

Advanced Trigonometry

Conversions: Decimal Degrees and Degrees, Minutes and Seconds

Name _____

Date _____

Decimal Degrees, to Degrees, Minutes, and Seconds

Convert 56.612° to degrees, minutes, and seconds.

- Your degrees will be the whole number, so in this case, we have 56° .
- Use a conversion to convert .612 to minutes:

$$\frac{.612 \text{ degrees}}{1} \cdot \frac{60 \text{ minutes}}{1 \text{ degree}(s)} \quad \text{cancel units!}$$

- Multiply across to determine the number of minutes: $.612 \times 60 \text{ minutes} = 36.72$
- The whole number becomes your minutes. So now you have $56^\circ 36'$ and .72 of a minute, which still needs to be converted to seconds.
- Write another conversion to convert .72 to seconds:

$$\frac{.72 \text{ minutes}}{1} \cdot \frac{60 \text{ seconds}}{1 \text{ minute}(s)} \quad \text{cancel units!}$$

- Multiply across to determine the number of seconds: Round to the nearest whole number. $.72 \times 60 \text{ seconds} = 43 \text{ seconds}$
- Put all the pieces together and you have $56^\circ 36' 43''$

Degrees, Minutes, and Seconds to Decimal Degrees

Convert $56^\circ 36' 43''$ to decimal degrees.

- The degree measure becomes your whole number in your decimal degrees.
- Now you have to convert $36'$ to a decimal. Do the conversion:

$$\frac{36 \text{ minutes}}{1} \cdot \frac{1 \text{ degree}}{60 \text{ minutes}} \quad \text{cancel units!}$$

- Multiply across and you will end up with a fraction: $\frac{36 \text{ degrees}}{60} = .6^\circ$

- Now you have to convert $43''$ to decimal degrees. Do a conversion:

$$\frac{43 \text{ seconds}}{1} \cdot \frac{1 \text{ degree}}{3600 \text{ seconds}} \quad \text{cancel units!}$$

- Again, you will have a fraction, $\frac{43 \text{ degrees}}{1} = .012^\circ$ (which is rounded to the nearest thousandth)
- Now add the whole number and the decimals to determine your decimal degrees.
 $56^\circ + .6^\circ + .012^\circ = 56.612^\circ$

Convert the following to degrees, minutes and seconds. Show your work.

1.) 45.245°

2.) 94.252°

3.) 100.9°

4.) 178.002°

Convert the following to decimal degrees.

5.) $45^\circ 59' 12''$

6.) $45^\circ 12' 56''$

7.) $140^\circ 45' 3''$

8.) $5^\circ 5' 5''$