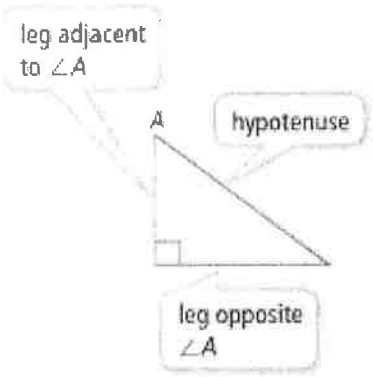
Algebra I
Section 10.6 Notes (Part 1)
Trigonometry

Name: Key

Trigonometry is the study of angles and side lengths in a triangle. A **trigonometric ratio** is a ratio of the lengths of two sides of a right triangle.

Name	Written	Definition
sine of $\angle A$	$\sin A$	$\frac{\text{length of leg opposite } \angle A}{\text{length of hypotenuse}}$
cosine of $\angle A$	$\cos A$	$\frac{\text{length of leg adjacent to } \angle A}{\text{length of hypotenuse}}$
tangent of $\angle A$	$\tan A$	$\frac{\text{length of leg opposite } \angle A}{\text{length of leg adjacent to } \angle A}$



To help remember the trigonometric ratios, we can use the word **SOH-CAH-TOA

A **Trigonometric Equation** can be used to find the side lengths and angle measures in a right triangle.

$$Trigfunc(\angle\ measure) = \frac{side\ length}{side\ length}$$

Practice Problems
For ΔJKL and ΔRST, find the value of each expression.

1. $\sin J$ — $\frac{9}{15} = \frac{3}{5}$

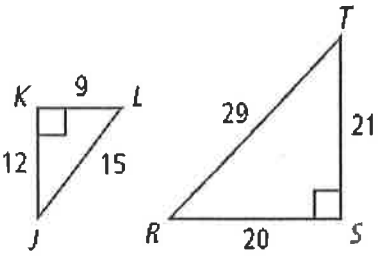
2. $\cos J$ — $\frac{12}{15} = \frac{4}{5}$

3. $\tan L$ — $\frac{12}{9} = \frac{4}{3}$

4. $\cos L$ — $\frac{9}{15} = \frac{3}{5}$

5. $\tan T$ — $\frac{20}{21}$

6. $\sin T$ — $\frac{20}{29}$



7. $\tan J$ — $\frac{9}{12} = \frac{3}{4}$

8. $\cos R$ — $\frac{20}{29}$

9. $\sin R$ — $\frac{21}{29}$

10. $\tan R$ — $\frac{21}{20}$

11. $\sin L$ — $\frac{12}{15} = \frac{4}{5}$

12. $\cos T$ — $\frac{21}{29}$

Find the value of each expression. Round to the nearest ten-thousandth.

13. sin 15° 0.259

14. tan 45° 1

15. cos 60° 0.5

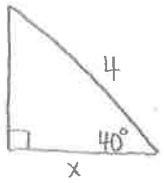
16. tan 72° 3.078

17. sin 30° 0.5

18. cos 80° 0.174

For each triangle, find the missing side length to the nearest tenth.

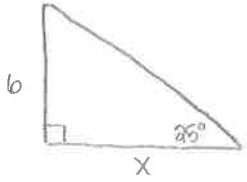
19. The hypotenuse is 4 m long. How long is the side adjacent to a 40° angle?



$4 \cdot \cos(40) = \frac{x}{4} \cdot 4$

$x = 4 \cdot \cos(40)$ $x = 3.06$

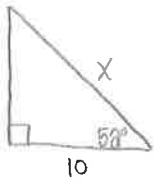
20. A 25° angle has an opposite leg 6 cm long. How long is the adjacent leg?



$x \cdot \tan(25) = \frac{6}{x} \cdot x$

$\frac{x \cdot \tan(25)}{\tan(25)} = \frac{6}{\tan(25)}$ $x = 12.87$

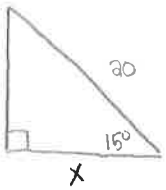
21. A 52° angle has an adjacent leg 10 inches long. How long is the hypotenuse?



$x \cdot \cos(52) = \frac{10}{x} \cdot x$

$\frac{x \cdot \cos(52)}{\cos(52)} = \frac{10}{\cos(52)}$ $x = 16.24$

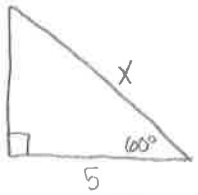
22. The hypotenuse is 20 mm long. How long is the side adjacent to a 15° angle?



$20 \cdot \cos(15) = \frac{x}{20} \cdot 20$

$x = 20 \cdot \cos(15)$ $x = 19.32$

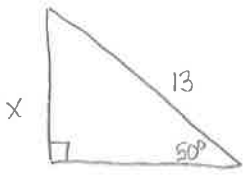
23. A 60° angle has an adjacent leg 5 cm long. How long is the hypotenuse?



$x \cdot \cos(60) = \frac{5}{x} \cdot x$

$\frac{x \cdot \cos(60)}{\cos(60)} = \frac{5}{\cos(60)}$ $x = 10$

24. The hypotenuse is 13 inches long. How long is the side opposite a 50° angle?



$13 \cdot \sin(50) = \frac{x}{13} \cdot 13$

$x = 13 \cdot \sin(50)$ $x = 9.96$