2.1. Honors Geometry

DATE: 10/1

Target 2A. Determine if lines, segments or rays are parallel or perpendicular based on angle relationships.

Perpendicular ⊥ (↷ symbol): lines, rays or segments that intersect at right angles.

- Write the definition of perpendicular as a conditional statement.

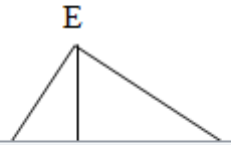
  If lines, rays, or segments intersect at right ∠s, then they are ⊥.

- Since definitions are always reversible, the converse is also true! Write the converse of the definition of perpendicular.

  If lines, rays, or segments are ⊥, then they intersect to form right ∠'s.

Example

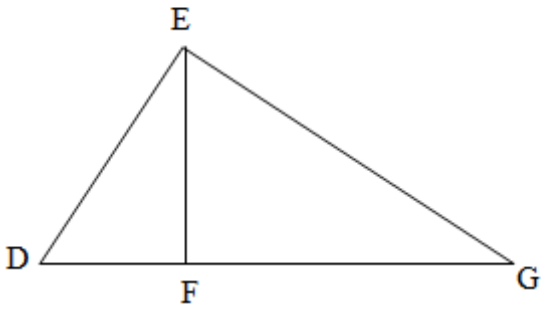
1) Given: $\overline{DG} \perp \overline{EF}$



Conclusion:

Example

1) Given: $\overline{DG} \perp \overline{EF}$



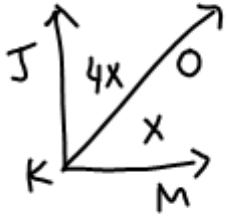
Conclusion:

① ∠EFD, ∠EFG are rt. ∠s

② ∠EFD = 90°, ∠EFG = 90°

③ ∠EFD ≅ ∠EFG b/c of ② and ③ . Is ∠DEG rt.? Why not?

2) $\overrightarrow{KJ} \perp \overrightarrow{KM}$ and ∠JKO is four times as large as ∠MKO. Find m∠JKO. Draw a picture first.



$\overrightarrow{KJ} \perp \overrightarrow{KM} \Rightarrow$ ∠JKM = 90° ∴ Equation is,

$4x + x = 90$ Combine like terms

$5x = 90$ ÷ both sides by 5

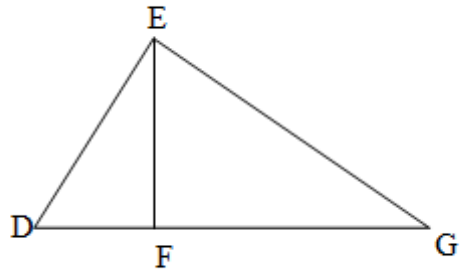
$x = 18$

$m\angle JKO = 4x = 4(18) = 72°$ ✓

Complete a two-column proof.

1) Given: $\overline{DG} \perp \overline{EF}$

Prove: $\angle DFE \cong \angle EFG$

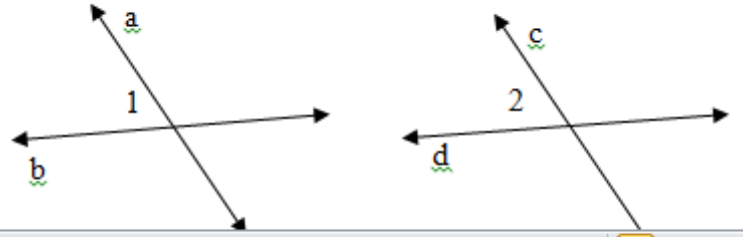


Statement	Reason
① $\overline{DG} \perp \overline{EF}$	① Given
② $\angle DFE$ rt. $\angle$	② If two seg. are $\perp$, then they intersect at rt. $\angle$.
③ $\angle EFG$ rt. $\angle$	③ Same as step 2.
④ $\angle DFE \cong \angle EFG$	④ If two $\angle$s are rt. $\angle$s, then they are $\cong$. (step 2 & 3)

2) Given: $\angle 1$ is a rt. $\angle$

$\angle 1 \cong \angle 2$

Prove: $c \perp d$



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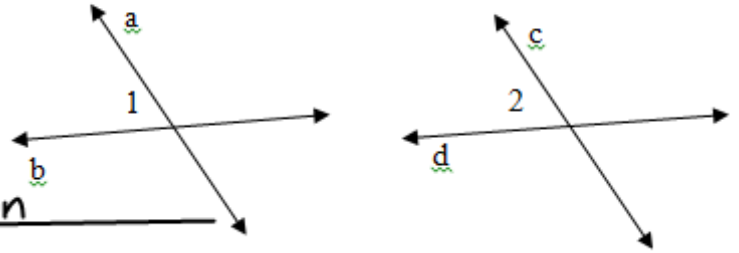
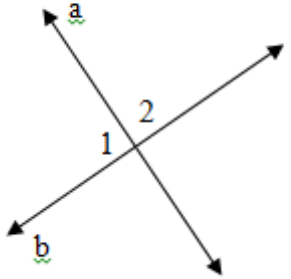


Statement	Reason
① $\angle 1$ is rt. $\angle$	① Given
② $\angle 1 = 90°$	② If an $\angle$ is a rt. $\angle$, then its measure is 90°.
③ $\angle 1 \cong \angle 2$	③ Given
④ $\angle 2 = 90°$	④ If $\angle$'s are $\cong$, then they have the same measure.
⑤ $\angle 2$ is rt. $\angle$	⑤ If an $\angle$ has a measure of 90°, then it's a rt. $\angle$.
⑥ $c \perp d$	⑥ If two intersect at right $\angle$s, then they are $\perp$. (step 1 & 5)

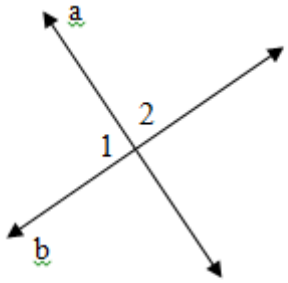
3) Given: $a \perp b$

Prove: $\angle 1 \cong \angle 2$



3) Given: $a \perp b$

Prove: $\angle 1 \cong \angle 2$



Statement	Reason
① $a \perp b$	① Given
② $\angle 1$ is rt.	② If two lines are $\perp$, then they intersect at rt. $\angle$s.
③ $\angle 2$ is rt.	③ Same as step 2.
④ $\angle 1 \cong \angle 2$	④ (Fill in the reason)