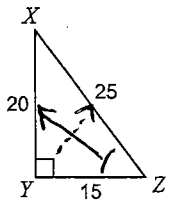
AW 10 Name _____

Assignment 7.1 SOH CAH TOA

Find the value of each trigonometric ratio to the nearest ten-thousandth.

1) sin Z

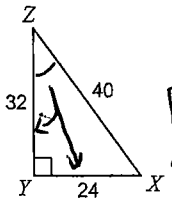


$\sin\theta = \frac{O}{H}$

$\sin Z = \frac{20}{25}$

$\sin Z = 0.80$

2) tan Z

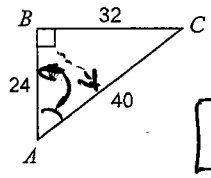


$\tan\theta = \frac{O}{A}$

$\tan Z = \frac{24}{32}$

$\tan Z = 0.75$

3) cos A

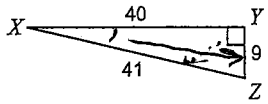


$\cos\theta = \frac{A}{H}$

$\cos A = \frac{24}{40}$

$\cos A = 0.60$

4) sin X



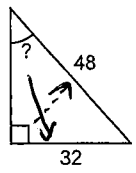
$\sin\theta = \frac{O}{H}$

$\sin X = \frac{9}{41}$

$\sin X = 0.22$

Find the measure of the indicated angle to the nearest degree.

5)



$\sin\theta = \frac{O}{H}$

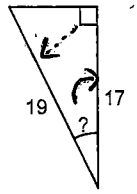
$\sin\theta = \frac{32}{48}$

$\frac{\sin\theta}{\sin} = \frac{0.67}{\sin}$

$\theta = \sin^{-1}(0.67)$

$\theta = 41.8°$

6)



$\cos\theta = \frac{A}{H}$

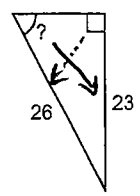
$\cos\theta = \frac{17}{19}$

$\frac{\cos\theta}{\cos} = \frac{0.89}{\cos}$

$\theta = \cos^{-1}(0.89)$

$\theta = 26.5°$

7)



$\sin\theta = \frac{O}{H}$

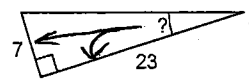
$\sin\theta = \frac{23}{26}$

$\frac{\sin\theta}{\sin} = \frac{0.88}{\sin}$

$\theta = \sin^{-1}(0.88)$

$\theta = 62.2°$

8)



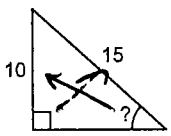
$\tan\theta = \frac{O}{A}$

$\tan\theta = \frac{7}{23}$

$\frac{\tan\theta}{\tan} = \frac{0.304}{\tan}$

$\theta = \tan^{-1}(0.304)$

$\theta = 16.9°$

9) 

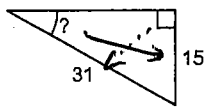
$\sin\theta = \frac{O}{H}$

$\sin\theta = \frac{10}{15}$

$\frac{\sin\theta}{\sin} = \frac{0.67}{\sin}$

$\theta = \sin^{-1}(0.67)$

$\boxed{\theta = 41.8^\circ}$

10) 

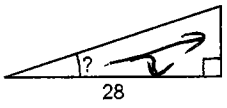
$\sin\theta = \frac{O}{H}$

$\sin\theta = \frac{15}{31}$

$\frac{\sin\theta}{\sin} = \frac{0.48}{\sin}$

$\theta = \sin^{-1}(0.48)$

$\boxed{\theta = 28.9^\circ}$

11) 

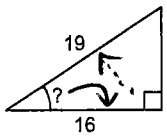
$\tan\theta = \frac{O}{A}$

$\tan\theta = \frac{9}{28}$

$\frac{\tan\theta}{\tan} = \frac{0.32}{\tan}$

$\theta = \tan^{-1}(0.32)$

$\boxed{\theta = 17.8^\circ}$

12) 

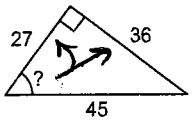
$\cos\theta = \frac{A}{H}$

$\cos\theta = \frac{16}{19}$

$\frac{\cos\theta}{\cos} = \frac{0.84}{\cos}$

$\theta = \cos^{-1}(0.84)$

$\boxed{\theta = 32.6^\circ}$

13) 

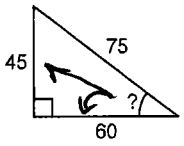
$\tan\theta = \frac{O}{A}$

$\tan\theta = \frac{36}{27}$

$\frac{\tan\theta}{\tan} = \frac{1.33}{\tan}$

$\theta = \tan^{-1}(1.33)$

$\boxed{\theta = 53.1^\circ}$

14) 

$\tan\theta = \frac{O}{A}$

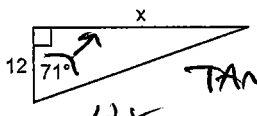
$\tan\theta = \frac{45}{60}$

$\frac{\tan\theta}{\tan} = \frac{0.75}{\tan}$

$\theta = \tan^{-1}(0.75)$

$\boxed{\theta = 36.87^\circ}$

Find the missing side. Round to the nearest tenth.

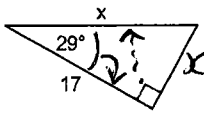
15) 

$\tan\theta = \frac{O}{A}$

$12 \cdot \tan(71) = \frac{x}{12} \cdot 12$

$(12)\tan(71) = x$

$\boxed{34.9 = x}$

16) 

$\cos\theta = \frac{A}{H}$

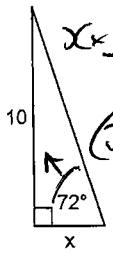
$x \cdot \cos(29) = \frac{17}{x} \cdot x$

$\frac{(x)\cos(29)}{\cos(29)} = \frac{17}{\cos(29)}$

$x = \frac{17}{\cos(29)}$

$\boxed{x = 19.4}$

17)



$\tan\theta = \frac{O}{A}$

$\tan(72) = \frac{10}{x}$ ×x

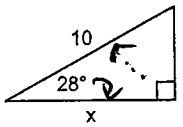
$(x)\tan(72) = 10$

$\frac{(x)\tan(72)}{\tan(72)} = \frac{10}{\tan(72)}$

$x = \frac{10}{\tan(72)}$

$x = 3.2$

18)



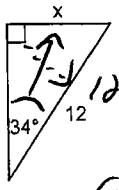
$\cos\theta = \frac{A}{H}$

$\cos(28) = \frac{x}{10}$ ×10

$(10)\cos(28) = x$

$8.8 = x$

19)



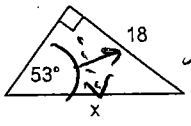
$\sin\theta = \frac{O}{H}$

$\sin(34) = \frac{x}{12}$ ×12

$(12)\sin(34) = x$

$6.71 = x$

20)



$\sin\theta = \frac{O}{H}$

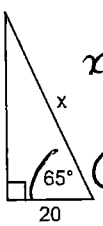
$\sin(53) = \frac{18}{x}$ ×x

$\frac{(x)\sin(53)}{\sin(53)} = \frac{18}{\sin(53)}$

$x = \frac{18}{\sin(53)}$

$x = 22.5$

21)



$\cos\theta = \frac{A}{H}$

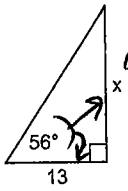
$\cos(65) = \frac{20}{x}$ ×x

$\frac{(x)\cos(65)}{\cos(65)} = \frac{20}{\cos(65)}$

$x = \frac{20}{\cos(65)}$

$x = 47.3$

22)



$\tan\theta = \frac{O}{A}$

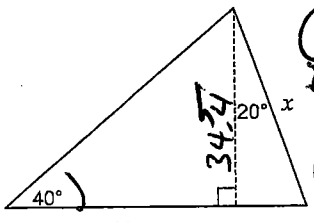
$\tan(56) = \frac{x}{13}$ ×13

$(13)\tan(56) = x$

$19.3 = x$

Find the length of the side labeled *x*. Round intermediate values to the nearest tenth. Use the rounded values to calculate the next value. Round your final answer to the nearest tenth.

23)



② $\cos\theta = \frac{A}{H}$

$\cos(20) = \frac{34.4}{x}$ ×x

$\frac{(x)\cos(20)}{\cos 20} = \frac{34.4}{\cos 20}$

$x = 36.6$

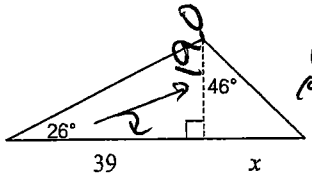
① $\tan\theta = \frac{O}{A}$

$41 \cdot \tan(40) = \frac{h}{41}$ ×41

$(41)\tan(40) = h$

$34.4 = h$

24)



② $\tan\theta = \frac{O}{A}$

$19 \cdot \tan(46) = \frac{x}{19.0}$ ×19

$(19)\tan(46) = x$

$19.7 = x$

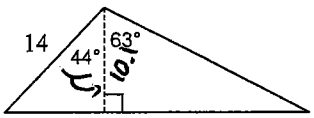
① $\tan\theta = \frac{O}{A}$

$39 \cdot \tan(26) = \frac{op}{39}$ ×39

$(39)\tan(26) = op$

$19.0 = op$

25)



① $\cos\theta = \frac{A}{H}$

$14 \times \cos(44) = \frac{A}{14} \times 14$

$(14)\cos(44) = A$

$10.1 = A$

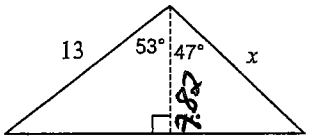
② $\tan\theta = \frac{O}{A}$

$\tan(63) = \frac{x}{10.1}$

$(10.1)\tan(63) = x$

$19.76 = x$

26)



① $\cos\theta = \frac{A}{H}$

$\cos(53) = \frac{A}{13}$

$(13)\cos(53) = A$

$7.82 = A$

② $\cos\theta = \frac{A}{H}$

$\cos(47) = \frac{7.82}{x} \times x$

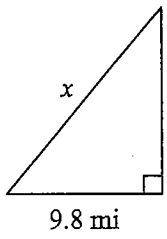
$(x)\cos(47) = 7.82$

$\frac{(x)\cos(47)}{\cos(47)} = \frac{7.82}{\cos(47)}$

$x = \frac{7.82}{\cos(47)} = 11.47$

Use the Pythagorean Theorum to find the missing side of each triangle.

27)



$a^2 + b^2 = c^2$

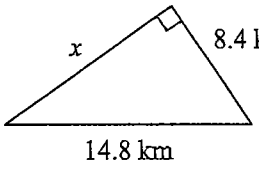
$9.8^2 + 11.6^2 = c^2$

$96.04 + 134.56 = c^2$

$\sqrt{230.6} = \sqrt{c^2}$

$15.2\text{mi} = c$

28)



$a^2 + b^2 = c^2$

$8.4^2 + x^2 = 14.8^2$

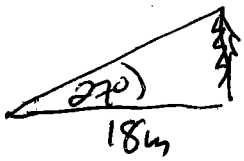
$70.56 + x^2 = 219.04$

$\sqrt{x^2} = \sqrt{148.48}$

$x = 12.2\text{km}$

Word Problems

29) A person is standing 18m away from a tree. The angle of elevation to the top of the tree is 27°. Determine the height of the tree.



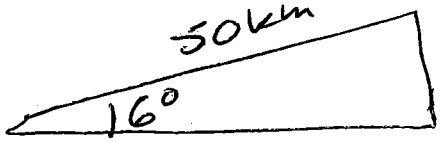
$\tan\theta = \frac{O}{A}$

$\tan(27) = \frac{OP}{18} \times 18$

$(18)\tan(27) = OP$

$9.17\text{m} = \text{HEIGHT}$

30) A road segment is 50km long and has an angle of elevation of 6°. Determine its vertical and horizontal distances.



$\sin\theta = \frac{O}{H}$

$\sin(6) = \frac{OP}{50}$

$(50)\sin(6) = OP$

VERTICAL

$5.2\text{km} = OP$

$\cos\theta = \frac{A}{H}$

$\cos(6) = \frac{A}{50}$

$(50)\cos(6) = A$

HORIZONTAL

$49.7\text{km} = A$

31) The base of a 40' ladder is 7' from the base of a wall. Determine the ladder's angle of elevation and the height it reaches up the wall.

$\cos\theta = \frac{A}{H}$

$\cos\theta = \frac{7}{40}$

$\cos\theta = 0.175$

$\theta = \cos^{-1}(.175)$

$\theta = 79.9°$

$a^2 + b^2 = c^2$

$7^2 + b^2 = 40^2$

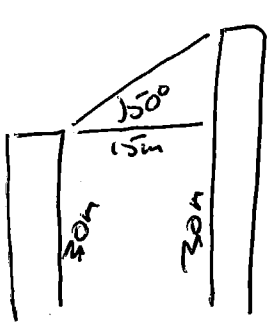
$49 + b^2 = 1600$

$-49 \quad -49$

$\sqrt{b^2} = \sqrt{1551}$

$b = 39.4'$

32) A person is standing on top of a 30m tall building. Another building is 15m away. The angle of elevation to the top of the other building is 50°. How tall is the other building?



$\tan\theta = \frac{O}{A}$

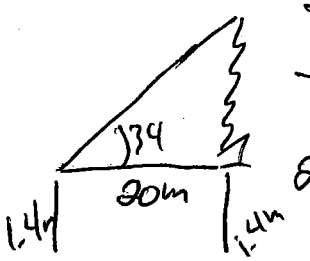
$\tan(50) = \frac{O}{15} \times 15$

$17.88\text{m} = OP$

$+30$

47.88m

33) Jimmy is standing 20m from a tree. He measures the angle of elevation to the top of the tree as 34°. His eyes are 1.4m above the ground. Determine the height of the tree.



$\tan\theta = \frac{OP}{AD}$

$\tan(34) = \frac{OP}{20}$

$20 \cdot \tan(34) = OP$

$13.5\text{m} = OP$

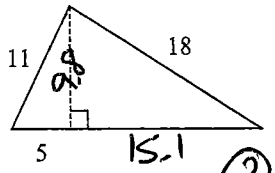
13.5m

$+ 1.4$

14.9m

Find the area of each triangle. Round intermediate values to the nearest tenth. Use the rounded values to calculate the next value. Round your final answer to the nearest tenth.

34)



① $a^2 + b^2 = c^2$

$5^2 + b^2 = 11^2$

$b^2 = 121 - 25$

$\sqrt{b^2} = \sqrt{96}$

$b = 9.8$

② $a^2 + b^2 = c^2$

$9.8^2 + b^2 = 18^2$

$96 + b^2 = 324$

$-96 \quad -96$

$\sqrt{b^2} = \sqrt{228}$

$b = 15.1$

$+ 5$

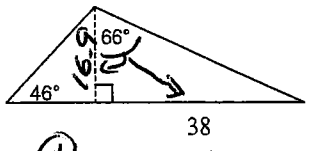
20.1

③ $A = \frac{bh}{2}$

$A = \frac{(20.1)(9.8)}{2}$

$A = 98.5 \text{ units}^2$

35)



① $\tan\theta = \frac{O}{A}$

$A \cdot \tan(66) = \frac{38}{A} \cdot A$

$A \cdot \tan(66) = 38$

$\frac{A \cdot \tan(66)}{\tan(66)} = \frac{38}{\tan(66)}$

$A = 16.9$

② $\tan\theta = \frac{O}{A}$

$A \cdot \tan(46) = \frac{16.9}{A} \cdot A$

$(A)\tan(46) = 16.9$

$\frac{(A)\tan(46)}{\tan(46)} = \frac{16.9}{\tan(46)}$

$A = 16.34$

$+ 38$

54.34

③ $A = \frac{bh}{2} = \frac{(54.34)(16.9)}{2}$

$= 443.9 \text{ units}^2$