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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:

Bank	Amount($)	APR(%)	Compounding Frequency
A	1000	3.25	Monthly
B	950	3.5	Quarterly
C	925	3.5	Continuously

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

2 Solve the equation $\mathbf{2 \cdot 3^{2x+1} = 4^x}$ for $\boldsymbol{x}$. Round your final answer to 4 decimal places.

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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 $f(x) = \dfrac{x^2 - 5x + 6}{x^2 + 5x + 4}$.

(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 $\boldsymbol{P(x) = x^4 + 2x^3 + 6x^2 - 22x + 13}$. Make a sign-change chart for $\boldsymbol{P(x)}$.

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

6 Express the complex number $\dfrac{\boldsymbol{4 - 5i}}{\boldsymbol{2 + 3i}}$ in the standard $\boldsymbol{a + bi}$ form.

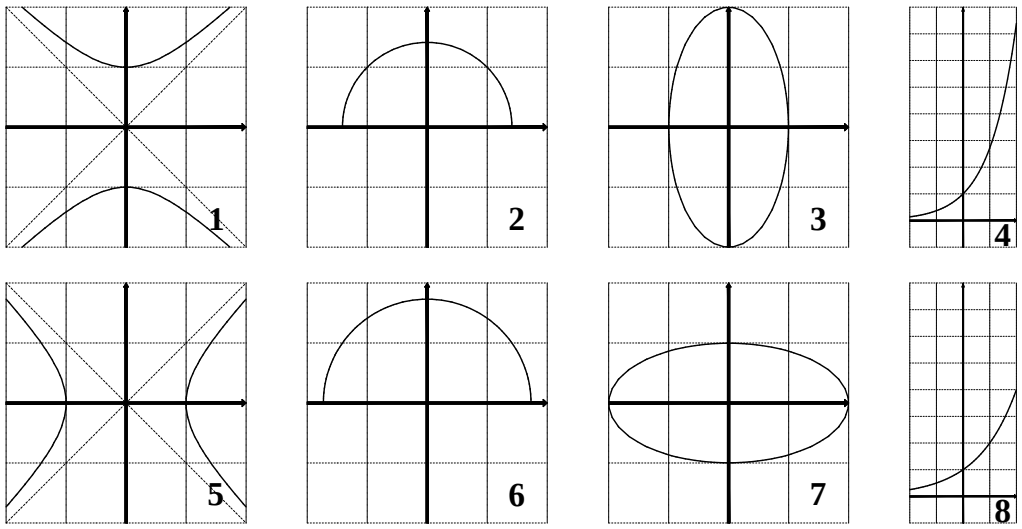
7 Compute and simplify $f(x) - f(x-h)$ if $f(x) = 7 - x^2$.

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

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

10 Solve for x: $\log_4(2-x) + \log_4(x-10) = 2$

11 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) ____ $y = e^x$

(b) ____ $y = 2^x$

(c) ____ $x^2 - y^2 = 1$

(d) ____ $y^2 - x^2 = 1$

(e) ____ $x^2 + 4y^2 = 4$

(f) ____ $4x^2 + y^2 = 4$

(g) ____ $y = \sqrt{2 - x^2}$

(h) ____ $y = \sqrt{3 - x^2}$

12 Sketch the following curves. Label salient features (vertices, asymptotes, intercepts) with their coordinates:

(a) $\boldsymbol{(x-2)^2+y^2=4}$

(b) $\boldsymbol{x^2-y^2=4}$

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