### Quiz Week 2 Results

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sec. Ex. 43 - 10.4 Section Exercise 43</td>
<td>16.67%</td>
</tr>
<tr>
<td>Example 9 - 10.5 Example 9</td>
<td>77.78%</td>
</tr>
<tr>
<td>Sec. Ex. 5a - 10.5 Section Exercise 5a</td>
<td>83.33%</td>
</tr>
<tr>
<td>Sec. Ex. 9a - Vectors</td>
<td>83.33%</td>
</tr>
<tr>
<td>Sec. Ex. 39 - 10.5 Section Exercise 39</td>
<td>83.33%</td>
</tr>
<tr>
<td>Example 1 - 10.6 Example 1</td>
<td>88.89%</td>
</tr>
<tr>
<td>Example 3 - 10.6 Example 3</td>
<td>100.00%</td>
</tr>
<tr>
<td>Example 6 - 10.6 Example 6</td>
<td>88.89%</td>
</tr>
<tr>
<td>Example 8 - 10.6 Example 8</td>
<td>94.44%</td>
</tr>
<tr>
<td>Sec. Ex. 55 - 10.6 Section Exercise 55</td>
<td>77.78%</td>
</tr>
</tbody>
</table>
Date: 9/9/14

Independent Variable (x-axis):

Dependent Variable (y-axis):

Conclusion (in words):
The amount of gold needed to make the ruling of the spiral stair-case in 1 ft is 62.86 ft.

Supporting Work:

\[ x^2 + y^2 = r^2 = 2 \times 10^6 \]
\[ x = 50 \text{ cm} \]
\[ y = 50 \text{ cm} \]
\[ r = \frac{25}{2} \text{ cm} \]

\[ r'(t) = (50 \cos t, 50 \sin t, \frac{100}{t}) \]

\[ z = 2 \times 10^6 \text{ cm} \]
\[ \omega = 10^6 \text{ m/s} \]

\[ \text{arc length} = \int_0^{2 \pi} \sqrt{2 \times 10^6 + \left(\frac{100}{t^2}\right)^2} \, dt \]

\[ = 62.86 \text{ ft of gold ruling} \]
Please round your answer to three decimals and remember answer is in radians.

Use the cross product to determine the angle between \( \mathbf{a} = 4\mathbf{i} + 9\mathbf{k} \) and \( \mathbf{b} = 7\mathbf{j} + 6\mathbf{k} \).

Your Answer:

\[
\begin{vmatrix}
4 & 0 & 9 \\
0 & 7 & 5 \\
9 & 6 & 0
\end{vmatrix} = \langle 63, -20, 28 \rangle
\]
Find the parametric equations for the line passing through \((3, 1, 2)\) and normal to the
plane \(6x - 4y + 2z = 10\).

\[
\mathbf{r} = \langle 6, -4, 4 \rangle \\
\langle 3, 1, 2 \rangle + \langle 6, -4, 4 \rangle t
\]

\[
x = 3 + 6t \\
y = 1 - 4t \\
z = 2 + 4t
\]
Find parametric equations for the surface $z = 7 + 4x^2 + 4y^2$.

- A. $z = \frac{1}{7} + s^2$, $x = \frac{1}{2} \cos t$, and $y = \frac{1}{2} s \sin t$
- B. $z = \frac{1}{7} + s^2$, $x = \frac{1}{2} \cos t$, and $y = \frac{1}{4} s \sin t$
- C. $z = 7 + s^2$, $x = \frac{1}{2} s \cos t$, and $y = \frac{1}{2} s \sin t$
- D. $z = 7 + s^2$, $x = \frac{1}{4} s \cos t$, and $y = \frac{1}{4} s \sin t$
Match the vector-valued function

\[ f(t) = \langle t \cos t, t \sin t, t \rangle \]

with the corresponding computer-generated graph.

\[ x^2 + y^2 = t^2 \cos^2 t + t^2 \sin^2 t = t^2 (\cos^2 t + \sin^2 t) = t^2 \]

\[ x^2 + y^2 = t^2 \]

\[ z = t \]
3. \[ x^2 + y^2 = 3^2 \]
\[ r = 3 \]
\[ s = r^2 \]
\[ t = 0 \]
\[ r(0) = (3, 0, 0) \]

A. \[ r(t) = (3 \cos t, 3 \sin t, t) \]
7. \[
\begin{align*}
\mathbf{e} \cdot (\mathbf{b} - 4\mathbf{e}^2) \\
x &= z = y \\
2 = b - 4y^2
\end{align*}
\]

Options:
- A.
- C.
- D.
9. Which graph matches the vector-valued function.

\[ r(t) = (\cos t^3, t, t) \]

A. B.
Which graph matches the vector-valued function.

\[ r(t) = (\cos t^3, t, t) \]

\[ y = \cos(x^2) \]
11. Points

Problem: Adjust credit for all students.

\[ \mathbf{r}(t) = (-\sin t, \cos t, \cos t - \sin t) \]

\[ s = \int_{0}^{\pi} \sqrt{1 + (\cos t - \sin t)^2} \, dt \approx 8.74 \]

\[ s = \sum_{n=1}^{\infty} \left( \sqrt{(x_n - x_{n-1})^2 + (y_n - y_{n-1})^2} \right) \]
12. 

Points:

Problem: Adjust credit for all students.

Given:

\[ r(t) = \langle x \sin t, x \cos t, -16 \sin 16t \rangle \]

Find the arc length of the curve from \( t = 0 \) to \( t = 4 \):

\[ s = \int_0^4 \sqrt{x^2 + (-16 \sin 16t)^2} \, dt \]

\[ s = 43.37 \]
13. \[ \int_0^2 \sqrt{4t^2 + 4 + 4t^2} \, dt = \pi \]
\[ r(t) = \langle 2t, 2, 2t \rangle \]
\[ s = \int_0^2 \sqrt{4t^2 + 4 + 4t^2} \, dt = 7.23 \]
September 9, 2014

\[ y'(t) < x(t), y(t), z(t) > \]

\[ x = \omega \cos \theta \]
\[ y = 2\omega \sin \theta \]
\[ z = 12 \frac{\theta}{\pi} \]

\[ \int_{0}^{\pi/2} \frac{\omega^2}{(\omega^2 \cos^2 \theta + 2\omega^2 \sin^2 \theta + 16\theta^2/\pi^2)} d\theta = \frac{2\sqrt{2}}{3} \]

\[ 0 < t < 5\pi/11 \]