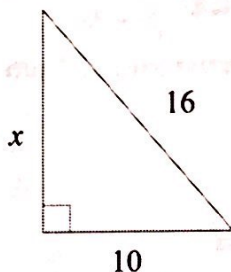Name:_____ Period:_____ **Key**_____

SM2H – Unit 8 Trigonometry Test Review

Find the missing side of each triangle. Leave your answers in simplest radical form.
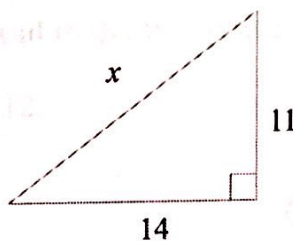
1.

$$x^2 + 10^2 = 16^2$$
$$\sqrt{x^2} = \sqrt{156}$$
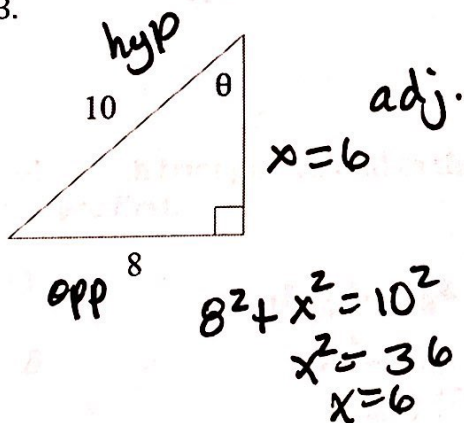$$\cdot x = \sqrt{2 \cdot 2 \cdot 39}$$
$$x = 2\sqrt{39}$$

2.

$$11^2 + 14^2 = x^2$$
$$317 = x^2$$
$$\sqrt{317} = x$$

Find the sine, cosine, tangent, cosecant, secant, and cotangent ratios for the angle indicated. Express your answers as simplified fractions. SOH CAH TOA

3.

hyp 10   θ   adj.
$$x = 6$$
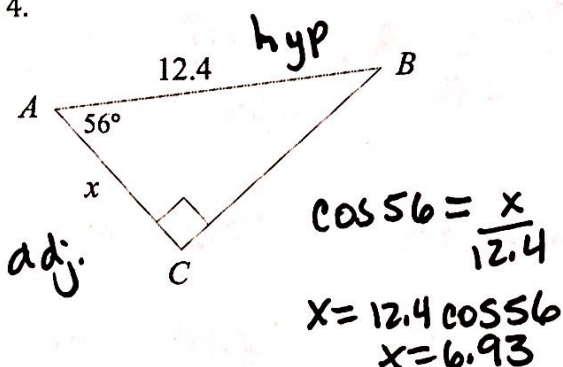opp 8
$$8^2 + x^2 = 10^2$$
$$x^2 = 36$$
$$x = 6$$

$$\sin \theta = \frac{8}{10} = \frac{4}{5} \qquad \csc \theta = \frac{5}{4}$$

$$\cos \theta = \frac{6}{10} = \frac{3}{5} \qquad \sec \theta = \frac{5}{3}$$

$$\tan \theta = \frac{8}{6} = \frac{4}{3} \qquad \cot \theta = \frac{3}{4}$$

Find the measure of each side indicated. Round to the nearest tenth. You must write an equation for full credit.
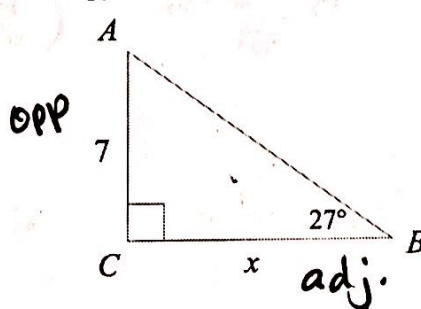
4.

12.4 hyp B
A 56°
x
adj. C

$$\cos 56 = \frac{x}{12.4}$$
$$x = 12.4 \cos 56$$
$$x = 6.93$$

5.

A
opp 7
C   27° B
x adj.

$$\tan 27 = \frac{7}{x}$$
$$x \tan 27 = 7$$
$$x = \frac{7}{\tan 27}$$
$$x = 13.74$$

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

6. $\sin 42° =$
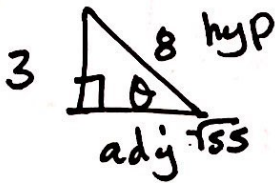   .6691

7. $\sec 83° = \dfrac{1}{\cos 83}$
   8.2055

8. $\tan 29° =$
   .5543

Find the value of the trigonometric function indicated, given the following information.

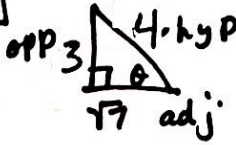9. Find $\tan\theta$ if $\sin\theta = \dfrac{3}{8}$.

opp hyp

$3 \quad \triangle \, 8 \, \text{hyp}$ θ

opp

$\text{adj } \sqrt{55}$

$\tan\theta = \dfrac{3}{\sqrt{55}} \cdot \dfrac{\sqrt{55}}{\sqrt{55}}$

$\boxed{\tan\theta = \dfrac{3\sqrt{55}}{55}}$

$3^2 + x^2 = 8^2$

$x^2 = 55$

$x = \sqrt{55}$

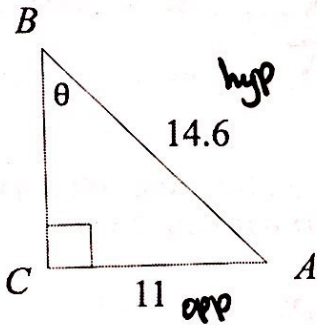10. Find $\csc\theta$ if $\cos\theta = \dfrac{2\sqrt{7}}{84}$.

SOH $\dfrac{1}{2\sqrt{7}} \text{adj}$ $84 \, \text{hyp}$

$\text{opp } 3 \, \triangle \, 4 \cdot \text{hyp}$ θ

$\sqrt{7} \, \text{adj}$

$\boxed{\csc\theta = \dfrac{4}{3}}$

$x^2 + (\sqrt{7})^2 = 4^2$

$x^2 + 7 = 16$

$9 = x^2$

$3 = x$

Find the measure of each angle indicated. Round to the nearest tenth.

11.

B θ hyp 14.6

$C \quad 11 \, \text{opp} \quad A$

$\theta = \sin^{-1}\left(\dfrac{11}{14.6}\right)$

$\theta = 48.89$

$\theta = 48.9°$

12.

C $\text{opp } 6$ $4 \, \text{adj}$

$A \quad \theta \quad B$

$\theta = \tan^{-1}\left(\dfrac{6}{4}\right)$

$\theta = 56.3°$
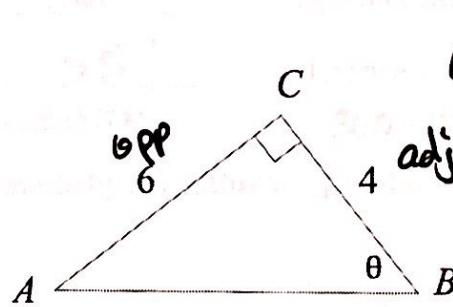
Solve each triangle. Round to the nearest tenth. If there is no picture provided, draw a picture first.

13.

B $3\sqrt{15}$ $16 \, \text{hyp}$ $46.7°$

$C \quad 11 \, \text{adj} \quad A$
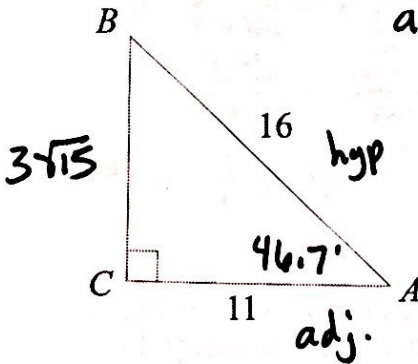
$a^2 + 11^2 = 16^2$

$a^2 = 135$

$a = \sqrt{135}$

$3 \cdot 3 \cdot 3 \cdot 5$

$a = 3\sqrt{15}$

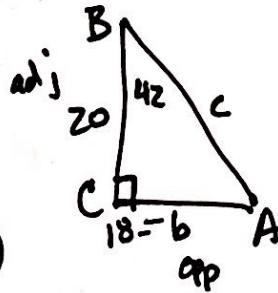$A = \cos^{-1}\left(\dfrac{11}{16}\right)$

$A =$

$m\angle A = 46.7°$ $\quad a = 3\sqrt{15} = 11.6$

$m\angle B = 43.3°$ $\quad b = 11$

$m\angle C = 90°$ $\quad c = 16$

$180 - 46.7 - 90$

14. $m\angle B = 42°$
$a = 20$

B $\text{adj } 20$ 42 c

$C \quad \underset{\text{opp}}{18 = b} \quad A$

$\tan 42 = \dfrac{b}{20}$

$b = 20 \tan 42$

$b = 18$

$18^2 + 20^2 = c^2$

$= c$

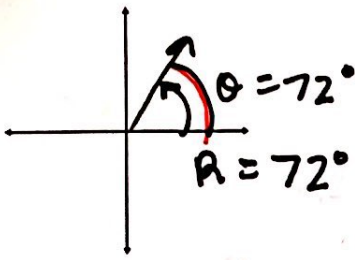$m\angle A = 48°$ $\quad a = 20$

$m\angle B = 42°$ $\quad b = 18$

$m\angle C = 90°$ $\quad c = 26.9$

$180 - 90 - 42 = 48$

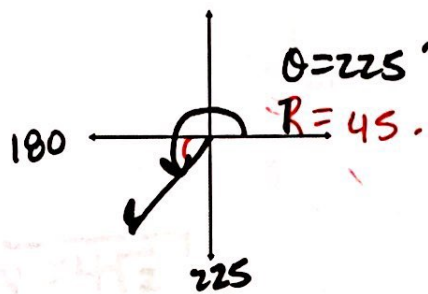**Draw the angle in standard position. Identify the reference angle and its measurement.**
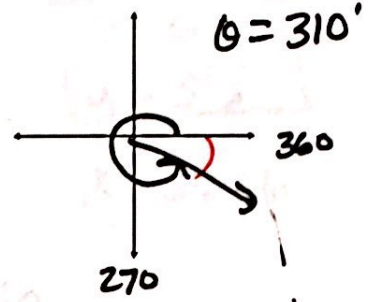
15. 72°

$\theta = 72°$
$R = 72°$

angle measure ___72°___

reference angle ___72°___

16. 225°

$\theta = 225°$
$R = 45.$

180

225

angle measure ___225°___

reference angle ___45°___

$225 - 180 = 45$

17. 310°

$\theta = 310°$

360

270

angle measure ___310°___

reference angle ___50°___

$360 - 310 = 50°$

Find the sine, cosine, and tangent of the angle made by the following points. Keep answers in simplified radical form. (NO DECIMALS)
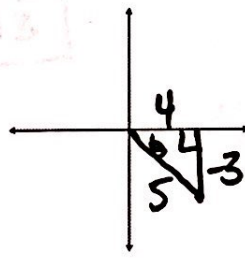
18. $(1, 5)$
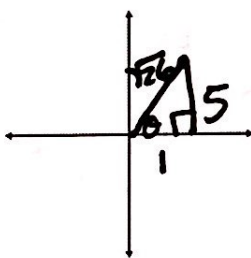
$1^2 + 5^2 = c^2$
$26 = c^2$
$\sqrt{26} = c$

$\sin\theta = \dfrac{5}{\sqrt{26}} \cdot \dfrac{\sqrt{26}}{\sqrt{26}} = \dfrac{5\sqrt{26}}{26}$

$\cos\theta = \dfrac{1}{\sqrt{26}} \cdot \dfrac{\sqrt{26}}{\sqrt{26}} = \dfrac{\sqrt{26}}{26}$

$\tan\theta = \dfrac{5}{1} = 5$

19. $(4, -3)$

$\sin\theta = -3/5$

$\cos\theta = 4/5$

$\tan\theta = -3/4$

20. $(-8, -15)$
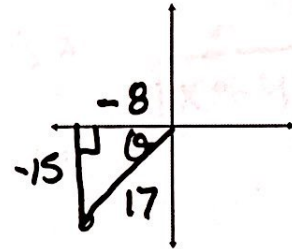
$(-8)^2 + (-15)^2 = c^2$
$289 = c^2$
$17 = c$
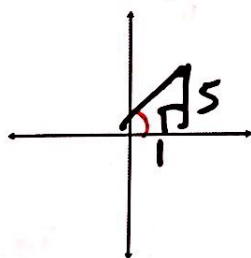

$\sin\theta = -15/17$

$\cos\theta = -8/17$

$\tan\theta = 15/8$

Find the measurement of the STANDARD ANGLE (you will need to first find the reference angle!) that is created by the coordinate point. Draw a picture. Round to the hundredth.
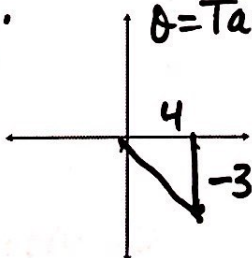
21. $(1, 5)$ $\theta = Tan^{-1}\left(\dfrac{5}{1}\right)$
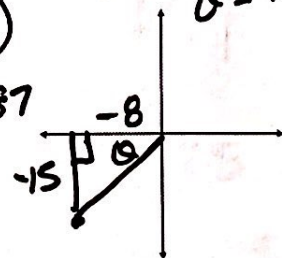
$\theta = 78.69°$

$\theta = 78.69°$

22. $(4, -3)$

$\theta = Tan^{-1}\left(\dfrac{-3}{4}\right)$

$\theta = -36.87$

$\theta = 323.13°$

$360 - 36.87$

23. $(-8, -15)$
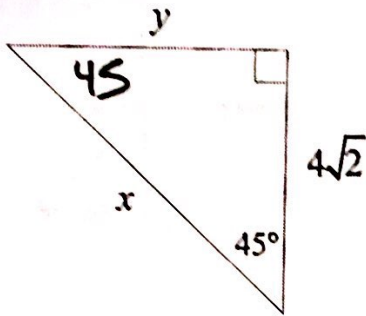
$\theta = Tan^{-1}\left(\dfrac{-15}{-8}\right)$

$\theta = 28.07°$

$\theta = 208.07°$

$180 + 28.07$

Use special right triangles to solve for *x* and *y*. Leave your answers as radicals in simplest form. NO DECIMAL ANSWERS ALLOWED!
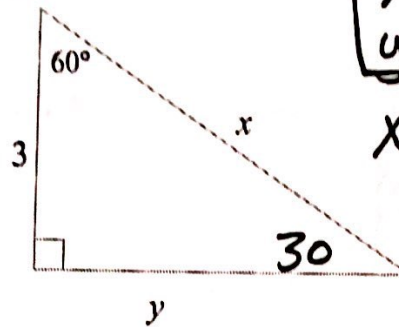
24.

y

45

$4\sqrt{2}$

x

45°

25.

60°

x

3

30

y

$x = 6$
$y = 3\sqrt{3}$

$X = 3\cdot 2 = 6$

$y = 4\sqrt{2}$

$X = 4\sqrt{2}\cdot\sqrt{2}$
$= 4\cdot 2$

$X = 8$
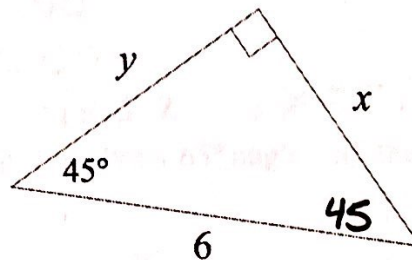
26.

x = 7

60

y

14

30°

$X = \frac{14}{2} = 7$

$X = 7$

$y = 7\sqrt{3}$

27.

y

x

45°

45

6
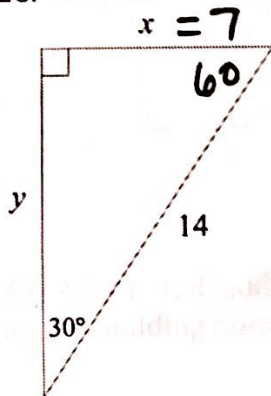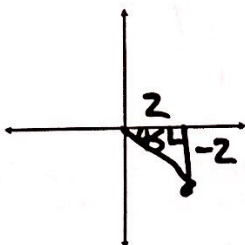
$X = y = \frac{6}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}} = \frac{6\sqrt{2}}{2}$

$X + y = 3\sqrt{2}$

Find the measurement of the STANDARD ANGLE (you will need to first find the reference angle!) that is created by the coordinate point. Draw a picture. Use special right triangles to solve for the angle. NO DECIMAL ANSWERS ALLOWED!
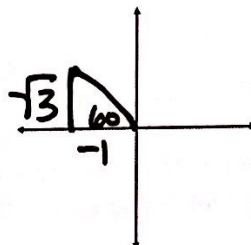
28. $(2, -2)$

2

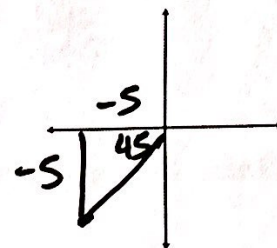45

-2

$\theta = 315°$

$360 - 45°$

29. $(-1, \sqrt{3})$

$\sqrt{3}$

60

-1

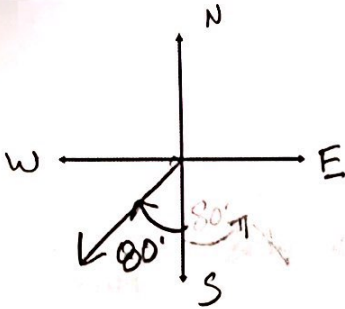$\theta = 120°$

$180 - 60$

30. $(-5, -5)$
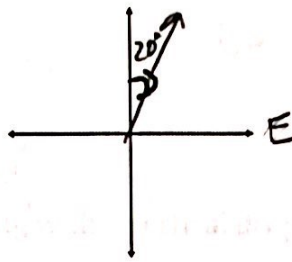
-5

45

-5

$\theta = 225°$

$180 + 45$

For each bearing, draw a picture and label the angle (angle to N or S).
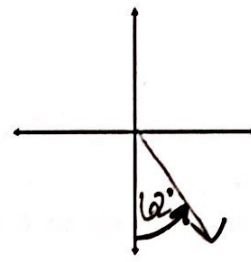
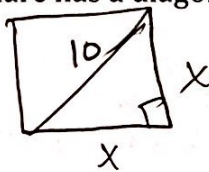31. *S 80° W*

32. *N 20° E*

33. *S 62° E*

Draw a diagram to help you solve each problem, then write the equation. Round your answer to the nearest tenth.

34. A square has a diagonal of length 10 cm. Find the length of each side.
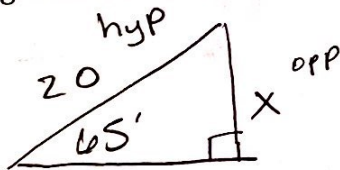

$$x^2 + x^2 = 10^2$$
$$2x^2 = 100$$
$$x^2 = 50$$
$$x = \sqrt{5 \cdot 5 \cdot 2} \qquad x = 5\sqrt{2} \ cm$$

35. A 20-ft. tall ladder is leaning against a building. It makes a 65° angle with the ground. How far up the building does it reach?
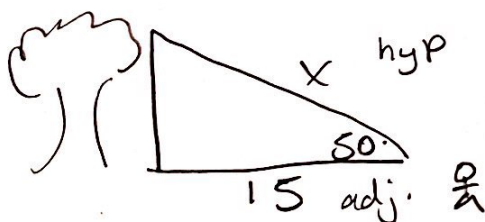

$$\sin 65 = \frac{x}{20}$$
$$x = 20\sin 65$$
$$x = 18.13 \ ft$$

36. A photographer wishes to take a picture of a bird in a tree. She is 15 feet from the base of the tree and is shooting the picture at a 50° angle of elevation. How far is the camera from the bird?
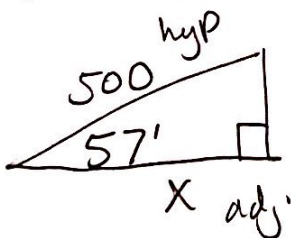

$$\cos 50 = \frac{15}{x}$$
$$\frac{x\cos 50}{\cos 50} = \frac{15}{\cos 50}$$
$$x = 23.34 \ ft$$

37. A ladder, 500cm long, leans against a building. If the angle between the ground and the ladder is 57 degrees, how far from the wall is the bottom of the ladder?
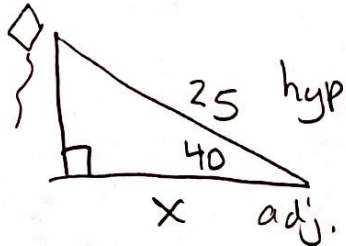

$$\cos 57 = \frac{x}{500}$$
$$x = 500\cos 57$$
$$x = 272.32 \ cm$$

38. A kite has 25 feet of string. The wind is blowing the kite to the west so that the angle of elevation is 40°. How far has the kite traveled horizontally?
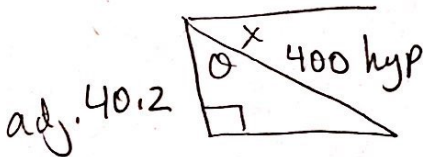
25 hyp
40
X   adj.

$\cos 40 = \dfrac{X}{25}$

$X = 25 \cos 40$

$X = 19.15 \text{ ft}$

39. A sledding run is 400 yards long with a vertical drop of 40.2 yds. Find the angle of depression of the run.
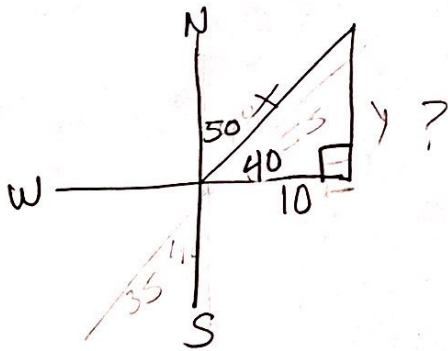
X
θ   400 hyp
adj. 40.2

$\cos \theta = \dfrac{40.2}{400}$

$\cos^{-1}\left(\dfrac{40.2}{400}\right) = 84.23$

$X = 90 - 84.23 = 5.77$

$X = 5.77°$

40. Two ships leave at the same time from the same spot in the Atlantic Ocean. One has a bearing of S 48° E and travels 35 mph. The other has a bearing of N 48° W and travels 55 mph. How far apart are they after 1 hour?

N
50 X
40   Y ?
10
W ————
S

$= 90$

$\cos 40 = \dfrac{10}{X}$

$\dfrac{X \cos 40}{\cos 40} = \dfrac{10}{\cos 40}$

$X = 13.05$

S