

Complex Numbers

Name _____

1. Perform the following calculations and simplify your final answer:

A. $(2 + 3i)(1 - 2i)$

B. $\frac{5}{3 - 2i}$

C. $(1 + i)^{20}$

2. Express $e^{(3+4i)t}$ in the form $a + bi$.

3. Express $-\frac{5}{2} + \frac{5\sqrt{3}}{2}i$ in the form $Re^{i\theta}$.

4. A. Use Euler's form to rewrite $e^{i(2\theta)}$.

B. Use $e^{i(2\theta)} = (e^{i\theta})^2$ to rewrite $e^{i(2\theta)}$ in the form $a + bi$.

C. Use your answers to parts A and B to derive two trig identities.

5. A. Use u-substitution to evaluate $\int e^{(a+bi)x} dx$. Express your final answer in Euler's Form.

B. Rewrite $\int e^{(a+bi)x} dx$ as the sum of two integrals using algebra.

C. Use your answers to parts A and B to derive formulas 8 and 9 from the integral table.