GSE Geometry **Unit 3 Review Sheet** Name: _____

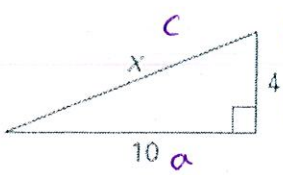
Right Triangle Trigonometry

Topic: Pythagorean Theorem

Things to Remember:
- ✓ $a^2 + b^2 = c^2$
- ✓ The hypotenuse MUST be 'c'

Examples:

1.



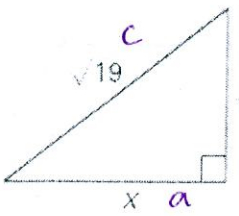
$(4)^2 + (10)^2 = c^2$

$\sqrt{116} = \sqrt{c^2}$

$\sqrt{116} = c$

$c \approx 10.77$ or $2\sqrt{29}$

2.



$(x)^2 + (\sqrt{7})^2 = (\sqrt{19})^2$

$x^2 + 7 = 19$

$\sqrt{x^2} = \sqrt{12}$

$x = \sqrt{12}$ or $2\sqrt{3}$

$x \approx 3.46$

3. The length of the hypotenuse is 10 cm. and the length of one leg is 2 cm. What is the length of the other leg?

$(2)^2 + (b)^2 = (10)^2$

$4 + b^2 = 100$

$\sqrt{b^2} = \sqrt{96}$ or $4\sqrt{6}$

$b = \sqrt{96} \approx 9.80$

4. Find the length of the hypotenuse of an isosceles triangle with a leg length of $\sqrt{3}$ inches.

$(\sqrt{3})^2 + (\sqrt{3})^2 = c^2$

$3 + 3 = c^2$

$\sqrt{6} = \sqrt{c^2}$

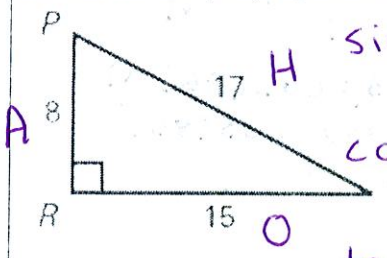
$c = \sqrt{6} \approx 2.45$

Topic: Trig Ratios

Things to Remember:
- ✓ Sine(angle) = $\frac{opposite}{hypotenuse}$
- ✓ Cosine(angle) = $\frac{adjacent}{hypotenuse}$
- ✓ Tangent(angle) = $\frac{opposite}{adjacent}$

Examples:

5. Find the sine, cosine, and tangent of $\angle P$

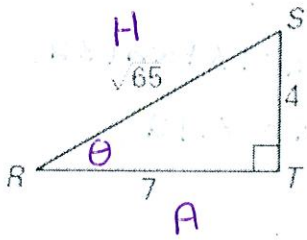


$\sin P = \frac{15}{17}$

$\cos P = \frac{8}{17}$

$\tan P = \frac{15}{8}$

6. Find the sine, cosine, and tangent of $\angle R$

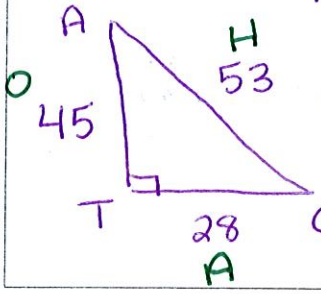


$\sin R = \frac{4}{\sqrt{65}} \rightarrow \frac{4\sqrt{65}}{65}$

$\cos R = \frac{7}{\sqrt{65}} \rightarrow \frac{7\sqrt{65}}{65}$

$\tan R = \frac{4}{7}$

7. Draw ΔCAT where $\angle ATC = 90°$, CA = 53, and CT = 28. What is the sin C?



$(53)^2 = (28)^2 + b^2$

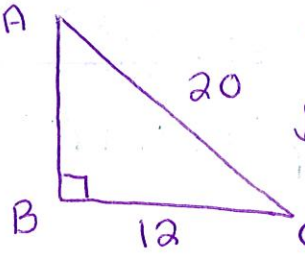
$2809 = 784 + b^2$

$\sqrt{2025} = \sqrt{b^2}$

$45 = b$

$\sin C = \frac{45}{53}$

8. Draw ΔABC where $\angle B = 90°$ and $\sin A = \frac{12}{20}$. What is the length of AB?



$(20)^2 = (12)^2 + b^2$

$400 = 144 + b^2$

$\sqrt{256} = \sqrt{b^2}$

$16 = b$

$16 = AB$

Topic: Evaluating using Trig Ratios

Things to Remember:
- ✓ Plug into a calculator to evaluate

Examples:

9. Evaluate the following trig ratio to the nearest tenth.

$\sin(90°) = 1.0$

10. Evaluate the following trig ratio to the nearest tenth.

$\tan(73°) = 3.27 \approx 3.3$

Topic: Co-Functions

Things to Remember:
- ✓ Sine(angle) = cos(90°-angle)
- ✓ Tangent is flipped!
- ✓ Tan(angle) = $\frac{1}{\tan(90°-angle)}$

Examples:

11. What expression is equivalent to $\sin(43)$?

$\cos(90-43)$

$\cos(47)$

12. What expression is equivalent to $\cos(15)$?

$\sin(90-15)$

$\sin(75)$

13. What expression is equivalent to $\tan(28)$?

$\frac{1}{\tan(90-28)} \Rightarrow \frac{1}{\tan(62)}$

14. What expression is equivalent to $\frac{1}{\tan(50)}$?

$\tan(90-50)$

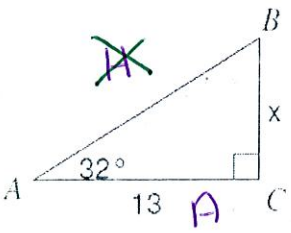
$\tan(40)$

Topic: Solving for sides

Things to Remember:
- ✓ Label from the given angle
- ✓ Cross off what you don't need
- ✓ Use the correct trig ratio
- ✓ Cross multiply and solve

Examples

15. Solve for x.

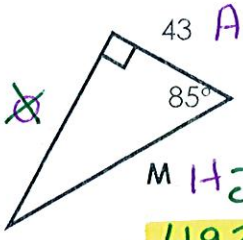


$\frac{\tan(32)}{1} = \frac{x}{13}$

$x = 13\tan(32)$

$x = 8.12$

16. Find m.



$\frac{\cos(85)}{1} = \frac{43}{M}$

$M\left(\frac{43}{\cos(85)}\right) = \frac{\cos(85)M}{\cos(85)}$

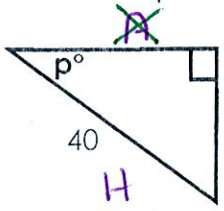
$493.37 = M$

Topic: Solving for angles

Things to Remember:
- ✓ Label from the wanted angle (θ)
- ✓ Cross off what you don't need
- ✓ Use the correct trig ratio
- ✓ Use the inverse ($^{-1}$) to find the angle.

Examples

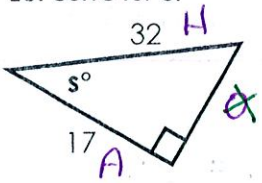
17. Solve for p.



$p° = \sin^{-1}\left(\frac{13}{40}\right)$

$p° = 18.97°$

18. Solve for s.



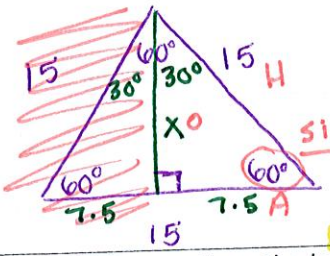
$s° = \cos^{-1}\left(\frac{17}{32}\right)$

$s° = 57.91°$

Topic: Word Problems

Things to Remember:
- ✓ Draw a picture to help solve the problem
- ✓ **REMEMBER:** angle of elevation = angle of depression

19. The perimeter of an equilateral triangle is 45 cm. What is the altitude of the triangle?



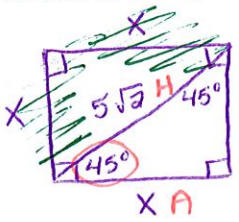
$\frac{45\text{ cm}}{3} = 15\text{ cm}$

$\frac{\sin(60)}{1} = \frac{X}{15}$

$X = 15\sin(60)$

$X = 12.99$ cm

20. The diagonal of a square is $5\sqrt{2}$ inches long. What is the perimeter of the square?



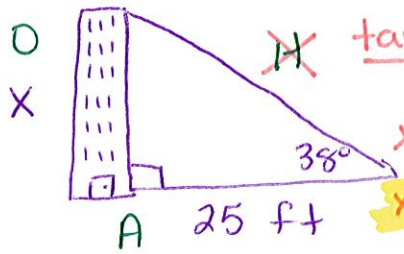
$\frac{\sin(45)}{1} = \frac{X}{5\sqrt{2}}$

$X = 5\sqrt{2}\sin(45)$

$X = 5$ in

$P = 20$ in

21. From 25 feet away from the base of a building, the angle of elevation from the ground to the top of a building is measured to be 38°. How tall is the building?

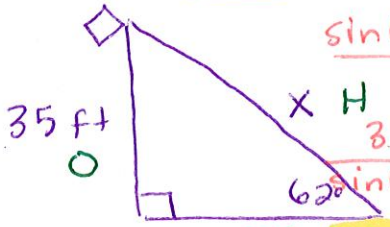


$\frac{\tan(38)}{1} = \frac{X}{25}$

$X = 25\tan(38)$

$X = 19.53$ ft

22. A kite is 35 feet in the air and the string forms an angle of 62° with the ground. How long is the string?

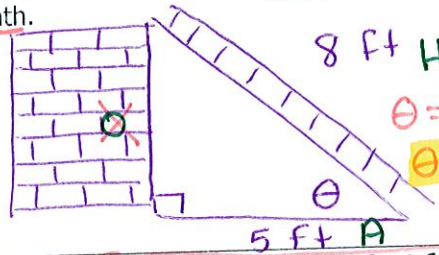


$\frac{\sin(62)}{1} = \frac{35}{X}$

$35 = \frac{\sin(62)X}{\sin(62)}$

$39.64 = X$ ft

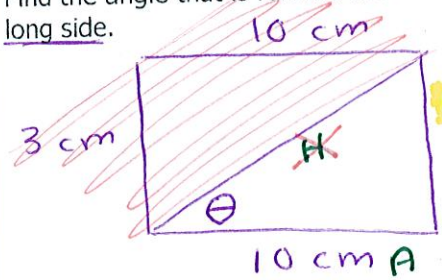
23. An 8 foot ladder is leaning against a wall so that the base is 5 feet from the base of the wall. What angle does the ladder make with the ground? Round to the nearest tenth.



$\theta = \cos^{-1}\left(\frac{5}{8}\right)$

$\theta = 51.3°$

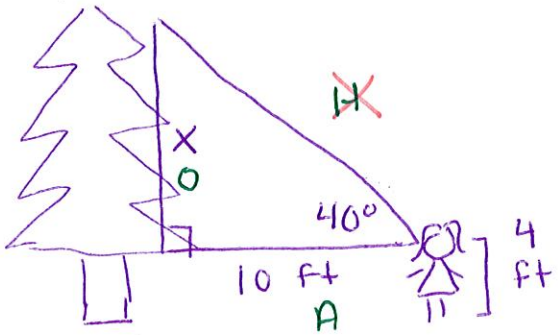
24. A rectangle has side lengths of 3 cm and 10 cm. Find the angle that is formed with the diagonal and the long side.



$\theta = \tan^{-1}\left(\frac{3}{10}\right)$

$\theta = 16.7°$

25. Lucy, ***whose eye level is 4 feet from the ground***, stands 10 feet away from the base of a tree. From her line of sight, she is looking at an angle of elevation of 40° to the top of the tree. How tall is the tree?



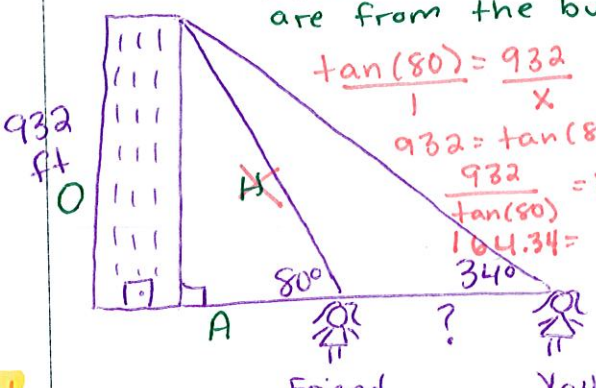
$\frac{\tan(40)}{1} = \frac{X}{10}$

$X = 10\tan(40)$

$X = 8.39$ ft $+ 4$ ft $= 12.39$ ft

26. You and you friend are visiting the tallest skyscraper in Atlanta, the Bank of America Plaza. The building is 932 feet tall. You start heading over to the Varsity and realize your friend did not follow you. How far away are you from your friend if your angle of elevation to the Bank of America Plaza is 34° and your friend's angle of elevation is 80°?

* Find how far each of you are from the building 1st!



$\frac{\tan(80)}{1} = \frac{932}{X}$ (Friend)

$932 = \tan(80)X$

$\frac{932}{\tan(80)} = X$

$164.34 = X$

$\tan(34) = \frac{932}{X} \Rightarrow X = 1381.75$

$1381.75 - 164.34 = 1217.41$ ft apart