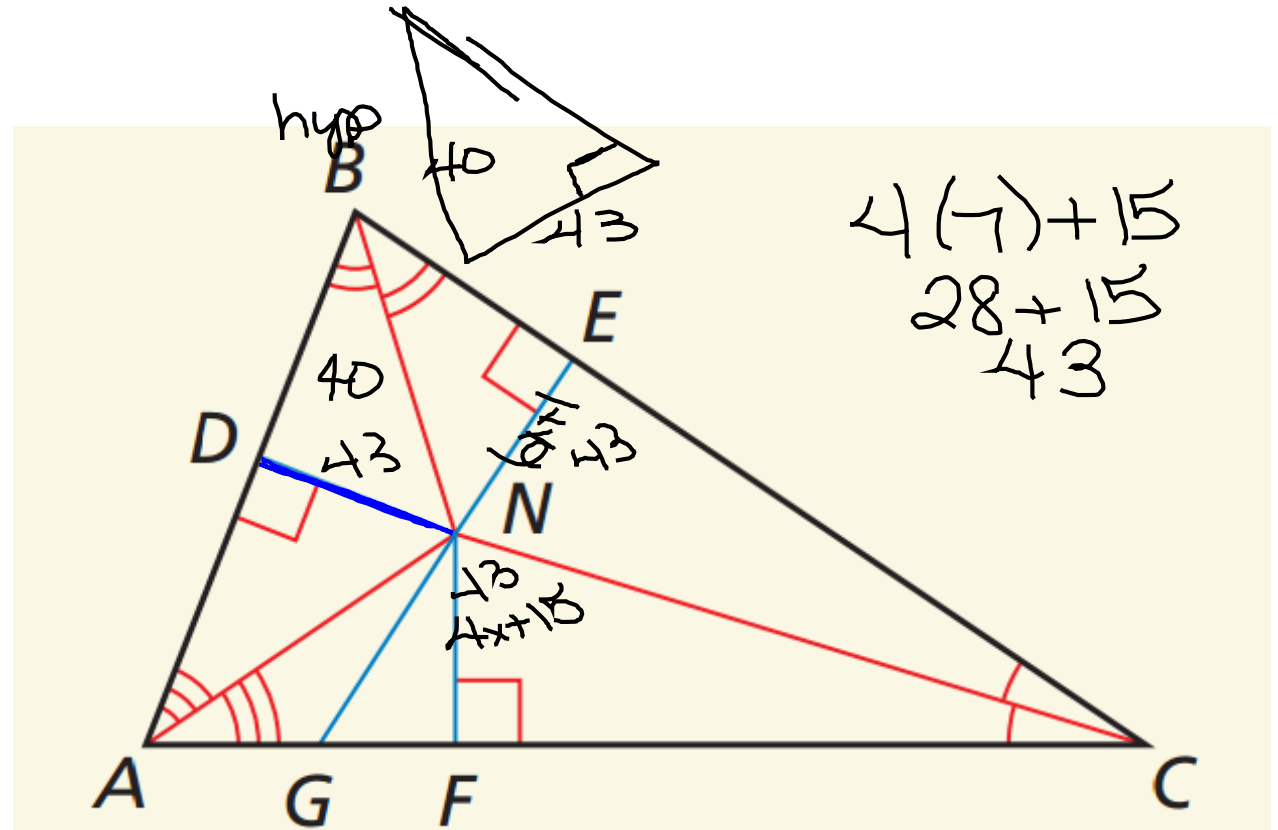
a. Find ND. = 43

$$\begin{array}{r} 6x + 1 = 4x + 15 \\ -4x \quad -1 \quad -4x \quad -1 \\ \hline 2x = 14 \\ x = 7 \end{array}$$

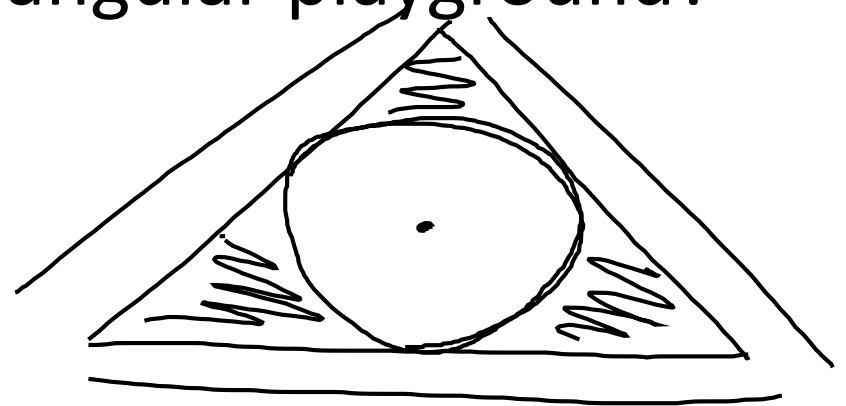
b. Can $NB = 40$? Explain your reasoning.

no because $43 > 40$

hyp must be largest



A school has fenced in an area in the shape of a scalene triangle to use for a new playground. The school wants to place a swing set where it will be the same distance from all three fences. Should the swing set be placed at the circumcenter or the incenter of the triangular playground? Explain.



Lesson 6.2 p. 315; 1, 2-16 even, 26, 28, 34,
36, 53-59 odd.