

What's Going On?

Checking In

Minds on

The Basics

Action!

Bike Tires

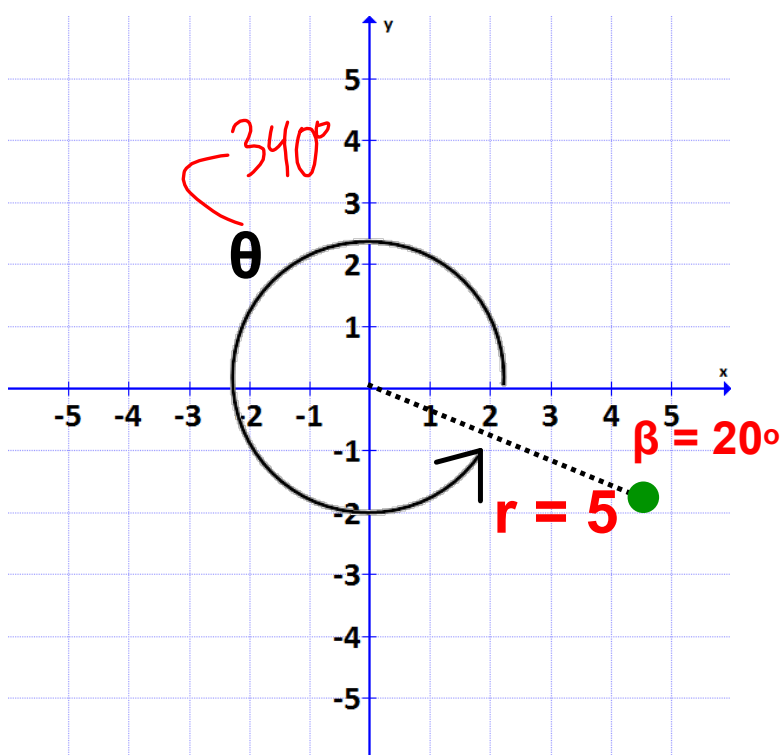
Consolidation

Table Saws

Learning Goal - I will be able to interpret the real-life significance of sinusoidal functions.

Checking In

F.F.M.



Find the exact and approximate coordinates of the point.

$$(x, y)$$

$$\begin{matrix} \swarrow & \searrow \\ r \cos \theta & r \sin \theta \\ (5 \cos 340, 5 \sin 340) \end{matrix}$$

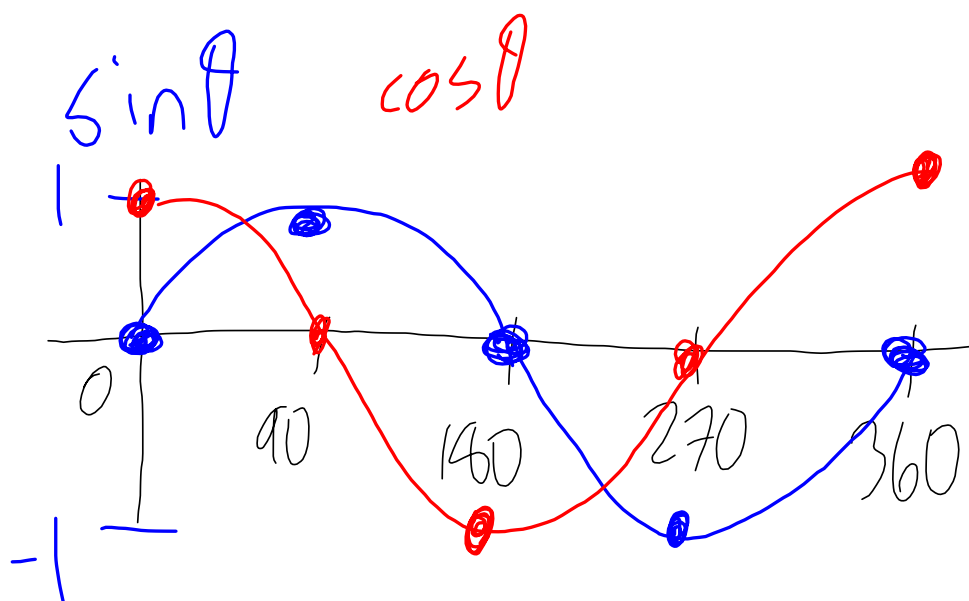
approximate: $(4.7, -1.7)$

Minds on

The Basics

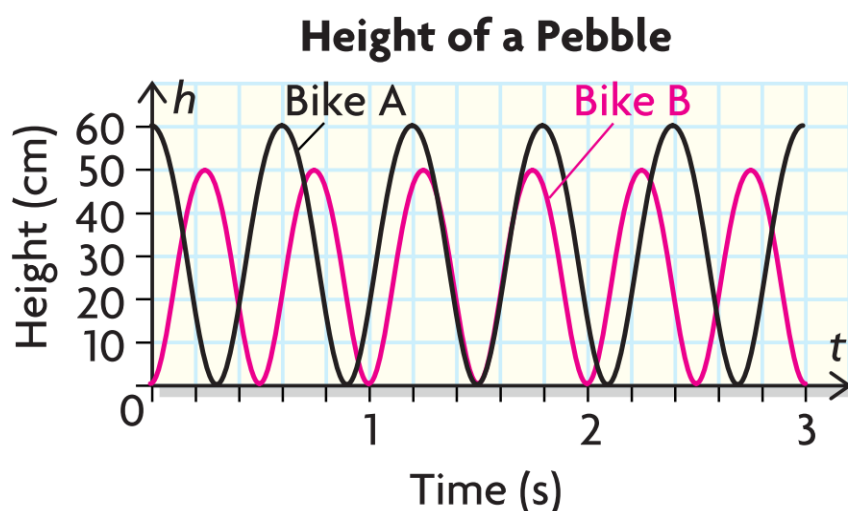
Without peaking, sketch rough graphs of $\sin\theta$ and $\cos\theta$ for θ between 0 and 360.

Include at least 5 points for each.



Action!

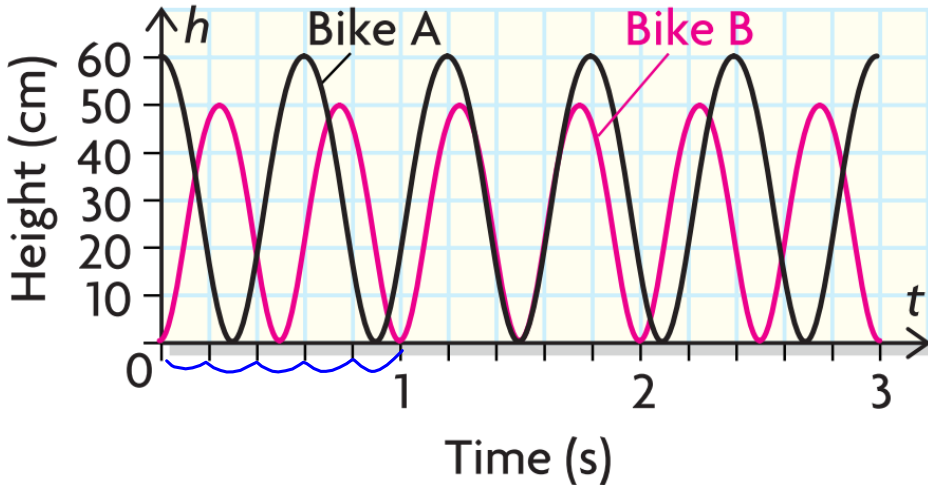
Bike Tires



Allan (Bike A) and Brian (Bike B) were out for a bike ride. Each of them got a pebble stuck in their tire.

The curves in the graph above show the height of the pebble above the ground over time.

Height of a Pebble



1. What is the diameter/radius of Allan's wheel?

60cm
30cm

2. What is the diameter/radius of Brian's wheel?

50cm
25cm

3. How high off the ground is the axle of Allan's wheel?

30cm

4. How high off the ground is the axle of Brian's wheel?

25cm

5. How long does it take Allan's wheel to complete one full revolution?

0.6s

6. How long does it take Brian's wheel to complete one full revolution?

0.5s

amplitude

equation of axis

period



7. How far does Allan's bike travel after one rotation of the wheel? ** circumference of his tire*

$$C = \pi(60) \quad 188.5 \text{ cm}$$

8. How far does Brian's bike travel after one rotation of the wheel?

$$C = \pi(50) \quad 157.1 \text{ cm}$$

9. Who is travelling at a faster speed?

$$S_A = \frac{188.5 \text{ cm}}{0.6 \text{ s}} = 314.2 \text{ cm/s} \quad \left| \quad S_B = \frac{157.1 \text{ cm}}{0.5 \text{ s}} = 314.2 \text{ cm/s}$$

10. Revisit questions 1-6 and identify which unit term each question is addressing.

Allan

$$\text{circumference} = 60\pi \text{ cm}$$

$$\text{time} = 0.6 \text{ s}$$

$$S = \frac{60\pi \text{ cm}}{0.6 \text{ s}}$$

$$S = 100\pi \text{ cm/s}$$

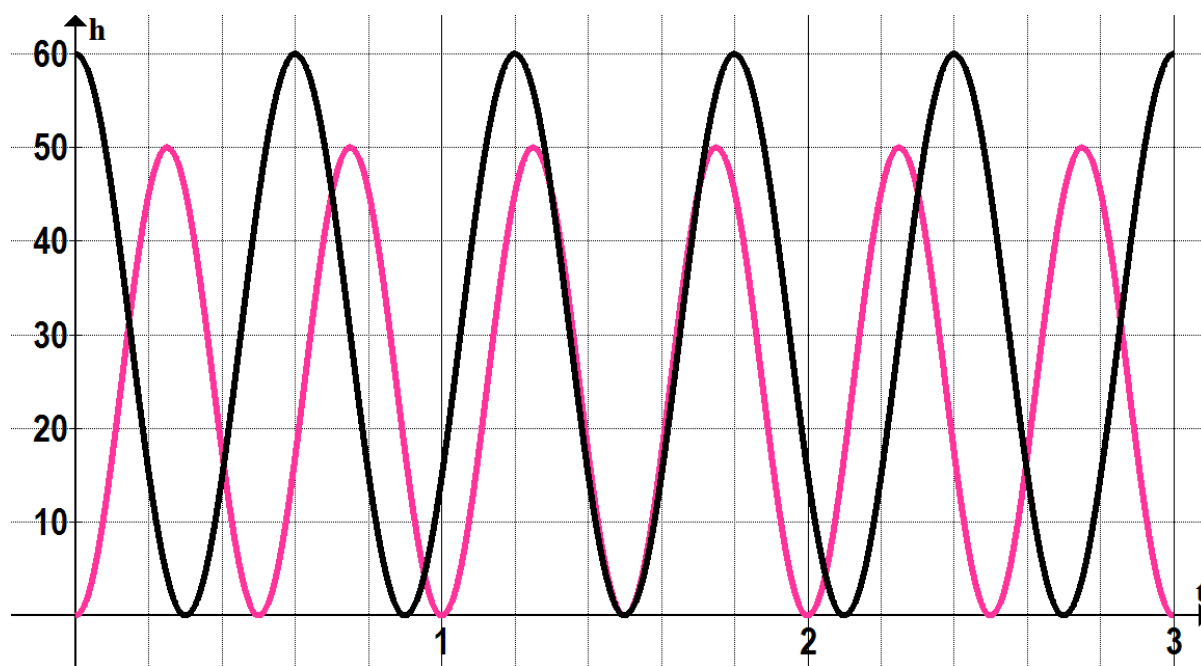
Brian

$$\text{circumference} = 50\pi \text{ cm}$$

$$\text{time} = 0.5 \text{ s}$$

$$S = \frac{50\pi \text{ cm}}{0.5 \text{ s}}$$

$$S = 100\pi \text{ cm/s}$$

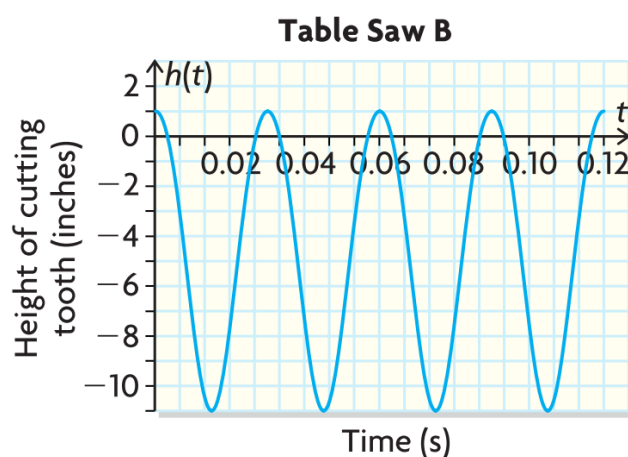
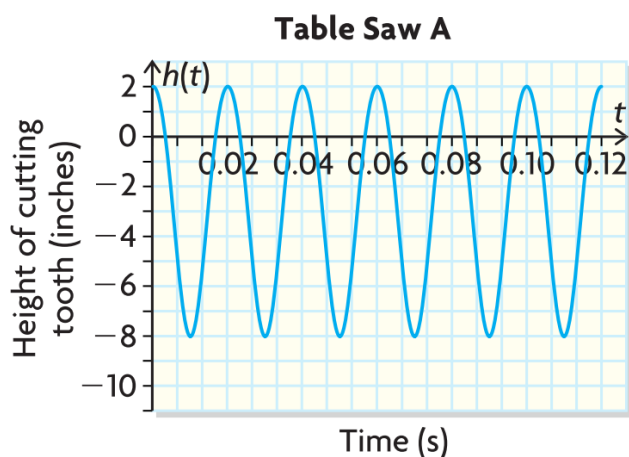


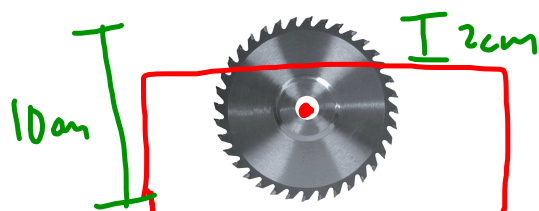
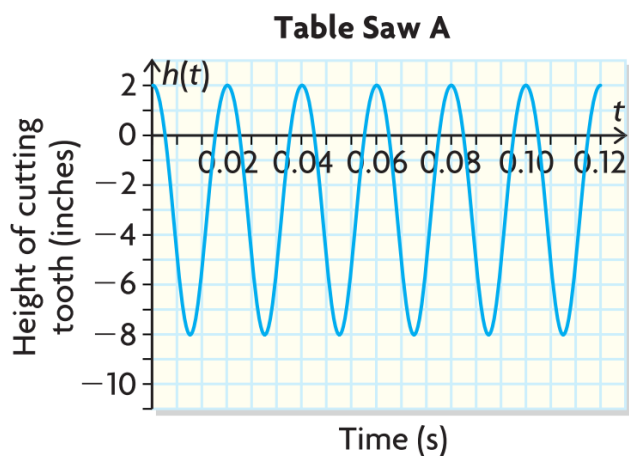
Consolidation

Table Saws

Below are graphs describing the motion of two different table saws.

What information can you gather from the graphs?





Radius of blade is
5 cm.
Blade is 2 cm above
the table.

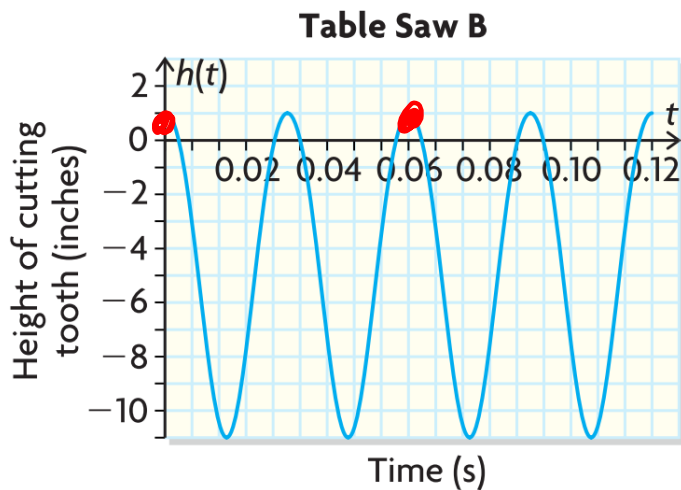
Blade completes one
rotation every 0.02 s

That's 50 rps or 3000 rpm

$$\text{Period} = 0.02 \text{ s}$$

$$\begin{aligned} \text{Equation of Axis: } h &= \frac{2 + (-8)}{2} \\ &= -3 \end{aligned}$$

$$\begin{aligned} \text{Amplitude} &= \frac{2 - (-8)}{2} \\ &= 5 \end{aligned}$$



radius = 6 in.
 cycle takes
 0.03s

2 cycles in 0.06s \Rightarrow 0.03s per cycle

- 33.3 cycles per second

or 2000 rotations per minute

- blade is 1 inch above table

- equation of axis = $\frac{1 + (-11)}{2}$
 $= -5$

- amplitude = 6 in.

- period = 0.03s