

Warm Up

Lucy invested \$6,000 into an account that earns 6% interest compounded continuously. **Approximately** how long will it take for Lucy's investment to be valued at \$25,000?

$$A = Pe^{rt}$$

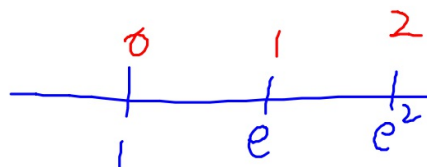
$$\frac{25000}{6000} = \frac{6000e^{0.06t}}{6000}$$

$$4.16 = e^{0.06t}$$

$$\frac{\ln(4.16)}{0.06} = \frac{0.06t}{0.06} \ln e$$

$$t \approx 23.75 \text{ years}$$

$$\ln e = \log_e e = 1$$



Objective: SWBAT transform sine and cosine functions.

Agenda:

- Warm Up
- Notes
- Practice
- Reflection

HW: 13-7G

9-14, 21-26

Vocabulary

Midline: An imaginary line going through the middle of the graph

Amplitude: The distance from the midline to the highest or lowest point on the graph

Period: The interval the graph takes to go one complete cycle

Frequency: The number of cycles the graph does in 2π radians (or 360°)

Notes: Sine & Cosine Functions

$$y = a \sin(b(x - c)) + d$$

frequency: b

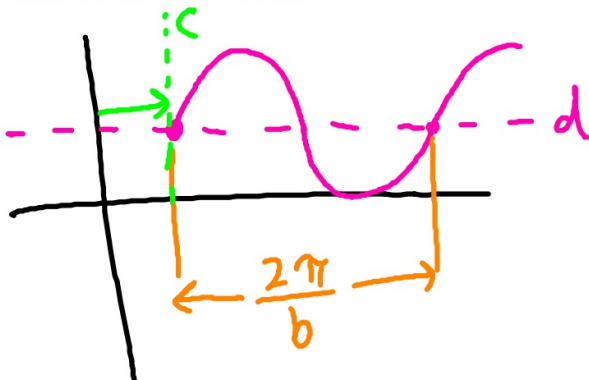
period: $2\pi/b$

amplitude: a

midline: $y = d$

horizontal shift: c

vertical shift: d



$$y = a \cos(b(x - c)) + d$$

frequency: b

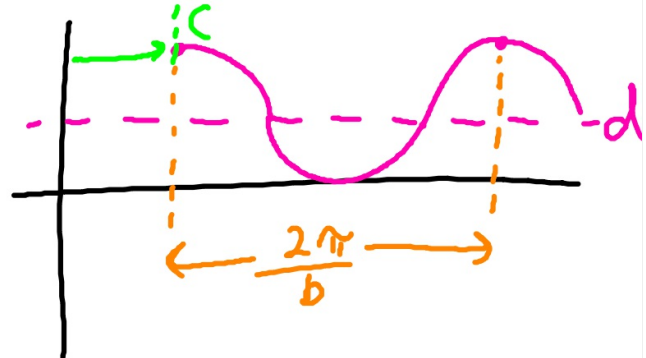
period: $2\pi/b$

amplitude: a

midline: $y = d$

horizontal shift: c

vertical shift: d



Released Items (AFM)

Suppose the function $H(t) = 8.5\sin(0.017t - 1.35) + 12$ models the hours of sunlight for a town in Alaska, where $t = 1$ is the first day of the year. Based on the function, what is the approximate range of daylight hours for the town?

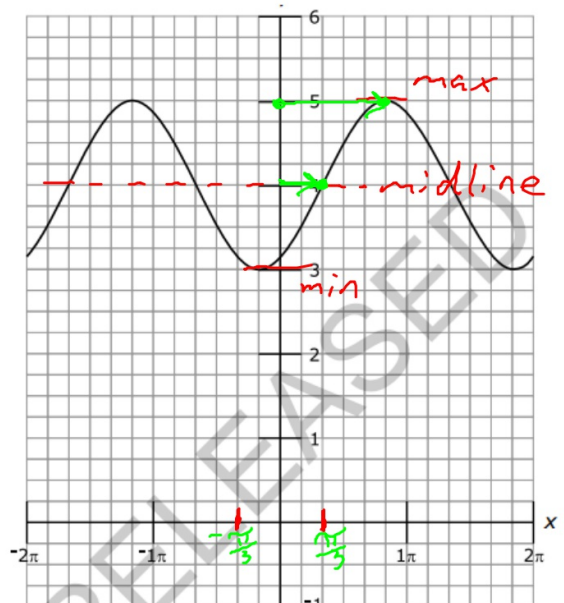
- A 3.5 to 20.5
- B 4 to 20
- C 4.5 to 19.5
- D 5 to 19

↳ lowest to highest

highest: $12 + 8.5 = 20.5$
lowest: $12 - 8.5 = 3.5$

Which function correctly represents the graph below?

- A $y = \sin\left(x - \frac{\pi}{3}\right) + 4$
- B $y = \sin\left(x + \frac{\pi}{3}\right) + 4$
- C $y = \cos\left(x - \frac{\pi}{3}\right) + 4$
- D $y = \cos\left(x + \frac{\pi}{3}\right) + 4$



right $\frac{\pi}{3}$

Which function has an amplitude that is twice the size and a period that is three times the size of the function $y = 3 \cos\left(\frac{x}{4} - 1\right) + 2$?

A $y = 6 \sin\left(\frac{x}{12} - 3\right) + 1$

B $y = \frac{3}{2} \cos\left(\frac{3x}{4} + 1\right) - 3$

C $y = 6 \cos\left(\frac{3x}{4} - 1\right) + 3$

D $y = \frac{3}{2} \sin\left(\frac{x}{12} + 3\right) - 1$

question what is new a + b?	need a = 3 b = 1/4 P = 2π/b	not need cosine d = 2 c = 4
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$$a = 2(3) = 6$$

$$P = 3 \left(\frac{2\pi}{1/4} \right) = 3(2\pi \cdot 4)$$

$$= 24\pi$$

$$P = 24\pi = \frac{2\pi}{b} \rightarrow \frac{b(24\pi)}{24\pi} = \frac{2\pi}{24\pi}$$

$$b = \frac{1}{12}$$

Practice

Graphs of Sine & Cosine Functions

(they only do period and amplitude)

Reflection

How are the transformations similar to those for other functions?