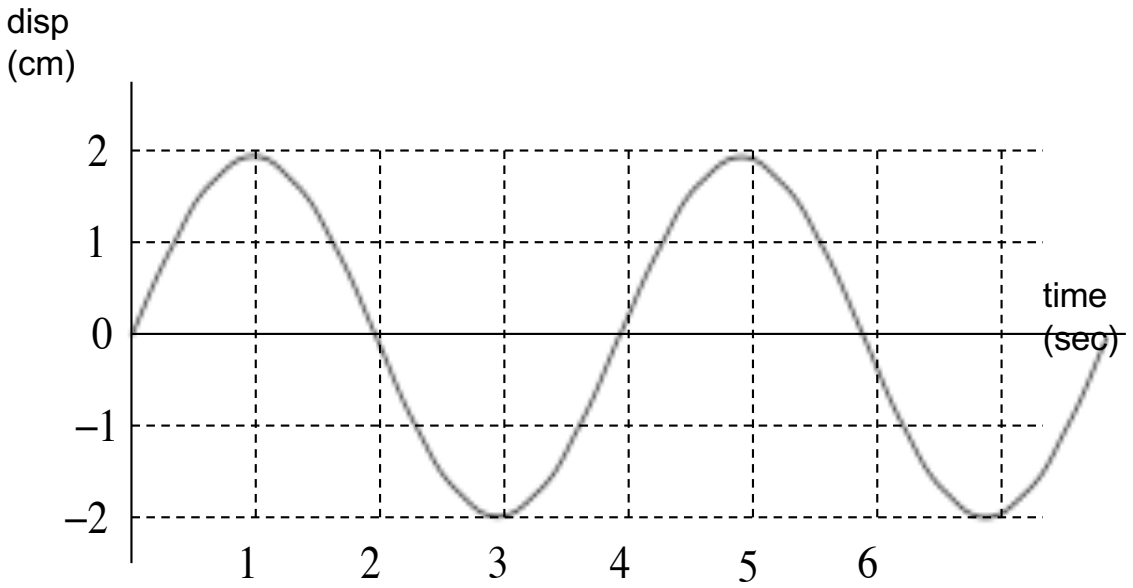
General announcements

Problem 13.42

For the sine wave shown, determine:



a.) amplitude?

b.) period?

c.) angular frequency?

d.) maximum speed?

e.) maximum acceleration?

f.) position as a function of time relationship using a sine function vs. a cosine function?

Answers to previous slide

- (a) 2 cm
- (b) 4 sec
- (c) 1.57 rad/sec
- (d) 3.14 cm/s or 0.0314 m/s
- (e) 4.93 cm/s^2 or 0.0493 m/s^2
- (f) $x(t) = (2\ cm)\sin(1.57t)$ or $x(t) = (2\ cm)\cos(1.57t+1.47)$

More with graphs

What if the x-axis isn't just time, it's ωt?

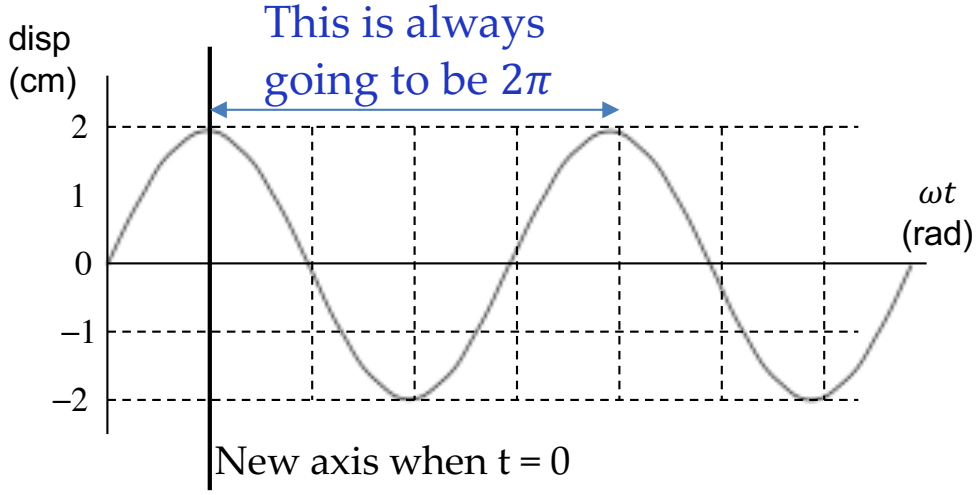
a.) amplitude?

Nothing different; still 2 cm

b.) period?

Can't pull that info

c.) angular frequency?



Now we can't just take the reading from the graph for either the period or the angular frequency because the x axis is ωt, not t. We would need to know something more about period, frequency, or angular frequency to calculate those. This graph can only really be used to extract **amplitude** and **phase shift**.

d.) position as a function of time relationship using a sine function vs. a cosine function?

Use the information above and the phase shift on the graph to derive it, depending on the situation.