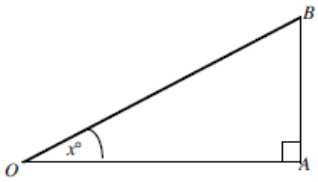
Lesson 3.1: The Tangent Ratio

Specific Outcome: 4.1 – Explain the relationships between similar right triangles and the definitions of the primary trigonometric ratios. 4.2 – Identify the hypotenuse of a right triangle and the opposite and adjacent sides for a give acute angle in the triangle. 4.4 – Solve a problem that involves one or more right triangles by applying the primary tri ratios or the Pythagorean theorem.

NAMING RIGHT-ANGLED TRIANGLES

Consider the right triangle AOB shown.
Each of the sides of the triangle is given a special name

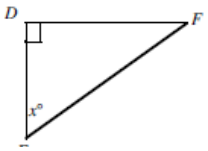
relative to the angle of $x°$ or $\angle 0$:



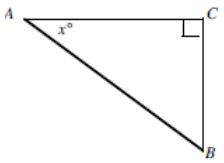
- the longest side is always called the _____ (label it on the diagram)
- the side directly across $x°$ or $\angle O$ is called the _____ (label it)
- the third side is called the _____ (label it).

Practice: Given the following triangles, identify the name of each side according to the angle labelled.

a)



b)



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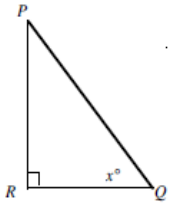
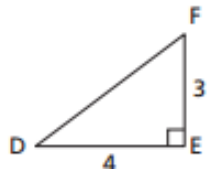


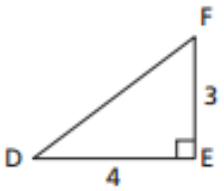
TANGENT RATIO

- Remember: A ratio is a fraction $\left(\frac{a}{b}\right)$.
- The ***tangent ratio*** of any angle is: $\frac{the\ measure\ of\ the\ opposite\ side}{the\ measure\ of\ the\ adjacent\ side}$
- We reduce it to $\tan A = \frac{o}{a}$
- The tangent ratio is expressed as a ratio or as a decimal.

Determine $tan\ D$ as a ratio and a decimal. Solution: 1. Label the sides according to $\angle D$
2. Use the *tan ratio* given above:

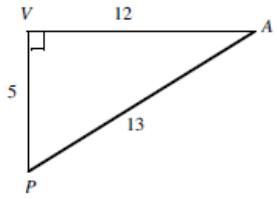


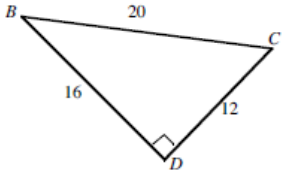
Determine $tan\ F$ as a ratio and decimal. Solution: 1. Label the sides according to $\angle$ F
2. Use the *tan ratio*:

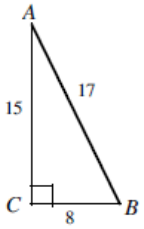


Practice: Determine the *tangent* ratio of the following. Express the answers as a ratio.

a) $tan\,A$ b) $tan\,B$ c) $tan\,B$



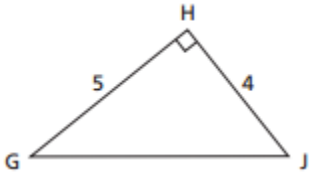




USING *TAN RATIO* TO DETERMINE AN ANGLE'S MEASURE

- The $\boldsymbol{tan^{-1}}$ button on your calculator will be used ***(inverse tan)***

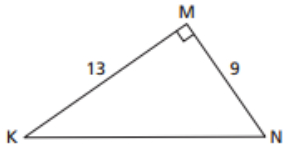
Determine the measure of $\angle G$ to the nearest degree.

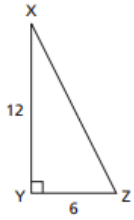


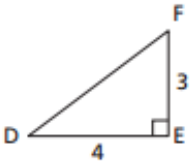
Practice:

1. Determine the measure of each angle to the nearest degree.

a) ∠N b) ∠Z c) ∠F







2. To the nearest degree, determine the measure of $\angle X$ for each value of $tan\,X$.

a) $tan\,X = 0.44$ b) $tan\,X = \frac{11}{6}$

Problem Solving:

1. A 10 ft. ladder leans against the side of a building with its base 6 ft. from the wall. What angle, to the nearest degree, does the ladder make with the ground?

2. A rectangle has dimensions 3 cm by 8 cm. What angles does a diagonal line of the rectangle make with the sides of the rectangle? Give measures to nearest tenth of a degree.

HOMEWORK: P. 75 – #3-5, 9a, 10, 13, 14