In classical mechanics, once the dynamics of a system is understood, we can determine the length of the pendulum from the equation

\[ \frac{d^2 \theta}{dt^2} = \frac{g}{L} \sin \theta - \frac{L}{L} \frac{d^2 \theta}{dt^2} \]

where \( g \) is the acceleration due to gravity, \( L \) is the length of the pendulum, and \( \theta \) is the angle of displacement from the vertical. The period of the pendulum is then given by

\[ T = 2\pi \sqrt{\frac{L}{g}} \]

where \( T \) is the period of oscillation. The equation of motion for a simple pendulum is

\[ \frac{d^2 \theta}{dt^2} + \frac{g}{L} \sin \theta = 0 \]

which describes the motion of the pendulum. If the angle of displacement is small, the equation can be simplified to

\[ \frac{d^2 \theta}{dt^2} + \frac{g}{L} \theta = 0 \]

which is a linear differential equation with harmonic oscillation.

In addition to the classical pendulum, there are many other types of oscillators, such as the spring-mass system, the double pendulum, and the driven pendulum. Each of these systems has its own unique dynamics and behavior.

**Solution:**

From the equation of motion \( \frac{d^2 \theta}{dt^2} + \frac{g}{L} \sin \theta = 0 \), we can determine that the period of oscillation is given by

\[ T = 2\pi \sqrt{\frac{L}{g}} \]

where \( T \) is the period of oscillation, \( L \) is the length of the pendulum, and \( g \) is the acceleration due to gravity.
\[\frac{\mu}{\tau} \frac{\sigma}{\tau} \frac{\gamma}{\tau} \frac{\theta}{\tau} = \frac{x}{\tau} \frac{\theta}{\tau} + \frac{\beta}{\tau} \frac{\gamma}{\tau} \frac{\theta}{\tau} = \frac{x}{\tau} \frac{\theta}{\tau} + \frac{\beta}{\tau} \frac{\gamma}{\tau} \frac{\theta}{\tau} = \gamma\]

Hence, if \(y = \mu\) where \(y\) is the mass of the object, then the equation from the following considerations: If the equation, a and –, as the result, and then -

\[x \frac{\theta}{\tau} - \beta = \gamma \frac{x}{\tau} \frac{\theta}{\tau} = \frac{x}{\tau} \frac{\theta}{\tau} - \beta\]

Hence we obtain the overall desired result. Since both the angular frequency \(\omega\) and the amplitude \(x\) are not

\[\gamma \frac{x}{\tau} \frac{\theta}{\tau} = \frac{x}{\tau} \frac{\theta}{\tau} - \beta\]

If the amplitude \(\frac{x}{\tau} \frac{\theta}{\tau}\) is equivalent to \(y\), then we obtain part of our desired

\[\frac{\mu}{\tau} \frac{\sigma}{\tau} \frac{\gamma}{\tau} \frac{\theta}{\tau} = \left[\left(\frac{y}{\tau} \frac{\theta}{\tau} \frac{\gamma}{\tau} \frac{\theta}{\tau}\right) \cos \left(\frac{y}{\tau} \frac{\theta}{\tau} \frac{\gamma}{\tau} \frac{\theta}{\tau}\right) \sin \left(\frac{y}{\tau} \frac{\theta}{\tau} \frac{\gamma}{\tau} \frac{\theta}{\tau}\right) \right] \frac{\mu}{\tau} \frac{\sigma}{\tau} \frac{\gamma}{\tau} \frac{\theta}{\tau} = \left[\left(\frac{y}{\tau} \frac{\theta}{\tau} \frac{\gamma}{\tau} \frac{\theta}{\tau}\right) \cos \left(\frac{y}{\tau} \frac{\theta}{\tau} \frac{\gamma}{\tau} \frac{\theta}{\tau}\right) \sin \left(\frac{y}{\tau} \frac{\theta}{\tau} \frac{\gamma}{\tau} \frac{\theta}{\tau}\right) \right] = \frac{x}{\tau} \frac{\theta}{\tau} + \frac{\beta}{\tau} \frac{\gamma}{\tau} \frac{\theta}{\tau} = \frac{x}{\tau} \frac{\theta}{\tau} - \beta\]

Hence the acceleration is given by second derivative of the displacement.
We see that \( y = 1 = f \) must be the correct answer.

To determine where the curve crosses the axes, we need to find where the curve crosses the x-axis. When \( y = 0 \), we have \( f(0) = \frac{1}{x^2} + \frac{x}{2} \). Setting this equal to 0, we find that the curve crosses the x-axis at \( x = -1 \).

Similarly, when \( x = 0 \), we have \( f(0) = \frac{1}{x} + x^2 \). Setting this equal to 0, we find that the curve crosses the y-axis at \( y = -1 \).

**Solution:** We look for a curve with a maximum amplitude of 2.

**Plugging:** Together, we can plot the curve as shown.

**Plugging:** The points of maximum amplitude will occur when \( f(x) = 0 \), which is true when \( f(0) = \frac{1}{x^2} + \frac{x}{2} \) or \( f(x) = \frac{x}{2} \). Since the curve will cross the axes when \( y = 0 \), we have \( f(0) = 0 \) and \( f(x) = 0 \).

**Plotting:** The expression we are supposed to plot is:

\[
\frac{1}{x^2} + x^2 = (x + \frac{1}{x} - x^2)^2 \sin(x) = (x^2 + \frac{1}{x} - x^2)^2 \sin(x) = (x^2 + \frac{1}{x} - x^2)^2 \sin(x)
\]

**Plugging:** Draw the curve as a function of \( x \) for a function of \( x \).

**Plotting:** The expression we are supposed to plot is:

\[
\frac{1}{x^2} + x^2 = (x + \frac{1}{x} - x^2)^2 \sin(x) = (x^2 + \frac{1}{x} - x^2)^2 \sin(x) = (x^2 + \frac{1}{x} - x^2)^2 \sin(x)
\]

**Plotting:** The expression we are supposed to plot is:

\[
\frac{1}{x^2} + x^2 = (x + \frac{1}{x} - x^2)^2 \sin(x) = (x^2 + \frac{1}{x} - x^2)^2 \sin(x) = (x^2 + \frac{1}{x} - x^2)^2 \sin(x)
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\]

**Plotting:** The expression we are supposed to plot is:

\[
\frac{1}{x^2} + x^2 = (x + \frac{1}{x} - x^2)^2 \sin(x) = (x^2 + \frac{1}{x} - x^2)^2 \sin(x) = (x^2 + \frac{1}{x} - x^2)^2 \sin(x)
\]
a. Consider, neglecting slope so it is a relative constant. You can just represent the process on your draft graph. In this case, you can find the point where the slope of the graph at a point equals the slope of the tangent at that point. Notice how the slope of the graph at a point equals the slope of the derivative at that point. Notice how the tangent line co-curves with the graph and that the point of tangency is the point where the derivative graphs. You can find the point derivative of an equation by finding the point on the graph where the slope is zero.

SOLUTION:

\[ \frac{dp}{dx} = \frac{d^2p}{dx^2} \]

Remember, second derivative is not a number, but it is easy to calculate in a much easier way. You can easily plot these two functions and quickly see the point where the functions intersect. This is the way to remember this to compare two functions that which is where the function is at a maximum or minimum. The function with the most curvature. High curvature means higher radius. The function with the higher magnitude of second derivative is the function with the highest rate of change. It is helpful to have a sketch of the function and where the derivative is zero where the derivative is positive, and where the derivative is negative. Increasing, decreasing, and relative maximum and minimum values. We want to get some practice in looking at curves and estimating where they are increasing, decreasing, and relative maximum and minimum values. We want to get some practice in looking at curves and estimating where they are increasing, decreasing, and relative maximum and minimum values. We want to get some practice in looking at curves and estimating where they are increasing, decreasing, and relative maximum and minimum values. We want to get some practice in looking at curves and estimating where they are increasing, decreasing, and relative maximum and minimum values. We want to get some practice in looking at curves and estimating where they are increasing, decreasing, and relative maximum and minimum values. We want to get some practice in looking at curves and estimating where they are increasing, decreasing, and relative maximum and minimum values. We want to get some practice in looking at curves and estimating where they are increasing, decreasing, and relative maximum and minimum values.
a. Find the second derivative of the function. Show that the critical points are not local maxima or minima and use the second-derivative test to determine the concavity (or inflection points) at these critical points.

b. Draw a sketch of the function, including the behavior at the critical points and intervals of increasing and decreasing.

c. Use the second derivative to determine the concavity of the function. Identify any inflection points.

7. More Estimating and Drawing Derivatives

SOLUTION:

(a) Below are plotted \( f(x) \) and \( f''(x) \). In order to draw the second derivative, remember the original plot by keeping in mind:

- Where does it change concavity, and where do the critical points occur?
- Where the concave up (second derivative zero) concave up (second derivative negative)
- Where the concave down (second derivative zero) concave down (second derivative positive)

(b) The second derivative shows where the function is increasing or decreasing. The second derivative also helps identify concavity and potential inflection points.
(c) Be the correct answer of the question above.

Part (a) in the previous section asked: (1) \( (\nabla + i)\theta = (\nabla - i)\theta - (i)\theta + \mu \nabla (i)\theta \)

Solution: The second derivative is related to the displacements at a given point, the expression derived in the previous section, and using the expression derived in the previous section.

9. More Approximate Second Derivatives

(1) \( (\nabla + i)\theta = (\nabla - i)\theta - (i)\theta + \mu \nabla (i)\theta \)

Solution: The second derivative is related to the displacements at a given point, the expression derived in the previous section, and using the expression derived in the previous section.

(b) Equilibrium points occur when the derivative of the potential function is zero. If we approach the equilibrium of the object, \( (i)\theta \) is measured at two times to be:

\[ 0 \leq \theta \leq 1.8 \]

The displacement of the object at 10.1 s, which is the following in the sequence to begin the displacement of the object at 10.1 s, is measured at two times to be:

\[ 0 \leq \theta \leq 1.8 \]

(c) Be the correct answer of the question above.