

Name: key Per: _____ Date: _____
 Serafino • Precalculus



2.2 Decimal Degrees ↔ Minutes & Seconds

Notes / Classwork

1. You're meeting up with a friend who LOVES decimals. She says, "I'll see you in 4.75 hours".

a. What is 4.75 hours in terms of hours, and minutes? 4 hours 45 minutes

b. 6.3 hours?

c. 6.125 hours?

d. 7.545 hours?

6 hours, 18 minutes

6 h, 7 min, 30 sec

17 h, 32 min, 42 sec

2. Now you're meetings up with a friend who is oddly precise. He says, "Meet me in 2 hours, 39 minutes."

a. What is 2 hours, 39 minutes in terms of hours? 2.65 hours

b. 10 hours, 42 minutes and 48 seconds?

c. 8 hours, 123 minutes?

* 10.71333 hours

10 hours, 3 min → 10.05 h

We can break down degrees into minutes and seconds.

$$60' \text{ (minutes)} = 1^\circ \text{ (degree)}$$

$$60'' \text{ (seconds)} = 1' \text{ (minute)}$$

Note: 60 minutes in an hour; 60 seconds in a minute... so there are 3600 seconds in one degree.

Notation: $52^\circ 10'$ = 52 degrees, 10 min
 $12^\circ 15''$ = 12 degrees, 15 seconds
 0 → degree
 ' → min → sec

$5^\circ 27' 30''$ = 5 degrees, 27 min, 30 sec

3. Convert Decimals → Minutes & Seconds

Example: $27.25^\circ = 27^\circ + 0.25^\circ = 27^\circ + 0.25(60)' = 27^\circ + 15' = 27^\circ 15'$

a. 34.85°

$34^\circ 51'$

b. 54.455°

$54^\circ 27' 18''$

c. 12.1268°

$12^\circ 7' 36''$ $36 \cdot 48$

4. Convert Minutes & Seconds → Decimal Degrees

Example: $10^\circ 45' = 10^\circ + 45' = 10^\circ + (45/60)^\circ = 10^\circ + 0.75^\circ = 10.75^\circ$

$68^\circ 30' 27'' = 68^\circ + 30' + 27'' = 68^\circ + (30/60)^\circ + (27/3600)^\circ = 68^\circ + 0.5^\circ + 0.0075^\circ = 68.5075^\circ$

put in calc as 15

a. $13^\circ 18'$

13.3°

b. $32^\circ 19' 65''$

↓ same as
 $32^\circ 20' 5''$
 32.33472°

c. $27^\circ 21' 40''$

$27 + (21/60) + (40/3600)$
 27.3611°

d. $94^\circ 5'' \rightarrow$ 94.00138°

5. **Add & Subtract Minutes & Seconds** Make sure to carry over into the next unit, if necessary.

Examples: $48^\circ 49' + 72^\circ 26' = \begin{array}{r} 48^\circ 49' \\ + 72^\circ 26' \\ \hline 120^\circ 75' \rightarrow 121^\circ 15' \end{array}$ $90^\circ - 24^\circ 14' = \begin{array}{r} 90^\circ 60' \\ - 24^\circ 14' \\ \hline 65^\circ 46' \end{array}$

a. $(23^\circ 14') + (12^\circ 42')$

$$\boxed{35^\circ 56'}$$

b. $(68^\circ 44') - (18^\circ 32')$

$$\boxed{50^\circ 12'}$$

4. **Use a calculator for each of the following.** Round all ratios to four places past the decimal point.

a. $\tan 58.75^\circ$

$$\boxed{1.6479}$$

d. $\cos 134^\circ 16' 30''$

$$\cos (134 + 16/60 + 30/3600) = \boxed{-0.6981}$$

g. $\sin 335^\circ 42'$

$$\boxed{-0.4115}$$

b. $\cot 43.1^\circ$

$$\boxed{1.0686}$$

e. $\sec 28.75^\circ$

$$\boxed{1.1406}$$

h. $\cot 238.5^\circ$

$$\boxed{0.6128}$$

c. $\sin 23^\circ 24'$

$$\boxed{0.39714}$$

f. $\cot 186^\circ 12'$

$$1/\tan(186 + 12/60) = \boxed{9.2052}$$

i. $\csc 13^\circ 36'$

$$\boxed{4.2527}$$

5. **Find θ if $0 \leq \theta < 360^\circ$.** Round your answers to the nearest second:

Example: Find θ if $\tan \theta = 3.152$ in QI
 $\tan^{-1}(3.152) = 72.4^\circ = 72^\circ 24'$

Find θ if $\cot \theta = 0.975$ in QIII
 $\tan^{-1}(1/0.975) = 264^\circ 25' 53''$

a. $\cos \theta = +.8774$ in QIV

$$\boxed{331^\circ 19' 49''}$$

e. $\tan \theta = .6345$ in QIII

$$\boxed{212^\circ 23' 42''}$$

b. $\sec \theta = 1.234$ in QII

$$\boxed{144^\circ 7' 57''}$$

f. $\cot \theta = .7896$ in QI

$$\boxed{51^\circ 42' 19''}$$

c. $\sin \theta = -.3474$ in QIII

$$\boxed{200^\circ 19' 42''}$$

g. $\cos \theta = -.2375$ in QII

$$\boxed{163^\circ 44' 21''}$$

d. $\csc \theta = 1.4398$ in QII

$$\boxed{136^\circ 34''}$$

h. $\cot \theta = -.5846$ in QIV

$$\boxed{300^\circ 18' 38''}$$

HW: Pg 67 (1-79 odds - do as many in EACH section that is necessary to master this concept)

Skills Check will be on this packet + the textbook