✔ Show first, last and best assignment attempts ✔ Exclude attempts submitted after due date
✔ Show percentages

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Questions	First assignment attempt	Last assignment attempt	Best assignment attempt
Example 5 - 11.1 Example 5	83.33%	83.33%	83.33%
Example 2 - 11.2 Example 2	100.00%	100.00%	100.00%
Example 4 - 11.2 Example 4	100.00%	100.00%	100.00%
Example 6 - 11.2 Example 6	88.89%	88.89%	88.89%
Sec. Ex. 18 - 11.2 Section Exercise 18	94.44%	94.44%	94.44%
Sec. Ex. 18 - Vector-Valued Function Graphs	77.78%	77.78%	77.78%
Sec. Ex. 37 - 11.2 Section Exercise 37	83.33%	83.33%	83.33%
Sec. Ex. 42 - 11.2 Section Exercise 42	66.67%	66.67%	66.67%
Sec. Ex. 37 - Parametric Graphs	52.78%	52.78%	52.78%

Select the correct answer for t such that r(t) and r'(t) are perpendicular.

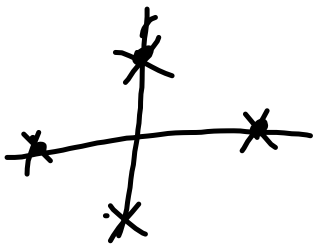
r(t) = $\langle 6\cos t, 2\sin t\rangle$

$\vec{r}'(t) = \langle -6\sin t, 2\cos t\rangle$

$\vec{r}\cdot\vec{r}' = -36\sin t\cos t + 4\sin t\cos t = 0$

$\sin t\cos t = 0$

$\sin t = 0 \quad \cos t = 0$



$\frac{\pi}{2}\cdot n = t$

Choose the sketch of the curve and estimate its arc length.

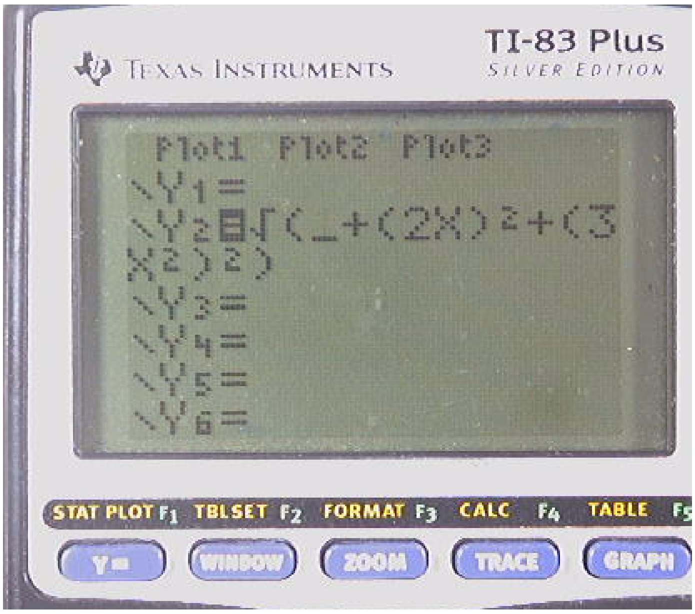
$$\mathbf{r}(t) = \langle t, t^2 - 1, t^3 \rangle, 0 \le t \le 2$$

Arclength

$$\int_{t=0}^{2} |r'(t)| \, dt$$

$$\int_0^2 \sqrt{(x')^2 + (y')^2 + (z')^2} \, dt$$

$$\int_0^2 \sqrt{1 + (2t)^2 + (3t^2)^2} \, dt$$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SILVER EDITION
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\Y2=√(_+(2X)²+(3
X²)²)
\Y3=
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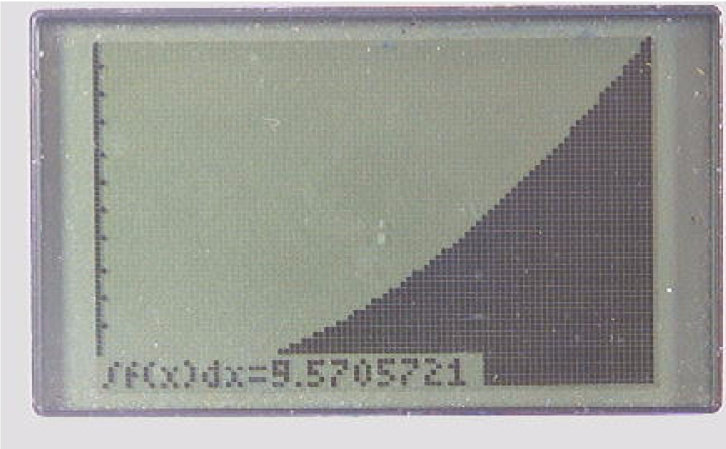
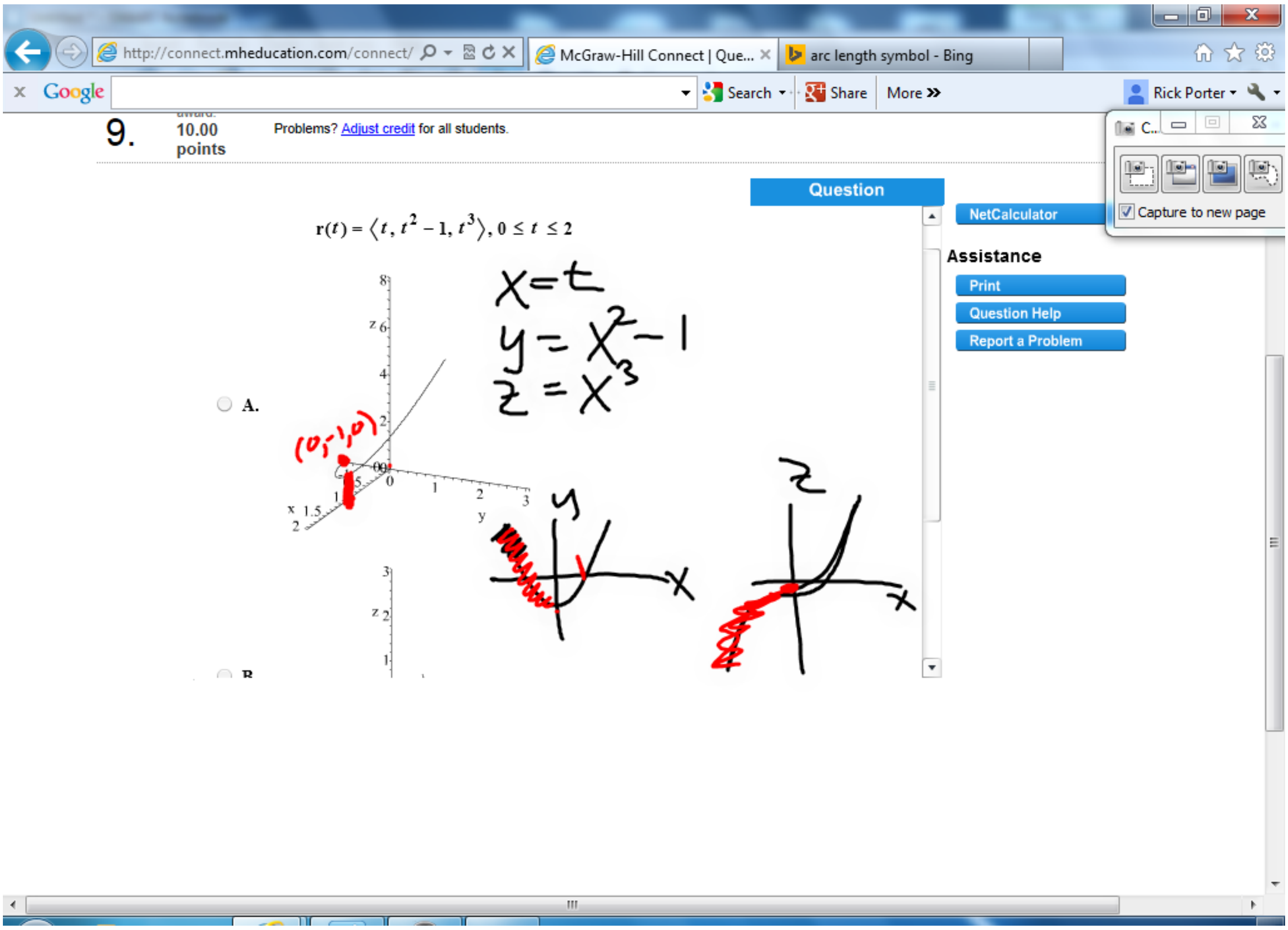

∫f(x)dx=9.5705721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Question
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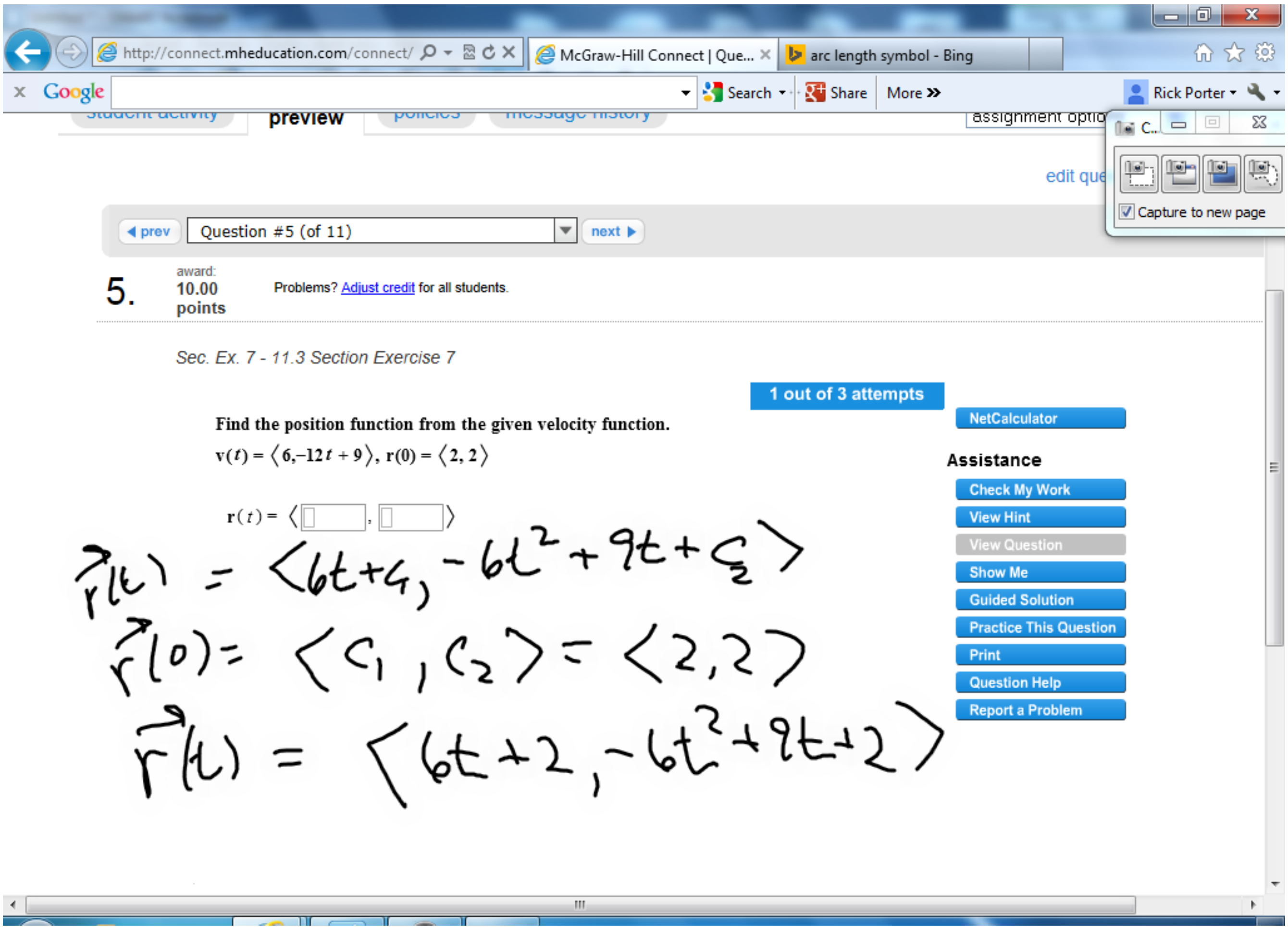
Report a Problem
r(t) = ⟨t, t^2 − 1, t^3⟩, 0 ≤ t ≤ 2
A.
x=t
y=x^2−1
z=x^3
(0,-1,0)
y
x
z
x

Position $\vec{r}(t)$

velocity $\vec{r}'(t) = \vec{v}(t)$

acceleration $\vec{r}''(t) = \vec{a}(t)$

Speed = $|\vec{v}(t)|$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Sec. Ex. 7 - 11.3 Section Exercise 7
1 out of 3 attempts
NetCalculator
Find the position function from the given velocity function.
v(t) = ⟨6,−12t + 9⟩, r(0) = ⟨2, 2⟩
Assistance
Check My Work
View Hint
View Question
Show Me
Guided Solution
Practice This Question
Print
Question Help
Report a Problem
r(t) = ⟨ , ⟩
$\vec{r}(t) = \langle 6t+c_1, -6t^2+9t+c_2 \rangle$
$\vec{r}(0) = \langle c_1, c_2 \rangle = \langle 2,2 \rangle$
$\vec{r}(t) = \langle 6t+2, -6t^2+9t+2 \rangle$


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American Honors at Mercer Appeals to Many ...more
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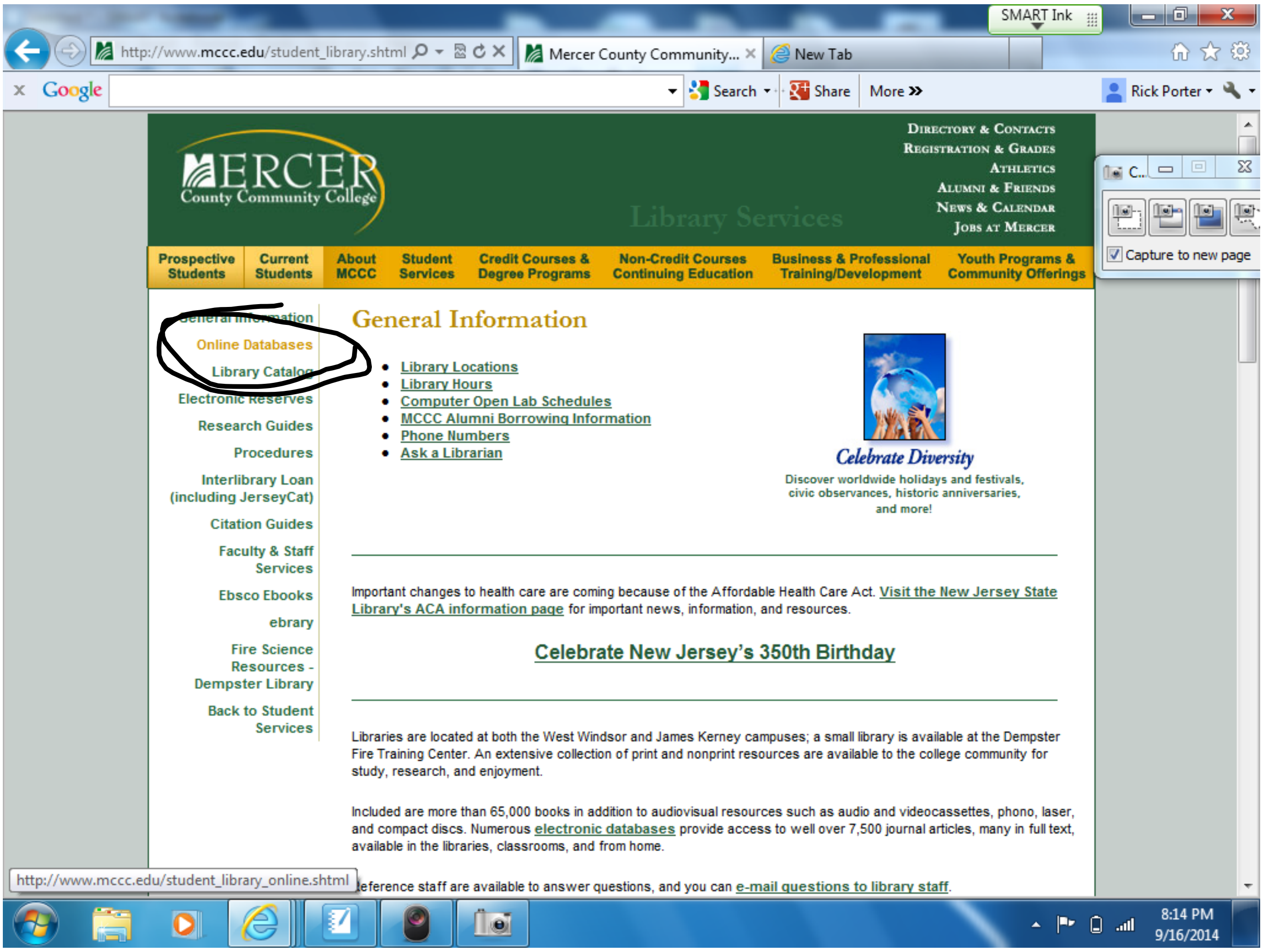
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Important changes to health care are coming because of the Affordable Health Care Act. Visit the New Jersey State Library's ACA information page for important news, information, and resources.
Celebrate New Jersey's 350th Birthday
Libraries are located at both the West Windsor and James Kerney campuses; a small library is available at the Dempster Fire Training Center. An extensive collection of print and nonprint resources are available to the college community for study, research, and enjoyment.
Included are more than 65,000 books in addition to audiovisual resources such as audio and videocassettes, phono, laser, and compact discs. Numerous electronic databases provide access to well over 7,500 journal articles, many in full text, available in the libraries, classrooms, and from home.
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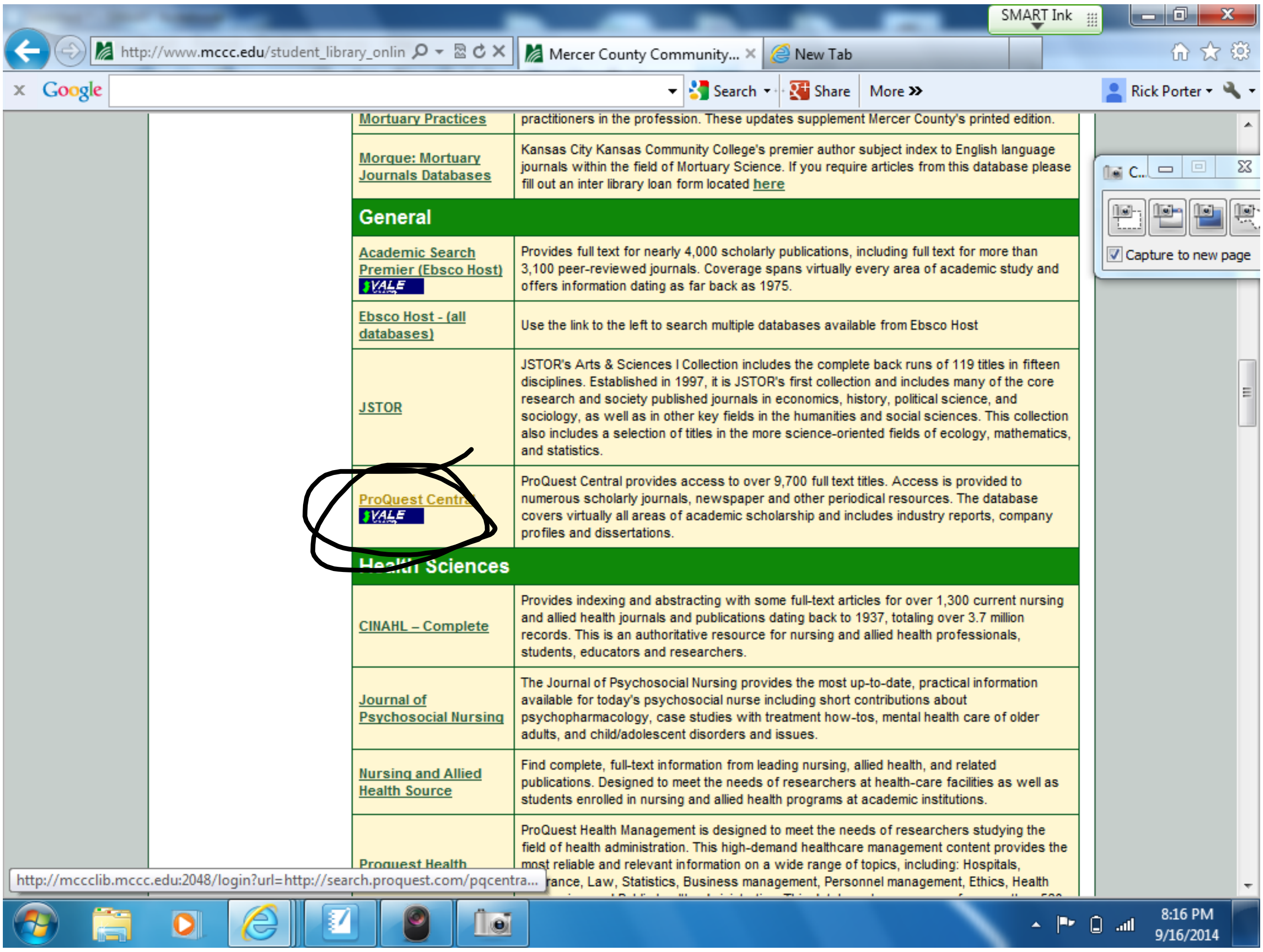
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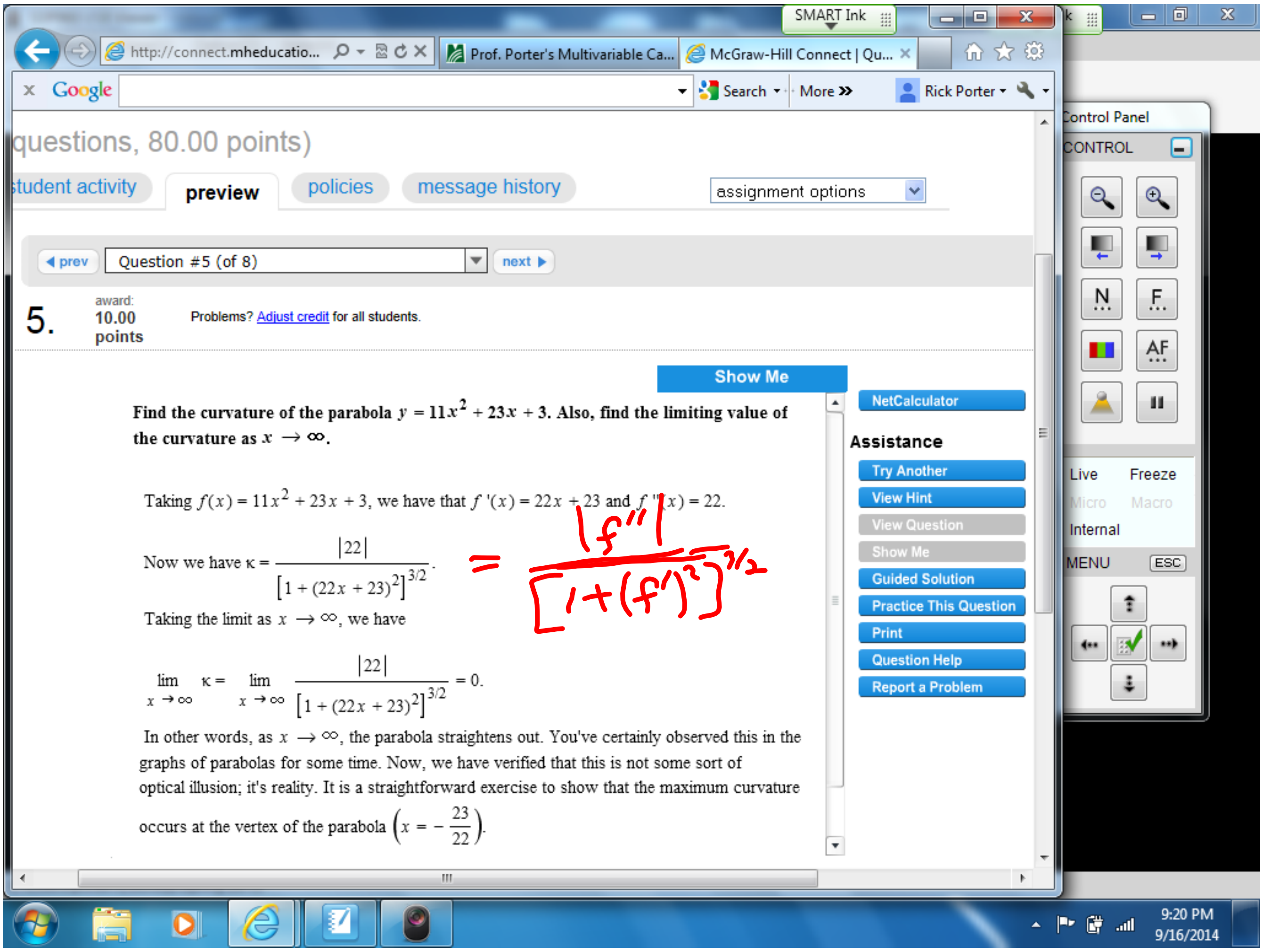
Find

$\overrightarrow{v(t)}$ and units

$\overrightarrow{a(t)}$ and units

and

average speed as archlenth/time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Find the curvature of the parabola $y = 11x^2 + 23x + 3$. Also, find the limiting value of the curvature as $x \to \infty$.
Taking $f(x) = 11x^2 + 23x + 3$, we have that $f'(x) = 22x + 23$ and $f''(x) = 22$.
Now we have $\kappa = \frac{|22|}{\left[1 + (22x + 23)^2\right]^{3/2}}$.
$= \frac{|f''|}{\left[1+(f')^2\right]^{3/2}}$
Taking the limit as $x \to \infty$, we have
$\lim_{x \to \infty} \kappa = \lim_{x \to \infty} \frac{|22|}{\left[1 + (22x + 23)^2\right]^{3/2}} = 0.$
In other words, as $x \to \infty$, the parabola straightens out. You've certainly observed this in the graphs of parabolas for some time. Now, we have verified that this is not some sort of optical illusion; it's reality. It is a straightforward exercise to show that the maximum curvature occurs at the vertex of the parabola $\left(x = -\frac{23}{22}\right)$.
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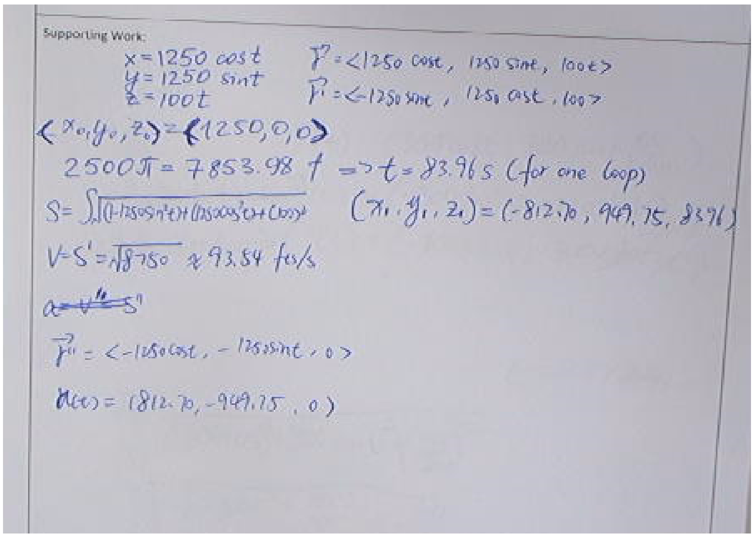


Supporting Work:

$x = 1250\cos t$ $\vec{r} = \langle 1250\cos t, 1250\sin t, 100t \rangle$

$y = 1250\sin t$ $\vec{r}' = \langle -1250\sin t, 1250\cos t, 100 \rangle$

$z = 100t$

$\langle x_0, y_0, z_0 \rangle = \langle 1250, 0, 0 \rangle$

$2500\pi = 7853.98$ ft $\Rightarrow t = 83.96$ s (for one loop)

$S = \int \sqrt{(-1250\sin t)^2 + (1250\cos t)^2 + (100)^2}$ $(x_1, y_1, z_1) = (-812.70, 949.75, 8396)$

$V = S' = \sqrt{8750} \approx 93.54$ ft/s

$a = S''$

$\vec{r}'' = \langle -1250\cos t, -1250\sin t, 0 \rangle$

$a(t) = (812.70, -949.75, 0)$

Supporting Work:

$x = 300\cos t$

$y = 300\sin t$

$z = \frac{10t}{2\pi}$

$\vec{r}(t) = (300\cos t, 300\sin t, \frac{10t}{2\pi})$

(feet/min) velocity $\rightarrow \vec{r}'(t) = (-300\sin t, 300\cos t, \frac{10}{2\pi})$

(feet/min²) acceleration $\rightarrow \vec{r}''(t) = (-300\cos t, -300\sin t, 0)$

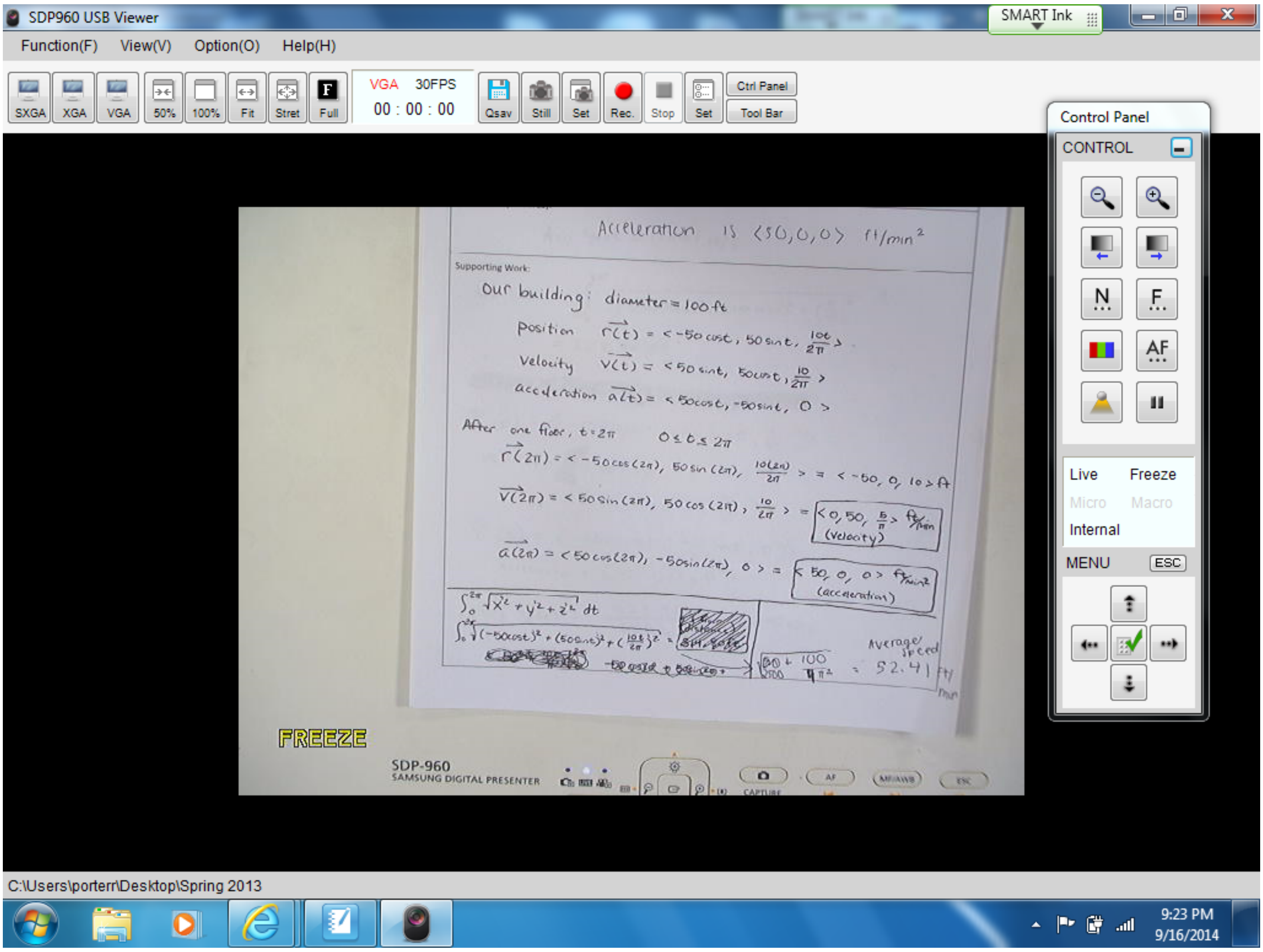
$t = 2\pi/\text{min}$

$$\int_0^{2\pi} \sqrt{(300\cos t)^2 + (300\sin t)^2 + \left(\frac{10t}{2\pi}\right)^2}$$

$$\int_0^{2\pi} \sqrt{300^2 + \frac{100t^2}{4\pi^2}}\, dt$$

$$\sqrt{90000 + \frac{100(2\pi)^2}{4\pi^2}}\Big|_0^{2\pi} = \frac{1885.3046}{2\pi}$$

$\frac{\text{arc lenght}}{\text{time}} \rightarrow 300 \frac{ft}{min}$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VGA 30FPS
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Ctrl Panel
Tool Bar
Control Panel
CONTROL
Live Freeze
Micro Macro
Internal
MENU ESC
Acceleration is <50,0,0> ft/min²
Supporting Work:
Our building: diameter = 100 ft
Position r(t) = <-50 cost, 50 sint, 10t/2π>
Velocity V(t) = <50 sint, 50cost, 10/2π>
acceleration a(t) = <50cost, -50sint, 0>
After one floor, t=2π 0 ≤ t ≤ 2π
r(2π) = <-50cos(2π), 50sin(2π), 10(2π)/2π> = <-50, 0, 10> ft
V(2π) = <50sin(2π), 50cos(2π), 10/2π> = <0, 50, 5/π> ft/min (Velocity)
a(2π) = <50cos(2π), -50sin(2π), 0> = <50, 0, 0> ft/min² (acceleration)
Average speed = 52.41 ft/min
FREEZE
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Conclusion (in words):

Avg Speed = 1.047 ft/s

Supporting Work:

Arc Length = $\int_0^{2\pi} \sqrt{(-100\sin t)^2 + (100\cos t)^2 + \left(\frac{5}{\pi}\right)^2}$

$= 628.40$ ft

$\vec{r}'(t) = \langle -100\sin t, 100\cos t, \frac{5}{\pi} \rangle$

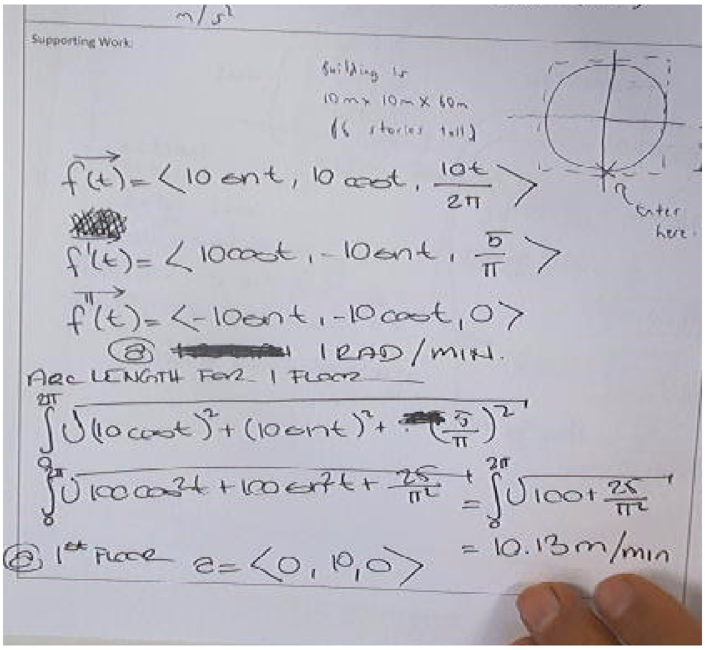
velocity = $\vec{r}'(t)$

$= \langle 0, 100, \frac{5}{\pi} \rangle$

$\vec{r}''(t) = \langle -100\cos t, -100\sin t, 0 \rangle$

acceleration = $\langle -100, 0, 0 \rangle$

Avg Speed = $\frac{628.40 \text{ ft}}{600 \text{ seconds}} = 1.047$ ft/s



m/s²

Supporting Work:

Building is
10m x 10m x 60m
(15 stories tall)

$\vec{f(t)} = \langle 10 \sin t, 10 \cos t, \frac{10t}{2\pi} \rangle$

$\vec{f'(t)} = \langle 10 \cos t, -10 \sin t, \frac{5}{\pi} \rangle$

$\vec{f''(t)} = \langle -10 \sin t, -10 \cos t, 0 \rangle$

⑧ [redacted] 1 RAD/MIN.

ARC LENGTH FOR 1 FLOOR

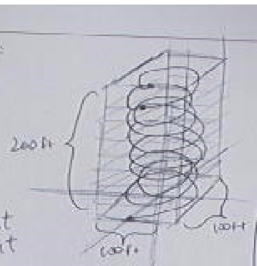
$\int_0^{2\pi} \sqrt{(10 \cos t)^2 + (10 \sin t)^2 + \left(\frac{5}{\pi}\right)^2}$

$\int_0^{2\pi} \sqrt{100 \cos^2 t + 100 \sin^2 t + \frac{25}{\pi^2}} = \int_0^{2\pi} \sqrt{100 + \frac{25}{\pi^2}}$

$= 10.13$ m/min

⑧ 1st Floor $a = \langle 0, 10, 0 \rangle$

Supporting Work:



$x = 50\cos t$

$y = 50\sin t$

$z = \frac{10t}{2\pi} = 200 \; , \; t = 40\pi$

$\vec{r}(t) = \langle 50\cos t, 50\sin t, \frac{10t}{2\pi} \rangle$

$\vec{v}(t) = \vec{r}\,'(t) = \langle -50\sin t, 50\cos t, \frac{10}{2\pi} \rangle$

$\vec{a}(t) = \vec{r}\,''(t) = \langle -50\cos t, -50\sin t, 0 \rangle$

$\int_0^{40\pi} \sqrt{2500 + \frac{100}{4\pi^2}}\, dt = 6286.3676 \text{ ft}$

$t = 2\pi$

$r'(t) = v(t) =$

$v(2\pi) = \langle 0, 50, 1.6 \rangle$

$a(2\pi) = \langle 50, 0, 0 \rangle$

$\int_0^{2\pi} \sqrt{2500 + \frac{10}{4\pi^2}} = 314.31838$

Average Speed $= \frac{S}{2\pi}$

$= \boxed{50.03 \text{ ft/min}}$

$|\vec{v}(2\pi)| = \sqrt{50^2 + 1.6^2}$

$= \boxed{50.03 \text{ ft/min}}$

$|\vec{a}(2\pi)| = \sqrt{-50^2}$

$= \boxed{50 \text{ ft/min}}$

hw2

A stationary merry–go–round of radius 9 feet is started in motion by a push consisting of a force of 18 pounds on the outside edge, tangent to the circular edge of the merry–go–round, for 1 second. The moment of inertia of the merry–go–round is $I = 81$. Find the resulting angular velocity of the merry–go–round.

We first compute the torque of the push. The force is applied 9 feet from the center of rotation, so that the torque has magnitude

τ = (Force)(Distance from axis of rotation) = (18)(9) = 162 foot–pounds.

From $\tau = I\alpha$ we have

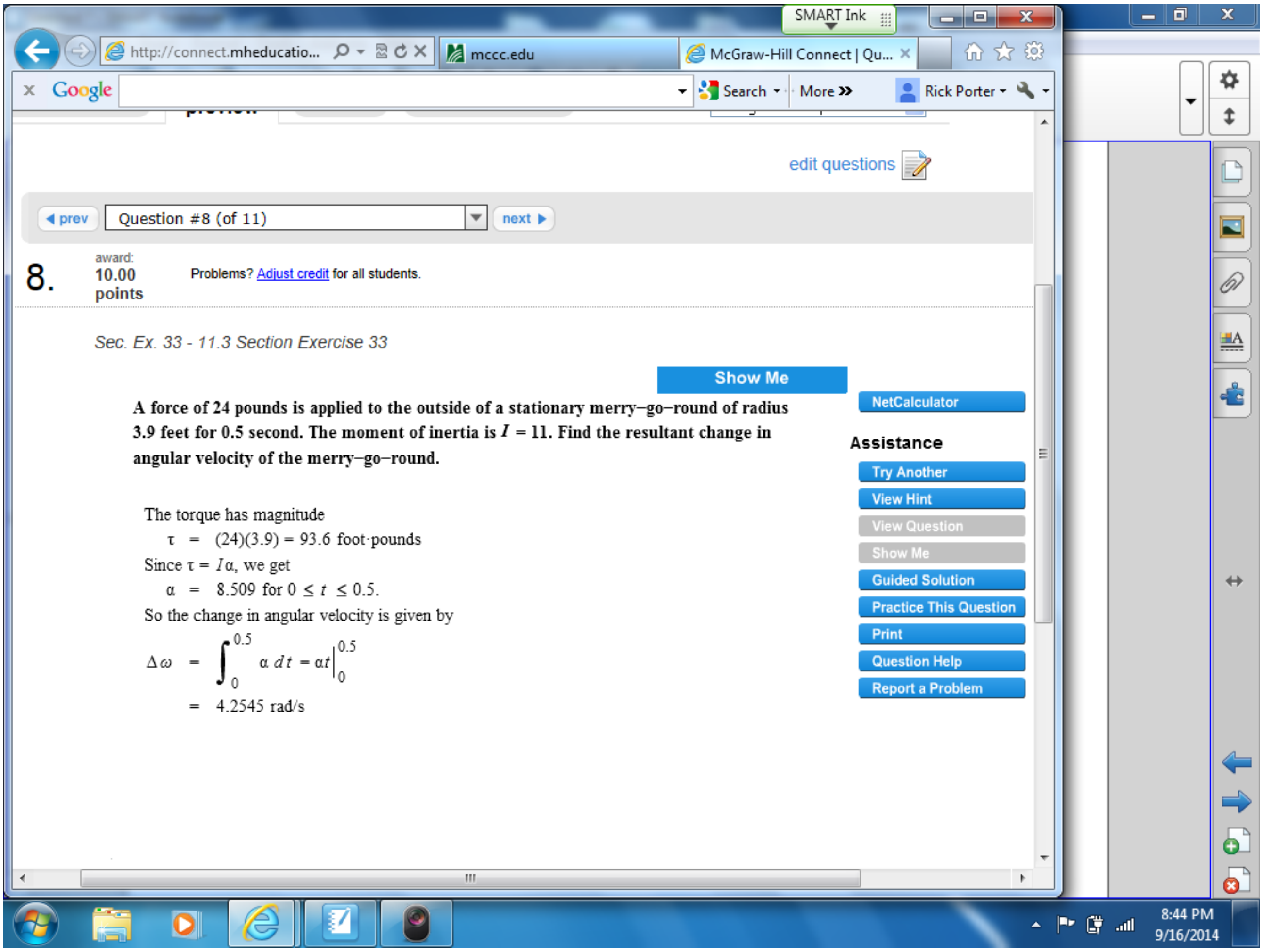
$$162 = 81\alpha, \text{ so that } \alpha = 2.$$

Since the force is applied for one second, this equation holds for $0 \le t \le 1$. Integrating both sides of the equation $\omega' = \alpha$ from $t = 0$ to $t = 1$,

we have by the Fundamental Theorem of Calculus that

$$\omega(1) - \omega(0) = \int_0^1 \alpha \, dt = \int_0^1 2 \, dt = 2.$$

If the merry–go–round is initially stationary, then $\omega(0) = 0$ and $\omega(1) = 2$ rad/s.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Sec. Ex. 33 - 11.3 Section Exercise 33
Show Me
A force of 24 pounds is applied to the outside of a stationary merry–go–round of radius 3.9 feet for 0.5 second. The moment of inertia is I = 11. Find the resultant change in angular velocity of the merry–go–round.
The torque has magnitude
τ = (24)(3.9) = 93.6 foot·pounds
Since τ = Iα, we get
α = 8.509 for 0 ≤ t ≤ 0.5.
So the change in angular velocity is given by
Δω = ∫ α dt = αt
= 4.2545 rad/s
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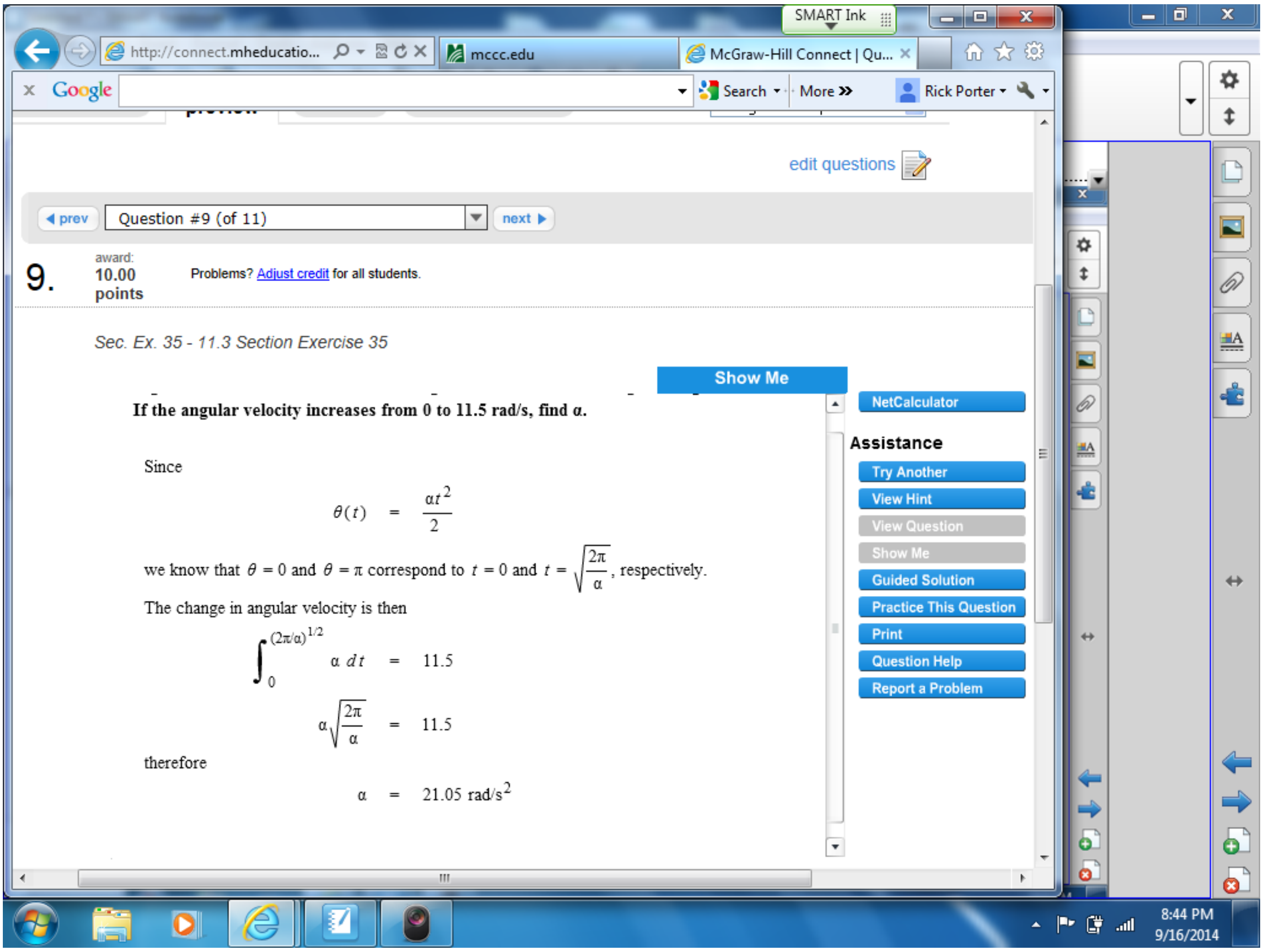
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Sec. Ex. 35 - 11.3 Section Exercise 35
Show Me
If the angular velocity increases from 0 to 11.5 rad/s, find α.
Since
$\theta(t) = \frac{\alpha t^2}{2}$
we know that $\theta = 0$ and $\theta = \pi$ correspond to $t = 0$ and $t = \sqrt{\frac{2\pi}{\alpha}}$, respectively.
The change in angular velocity is then
$\int_0^{(2\pi/\alpha)^{1/2}} \alpha\, dt = 11.5$
$\alpha\sqrt{\frac{2\pi}{\alpha}} = 11.5$
therefore
$\alpha = 21.05\ \text{rad/s}^2$
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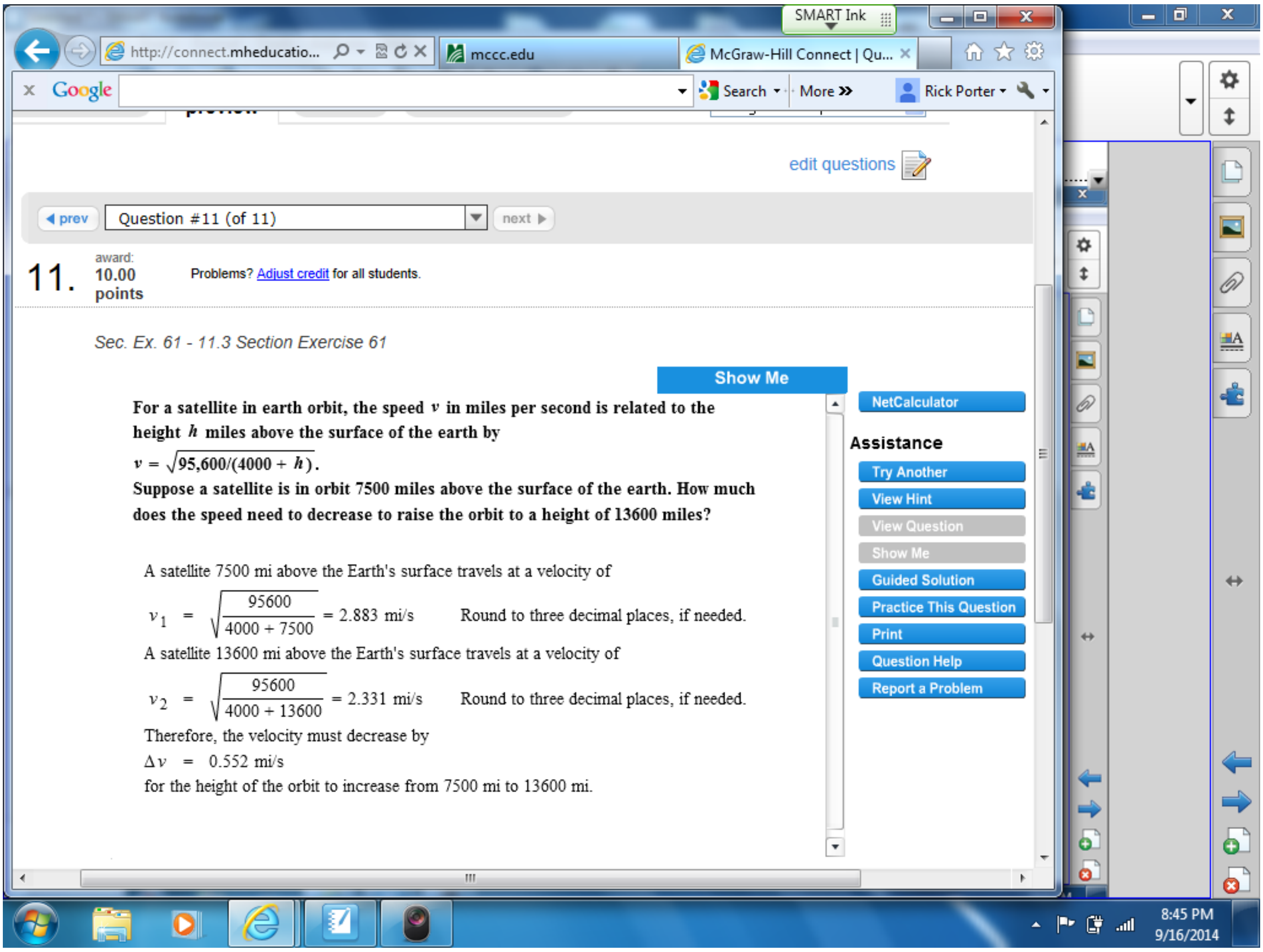

edit questions

prev Question #11 (of 11) next

11. award: 10.00 points

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Sec. Ex. 61 - 11.3 Section Exercise 61

Show Me

For a satellite in earth orbit, the speed v in miles per second is related to the height h miles above the surface of the earth by

$$v = \sqrt{95{,}600/(4000 + h)}.$$

Suppose a satellite is in orbit 7500 miles above the surface of the earth. How much does the speed need to decrease to raise the orbit to a height of 13600 miles?

A satellite 7500 mi above the Earth's surface travels at a velocity of

$$v_1 = \sqrt{\frac{95600}{4000 + 7500}} = 2.883 \text{ mi/s}$$ Round to three decimal places, if needed.

A satellite 13600 mi above the Earth's surface travels at a velocity of

$$v_2 = \sqrt{\frac{95600}{4000 + 13600}} = 2.331 \text{ mi/s}$$ Round to three decimal places, if needed.

Therefore, the velocity must decrease by

$\Delta v = 0.552$ mi/s

for the height of the orbit to increase from 7500 mi to 13600 mi.

NetCalculator

Assistance

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