# Period & Frequency

**Period (T):** the time it takes to make exactly one rotation/revolution.

units: seconds (s) or minutes (min)

**Frequency (f):** the number of rotations/revolutions in exactly one second or one minute.

units: revolutions/second (rps) aka Hertz (Hz) or revolutions/minute (rpm)

### Period or Frequency?

- A skater spins 3 times in 1 second.
- A car goes around a track in 45 seconds.
- In one minute, the dryer rotates 30 times.
- The earth rotates once in 24 hours.

## Period or Frequency?

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- A car goes around a track in 45 seconds. *Period*
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- The earth rotates once in 24 hours. *Period*

#### Changing Units: Period

Remember 1: changing units is just multiplying by 1! Remember 2: 1 minute = 60 seconds!

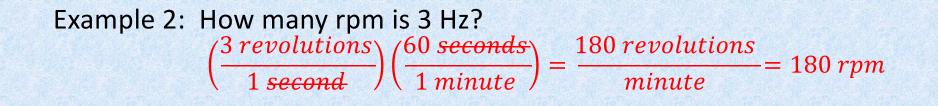
Example 1: How many seconds is 3.5 minutes?  $(3.5 \text{ minutes})\left(\frac{60 \text{ seconds}}{1 \text{ minute}}\right) = 210 \text{ seconds}$ 

Example 2: How many minutes is 20 seconds?  $(20 \text{ seconds}) \left(\frac{1 \text{ minute}}{60 \text{ seconds}}\right) = 0.33 \text{ minutes}$ 

#### Changing Units: Frequency

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Example 1: How many revolutions/second is 15 rpm?  $\left(\frac{15 \ revolutions}{1 \ minute}\right) \left(\frac{1 \ minute}{60 \ seconds}\right) = \frac{0.25 \ revolutions}{second} = 0.25 \ rps$ 



$$f = \frac{1}{T}$$
 also written as  $T = \frac{1}{f}$ 

Pay attention to units: s <-> rps and min <-> rpm

Example 1: What is the frequency of something rotating once every 0.2 seconds?

$$f = \frac{1}{T}$$
  $f = \frac{1}{0.2}$   $f = 5 rps$  notice "seconds" -> "rps"

Example 2: What is the period of something rotating at 20 rpm?  $T = \frac{1}{f}$   $T = \frac{1}{20}$  T = 0.05 minutes notice "rpm" -> "minutes"

#### Pay attention to units: s <-> rps and min <-> rpm

Example 3: What is the frequency in Hz of something rotating once every 5 minutes?

 $f = \frac{1}{T}$   $f = \frac{1}{300}$  f = 0.0033 rps notice "seconds" -> "rps"

