

Name: KEY

Date: 11/1/17 Pd: _____

Unit A Exam

Neatly solve the following problems. Make your answers clear by putting a box around the final answer. Partial credit will be awarded for work that is shown. Failure to follow directions and complete problems will result in deductions of points. (100)

1. For an angle measuring 43° , find the measure of its (a) complement and (b) supplement. (2)

(a) 47°

(b) 137°

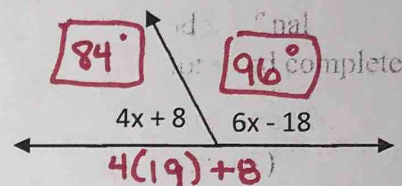
2. Find the value of x and determine the measure of each angle. (3)

$$(4x+8) + (6x-18) = 180$$

$$10x - 10 = 180$$

$$10x = 190$$

$$x = 19$$



3. Perform each calculation. (4)

(a) $15^\circ 21' 09'' + 25^\circ 18' 20''$

$$40^\circ 39' 29''$$

(b) $50^\circ - 27^\circ 24' 50''$

$$23^\circ \Rightarrow 22^\circ 60'$$

$$22^\circ 36' \Rightarrow 22^\circ 35' 60''$$

$$= 22^\circ 35' 10''$$

4. Convert to either Degrees, Minutes, Seconds or Decimal Degrees. (4)

(a) 44.625°

$$44^\circ 37' 30''$$

(b) $30^\circ 40' 35''$

$$30.6764^\circ$$

5. Find the least possible positive conterminal angle. (4)

(a) $1838^\circ - 5(360)$

$$= 38^\circ$$

(b) $-510^\circ + 2(360)$

$$210^\circ$$

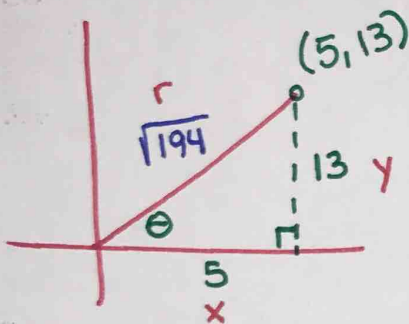
6. Vinyl records at 180 revolutions per minute. Through how many degrees will a point on the edge of a CD move in two seconds? (4)

Each revolution is 360°

$$180/60 \text{ sec} = 3/1 \text{ sec} \Rightarrow 6/2 \text{ sec}$$

$$6(360^\circ) = \boxed{2160^\circ}$$

7. The terminal side of angle θ in standard position passes through the point $(5, 13)$. Find the values of the six trigonometric functions of angle θ . (8)



$$5^2 + 13^2 = r^2$$

$$194 = r^2$$

$$\sqrt{194} = r$$

$$\sin \theta = \frac{y}{r} = \frac{13}{\sqrt{194}} = \frac{13\sqrt{194}}{194}$$

$$\cos \theta = \frac{x}{r} = \frac{5}{\sqrt{194}} = \frac{5\sqrt{194}}{194}$$

$$\tan \theta = \frac{y}{x} = \frac{13}{5}$$

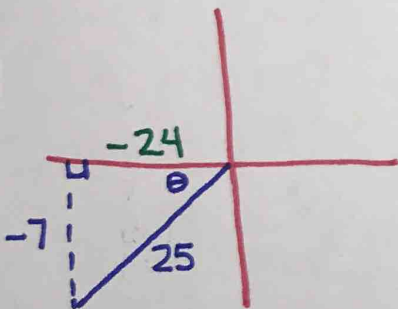
$$\cot \theta = \frac{x}{y} = \frac{5}{13}$$

$$\sec \theta = \frac{r}{x} = \frac{\sqrt{194}}{5}$$

$$\csc \theta = \frac{r}{y} = \frac{\sqrt{194}}{13}$$

8. Find $\cos \theta$ given $\sin \theta = -\frac{7}{25}$.

θ is in quadrant III. (5)



$$(-7)^2 + x^2 = 25^2$$

$$49 + x^2 = 625$$

$$x^2 = 576$$

$$x = 24$$

$$\cos \theta = \frac{-24}{25}$$

9. Determine if the equations are possible or impossible. (3)

(a) $\cos \theta = -0.9$ possible

(b) $\tan \theta = 25$ possible

(c) $\csc \theta = -0.5$ Not possible

10. In which quadrant are the statements true? (3)

(a) $\csc \theta < 0, \sec \theta < 0$ II possible. (3)

(b) $\tan \theta > 0, \csc \theta > 0$ I

(c) $\sin \theta > 0, \cot \theta > 0$ I

11. Solve for $\sin B$, $\cos B$ and $\tan B$. (6)

$$10^2 + a^2 = 14^2$$

$$100 + a^2 = 196$$

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

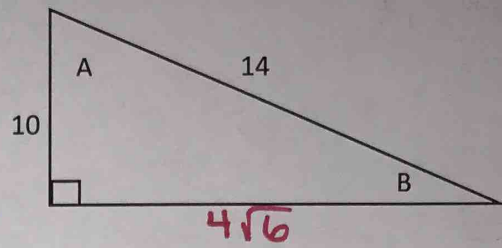
$$a = \sqrt{16 \cdot 6}$$

$$a = 4\sqrt{6}$$

$$\sin B = \frac{10}{14} = \frac{5}{7}$$

$$\cos B = \frac{4\sqrt{6}}{14} = \frac{2\sqrt{6}}{7}$$

$$\tan B = \frac{10}{4\sqrt{6}} = \frac{10\sqrt{6}}{4(6)} = \frac{10\sqrt{6}}{24} = \frac{5\sqrt{6}}{12}$$

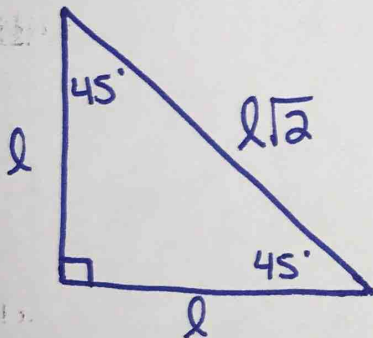


12. Write each function in terms of its cofunction. (4)

a. $\cos 68^\circ = \sin(90^\circ - 68^\circ)$
 $= \sin(22^\circ)$

b. $\csc(\theta + 40^\circ) = \sec(90^\circ - (\theta + 40^\circ))$
 $= \sec(50^\circ - \theta)$
 or
 $\sec(-\theta + 50^\circ)$

13. Draw a right triangle with a 45° angle. Find the degree of the missing angle. Also, find the sin, cosine and tangent ratios of the angle (excluding the 90° angle). (9)



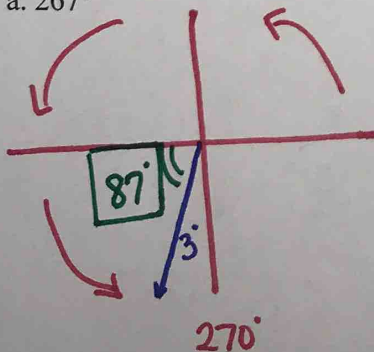
$$\sin 45^\circ = \frac{\sqrt{2}}{2}$$

$$\cos 45^\circ = \frac{\sqrt{2}}{2}$$

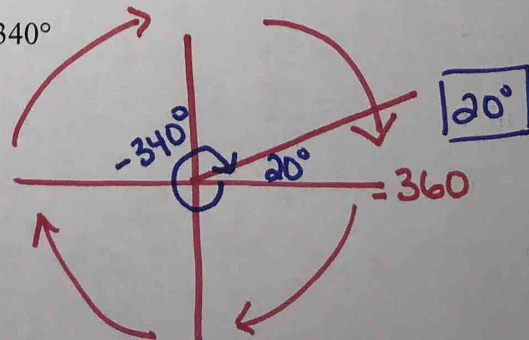
$$\tan 45^\circ = 1$$

14. Draw and find the reference angle for each of the following. (4)

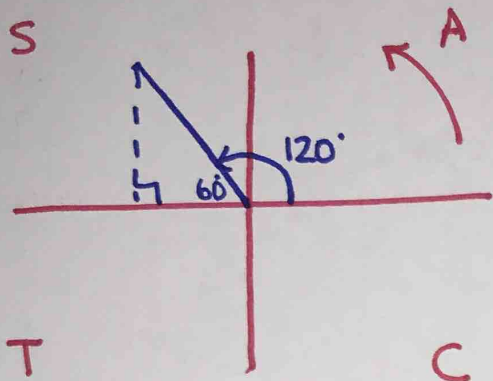
a. 267°



b. -340°



15. Draw and find the reference angle.
Find the six trigonometric function values for 120° . (8)



$\sin \theta = \frac{\sqrt{3}}{2}$
$\cos \theta = -\frac{1}{2}$
$\tan \theta = -\sqrt{3}$
$\cot \theta = -\frac{\sqrt{3}}{3}$
$\sec \theta = -2$
$\csc \theta = \frac{2\sqrt{3}}{3}$

16. Use your calculator to find the approximate value of each expression or equation. (4)

a. $\sin 99.773^\circ \approx .9855$

b. $\cot 50.13^\circ \approx .8352$

c. $\cos \theta = 0.25$

$\theta \approx 75.522^\circ$

d. $\sec \theta = 2.46$

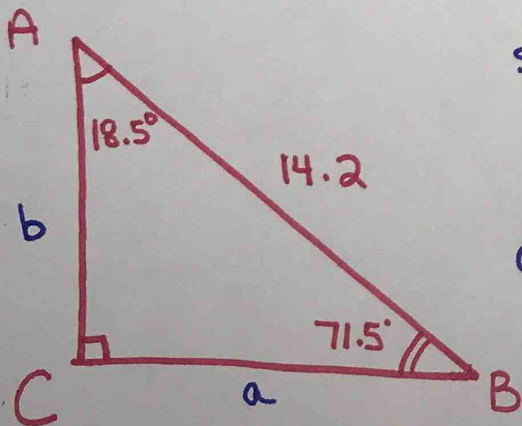
$\theta \approx 66.015^\circ$

17. Calculate F to the nearest 10 pounds for a 5000-lb car traveling an uphill grade with $\theta = 6.2^\circ$. (3)
 $F = w \sin \theta$ ($w =$ weight in pounds)

$F = (5000) \sin(6.2^\circ)$

$F \approx 540$ lbs

18. Solve right triangle ABC, if $A = 18^\circ 30'$ and $c = 14.2$ in. (5)



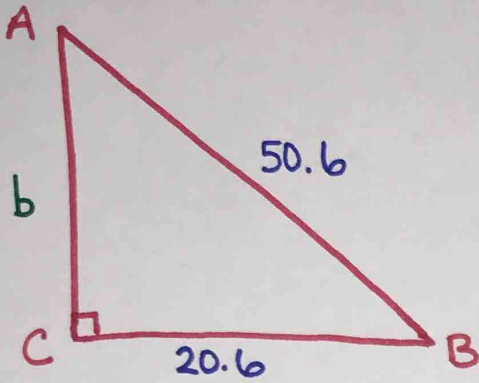
$\sin 18.5^\circ = \frac{a}{14.2}$

$a \approx 4.506$

$\cos 18.5^\circ = \frac{b}{14.2}$

$b \approx 13.466$

19. Solve **right** triangle ABC, if $a = 20.6$ cm and $c = 50.6$ cm, given angle C is the right angle. (5)



$$\cos B = \frac{20.6}{50.6}$$

$$B = \cos^{-1}\left(\frac{20.6}{50.6}\right)$$

$$B \approx 65.976^\circ$$

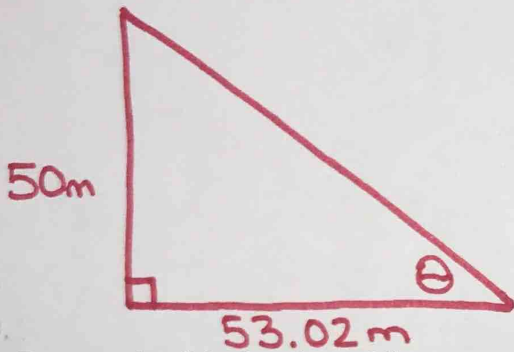
$$A \approx 24.024^\circ$$

$$b^2 + 20.6^2 = 50.6^2$$

$$b^2 = 2136$$

$$b \approx 46.217$$

20. The length of the shadow of a house that is 50 m tall is 53.02 m long. Find the angle of elevation of the sun. (4)



$$\tan \theta = \frac{50}{53.02}$$

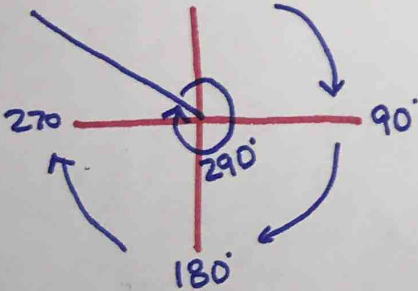
$$\theta = \tan^{-1}\left(\frac{50}{53.02}\right)$$

$$\theta \approx 43.321^\circ$$

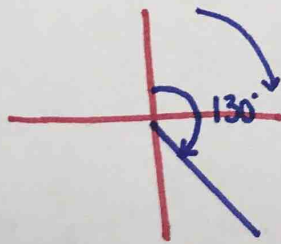
21.

21. Draw each of the bearings. (4)

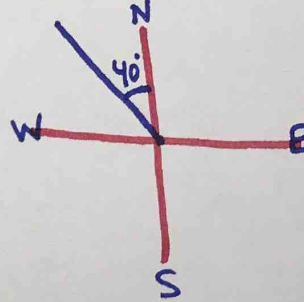
a. 290°



b. 130°



c. N 40° W



d. S 65° E

