**Activity 3.3.4a Constructing Parallel Lines**

Our goal is to create parallel lines using a straight edge and a compass. We are given only a line *m* and a point *P*. We will create a line parallel to line *m* through point *P*. Try this construction on another sheet of paper or on the computer.

Note: If you use GeoGebra, it is easier to draw complete circles rather than arcs. If you use a compass and straightedge, you may prefer to draw only an arc that passes through or locates the named points.



1. Given line *m* and point *P.*



1. Choose any point *T* on line *m*. Draw line $\overleftrightarrow{TP}$. Let *C* be another point on *m*.
2. We will now copy $∠PTC$ and form that angle with *P* as its vertex and one side along $\vec{TP}$.

Choose any point on line $\overleftrightarrow{TP}$ between points *T* and *P*. Call that point *D*. Draw the circle (or an arc) with center *T* through point *D*. Then draw the circle (or an arc) with center *P* with radius = *DT*.
3. Name the intersection of circle *T* and line *m*, point *E*. Name the intersection of circle *P* with line *TP*, point *F*.
4. Draw the circle (or an arc) with center *D* through point *E*. Draw the circle (or an arc) with center *F* and radius = *DE*.
5. Label the intersection of circle *F* and circle *P*, point *G* as in the diagram below. Draw line $\overleftrightarrow{PG}$. $\overleftrightarrow{PG }$has now been constructed to be parallel to line *m*.
6. Prove that this construction produces a line parallel to line *m* through point *P*.