7.6 - Quadratics and Parametrics

* Questions on Problems in Chapter 7 so far

* Making sure your answer makes sense... (what is being asked for...)

* Notes 7.6 : Parametrics Revisited

* Working on Assignment Packet

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Chapter 7 Packet Question

\[ P = 24 \]

\[ A(x) = S(x) + R(x) \]

\[ A(x) = \frac{1}{2}a(\pi r^2) + l \cdot w \]

\[ A(x) = \frac{1}{2}(\pi x^2) + (2x)(12 - x - \frac{\pi x}{2}) \]

\[ 24 = l + w + w + \frac{1}{2}(2\pi r) \]

\[ 24 = 2x + w + w + \pi x \]

\[ = \frac{1}{2}(\pi x^2) + (2x)(12 - x - \frac{\pi x}{2}) \]

\[ A(x) = -\frac{\pi x^2}{2} + 24x - 2x^2 \]
7.6a: Parametrics Revisited

Remember, parametric equations:

express $x$ and $y$ variables in terms of a 3rd variable ($t$)

have their own equation for $x$ and $y$ in terms of the parameter

NOW
we can start to use two parametric equations together to
make a single $x$ and $y$ equation

combine several parametric equations/conditions to become
a single function to maximize/minimize

Some "answers" may require a lot of thought and explanation

Problem 7.15:
a) Find the equation of the line along which particle A moves. Sketch this line
with a labeled starting point and direction of motion.

\[
x = t + 2
\]
\[
-2 - 2
\]
\[
(x-2) = t
\]
\[
y = \frac{1}{2}a + 3
\]
\[
y = \frac{1}{2}(x-2) - 3
\]
\[
y = \frac{1}{2}a(x-2) - 3
\]
\[
y = \frac{1}{2}ax - 4
\]
Problem 7.15:

b) Find the equation of the line along which particle B moves. Sketch this line with a labeled starting point and direction of motion.

\[
\begin{align*}
\frac{x - 12}{-1} &= \frac{y - 6}{-\frac{1}{2}} \\
-\frac{1}{2}x + 6 &= t
\end{align*}
\]

\[
\begin{align*}
\frac{x - 12}{-1} &= \frac{y - 6}{-\frac{1}{2}} \\
\frac{-\frac{1}{2}x + 6 - 6}{-\frac{1}{2}} &= t
\end{align*}
\]

\[
\begin{align*}
y &= 6 - \frac{1}{2}t \\
y &= 6 - \frac{1}{2} \left( -\frac{1}{2}x + 6 \right) \\
y &= 6 + \frac{1}{6}x - 2 \\
y &= \frac{1}{6}x + 4
\end{align*}
\]

Problem 7.15:

c) WHEN is the distance between two points at a minimum

\[
d = \sqrt{(x_B - x_A)^2 + (y_B - y_A)^2}
\]

\[
d(t) = \sqrt{(12 - 2t - (t+2))^2 + (6 - \frac{1}{3}t - (\frac{1}{2}t - 3))^2}
\]

\[
d(t) = \sqrt{(10 - 3t)^2 + (9 - \frac{9}{10}t)^2}
\]

\[
d(t) = \sqrt{100 - 60t + 9t^2 + 81 - 15t + \frac{81}{100}t^2}
\]

\[
d(t) = \sqrt{9\frac{89}{100}t^2 - 75t + 181}
\]
Assignment (Due "Wednesday")

1) Chapter 7 Problems Packet
   a) 7.1 / 7.3 (without g/c) / 7.6
      7.2 / 7.5 / 7.4 / 7.8 / 7.7
      7.9 - 7.13

   b) 7.16 / 7.17
      (check you equation setup with someone before using)

  *) neat, complete, organized, and well labeled