

## Popper P38 due by 5/10 at 11:59 pm

1. What is the assumed radius of the track?
  - a. 1
  - b. 2
  - c. 3
2. What is the variable name for the angle in the model?
  - a.  $\theta$
  - b.  $\tau$
  - c.  $\gamma$
3. What is the first order system of differential equations?
  - a. 
$$\begin{pmatrix} u'(t) = -v(t) \\ v'(t) = -9.8 \sin(u(t)) \end{pmatrix}$$
  - b. 
$$\begin{pmatrix} u'(t) = -v(t) \\ v'(t) = 9.8 \sin(u(t)) \end{pmatrix}$$
  - c. 
$$\begin{pmatrix} u'(t) = v(t) \\ v'(t) = -9.8 \sin(u(t)) \end{pmatrix}$$
4. What tool is used to solve the differential equation?
  - a. Geogebra
  - b. Excel
  - c. Winplot

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5. What do I call to the graph with arrows?
  - a. a phase plot
  - b. flow plot
  - c. a flux diagram
6. What does the solution look like in the graph?
  - a. a parabola
  - b. a line
  - c. an ellipse
7. The text file data that is obtained is
  - a. tabbed
  - b. comma separated
  - c. fixed width
8. The plot of  $x$  against  $t$  in Excel looks like
  - a. a cosine function
  - b. a parabola
  - c. an exponential function

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9. What sort of plot is created in Excel?
  - a. bar graph
  - b. xy scatter plot
  - c. vectored plot
10. What does the period of the data appear to be?
  - a. 2.08573
  - b. 2.4152
  - c. There is not period.
11. What color are most of the points in the graph with the yellow dots?
  - a. Red
  - b. Sky blue
  - c. Dark blue
12. What did I name the fourth column of data?
  - a. cart
  - b. movement
  - c. approx

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13. What software is used to animate the motion of the cart?

- a. Winplot
- b. Excel
- c. Geogebra

14. How do I represent the cart in the animation?

- a. as a dot
- b. as a circle of radius  $1/10$
- c. as a circle of radius  $1/20$

15. What is the pen width for the track?

- a. 1
- b. 2
- c. 3

16. What is the pen width for the cart?

- a. 1
- b. 2
- c. 3