This is the with-calculator portion of the test. When you have finished this part, raise your hand and I will come and pick up this part, and give you the remainder of the test.

Be sure to show steps enough that I can follow your methods.

1 Smythe has just made deposits in three banks:

<table>
<thead>
<tr>
<th>Bank</th>
<th>Amount($)</th>
<th>APR(%)</th>
<th>Compounding Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1000</td>
<td>3.25</td>
<td>Monthly</td>
</tr>
<tr>
<td>B</td>
<td>950</td>
<td>3.5</td>
<td>Quarterly</td>
</tr>
<tr>
<td>C</td>
<td>925</td>
<td>3.5</td>
<td>Continuously</td>
</tr>
</tbody>
</table>

If Smythe lets these accounts grow undisturbed for four years, how much will he have in each?

2 Solve the equation $2 \cdot 3^{2x+1} = 4^x$ for $x$. Round your final answer to 4 decimal places.
This part of the test has pages 2 – 6. Take a moment to make sure you have them all.

No Calculators Allowed; No Reference Materials; Just You and Your Pencil and Eraser.

3 Let \( f \) be given by \( f(x) = \frac{x^2 - 5x + 6}{x^2 + 5x + 4} \).

(a) Make a sign chart for \( f(x) \).

(b) The graph of this function does have a horizontal asymptote. Give this horizontal asymptote’s equation and then sketch the end behavior of \( f \).

(c) Determine whether \( f \) crosses its horizontal asymptote.

(d) Make a rough graph of \( f \) with the salient features labeled.
4 Find all zeros of the polynomial \( P(x) = x^4 + 2x^3 + 6x^2 - 22x + 13 \). Make a sign-change chart for \( P(x) \).

5 If \( A = -1 + 3i \), then \( \overline{A} = \) ______. Multiply \((2x + A)(2x + \overline{A})\) out, and collect like terms.

6 Express the complex number \( \frac{4 - 5i}{2 + 3i} \) in the standard \( a + bi \) form.
Compute and simplify $f(x) - f(x - h)$ if $f(x) = 7 - x^2$.  

Compute and simplify $f(xh) - f(x/h)$ if $f(x) = \ln(x)$.  

Compute and simplify $\frac{f(x)}{f(x - h)}$ if $f(x) = 2^{3-x}$.  

Solve for $x$: $\log_4(2 - x) + \log_4(x - 10) = 2$
The numbered diagrams show parts of graphs of various equations. Fill each blank with
the graph number best corresponding to the equation. The coordinate lines are one unit
apart.

(a) \( y = e^x \)  \hspace{2cm} (e) \( x^2 + 4y^2 = 4 \)

(b) \( y = 2^x \)  \hspace{2cm} (f) \( 4x^2 + y^2 = 4 \)

(c) \( x^2 - y^2 = 1 \)  \hspace{2cm} (g) \( y = \sqrt{2 - x^2} \)

(d) \( y^2 - x^2 = 1 \)  \hspace{2cm} (h) \( y = \sqrt{3 - x^2} \)
12 Sketch the following curves. Label salient features (vertices, asymptotes, intercepts) with their coordinates:

(a) \((x - 2)^2 + y^2 = 4\)

(b) \(x^2 - y^2 = 4\)

13 Find the coordinates of the crossing points of the two curves in problem 12.