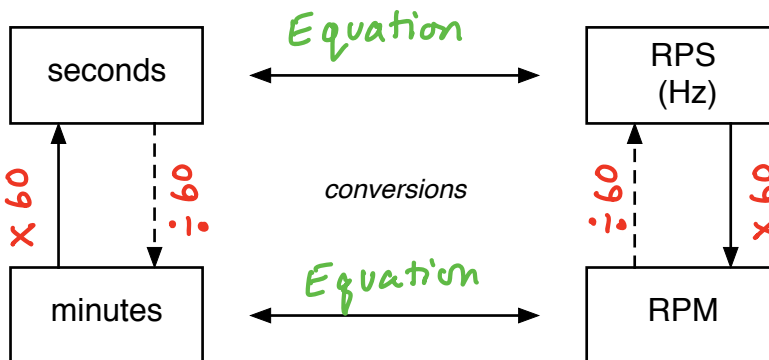NAME: __KEY__

Period & Frequency

Two seemingly simple terms often cause confusion for students because they are very
similar. These are *Period* and *Frequency*. The purpose of this sheet is to give you the
definitions of these terms and get you comfortable recognizing and converting between them.

	Symbol	Defintion	Units
Period	T	The time it takes an object to make exactly 1 rotation/revolution	S, min, hrs – any unit of TIME
Frequency	f	The # of rotations/revolutions an object makes in exactly 1 [unit of time]	rps, Hz, rpm

Period: 1 min = __60__ seconds   &   1 second = __1/60__ minutes

Frequency: 1 rps (Hz) = __60__ rpm   &   1 rpm = __1/60__ rps (Hz)

$$T = \frac{1}{f}$$

Period (T)

$$\frac{time}{revolution}$$

Frequency (f)

$$\frac{revolutions}{time}$$

$$f = \frac{1}{T}$$

Equation

| seconds | | RPS (Hz) |
| minutes | | RPM |

×60   ÷60   conversions   ÷60   ×60

Equation

Period & Frequency

Questions

1. For each of the following, tell whether I am giving you a *period (T)* or a *frequency (f)*:
   a. A car takes 24 seconds to go around a circle once. **T**

   b. A kid is spun around at 3 revolutions per minute. **f**

   c. A washing machine is spinning at 45 rpm. **f**

   d. A cd rotates once every 0.025 seconds. **T**

   e. A wheel goes around at a rate of 3.5 Hz. **f**

2. A runner does 4 laps around a track in 120 seconds.
   a. What is the period of the runner in seconds?

   $120\ s/4\ laps = 30\ s$ for 1 lap   **T = 30 s**

   b. What is the period of the runner in minutes?

   $(30\ s)\left(\frac{1\ min}{60\ s}\right) = \frac{1}{2}\ min$

   remember: 1 Hz = 1 rps

   c. What is the frequency of the runner in Hz?

   $f = \frac{1}{T}$ $f = \frac{1}{30\ s}$ **f = 0.033 Hz**

   d. What is the frequency of the runner in rpm?

   $f = \frac{1}{T}$ $f = \frac{1}{0.5\ min}$ **f = 2 rpm**

3. What is the frequency of a tire that takes 0.025 seconds to rotate once?

   $T = 0.025\ s$ $f = \frac{1}{T} = \frac{1}{0.025}$ **f = 40 Hz**

4. What is the period of a record that spins at 33.3 rpm?

   $f = 33.3\ rpm$ $T = \frac{1}{f}$ $T = \frac{1}{33.3\ rpm}$ **T = 0.03 min**

5. What is the period of something that rotates at 20 Hz?

   $f = 20\ Hz$ $T = \frac{1}{f}$ $T = \frac{1}{20\ Hz}$ **T = 0.05 s**

6. What is the frequency of a kid walking around in a circle once every 5 minutes?

   $T = 5\ min$ $f = \frac{1}{T}$ $f = \frac{1}{5\ min}$ **f = 0.2 rpm**

7. A car takes 330 seconds to make one lap around a track. What is its rpm?

   $T = 330\ s$ $f = ?$ $T = (330\ s)\left(\frac{1\ min}{60\ s}\right) = 5.5\ min$ $f = \frac{1}{T} = \frac{1}{5.5\ min}$ **f = 0.18 rpm**

8. A Merry-go-Round rotates 3.5 times every minute. How many seconds does it take to go around once?

   $f = 3.5\ rpm$ $T = ?$ $T = \frac{1}{f} = \frac{1}{3.5\ rpm}$ $(0.286\ min)\left(\frac{60\ s}{1\ min}\right)$

   $T = 0.286\ min$ **T = 17.1 s**

Answers: 1. a) T   b) f   c) f   d) T   e) f   2. a) 30 s   b) 1/2 min   c) 0.033 Hz
d) 2 rpm   3) 40 Hz   4) 0.03 min   5) 0.05 s   6) 0.2 rpm   7) 0.18 rpm   8) 17.1 s