

Name: _____

Date: _____

Pre Calculus 12 Honors Ch6 Review Complex Numbers:

1. Solve for 'z':

i) $z + 2\bar{z} = 6 - 4i$

ii) $\frac{z}{1+z} = -1 + i$

2. Find all the roots of the equations:

i) $f(x) = 2x^3 + 5x^2 + 15x + 18$

ii) $f(x) = 2x^4 - 23x^2 + 27x - 36$

3. Simplify: $(i+1)^{3200} - (i-1)^{3200}$

4. Suppose $x^8 = -1$, find all the roots:

5. Suppose $x^3 = 5$, find the roots:

6. Suppose $x^3 = 2 - 3i$, find the roots:

7. Evaluate the following using DeMoivre's formula:

i) $(-2\sqrt{3} + 6i)^8$

ii) $(5\sqrt{3} - 5)^{20}$

8. Prove the following: $\sin \theta = \frac{e^{i\theta} - e^{-i\theta}}{2i}$

9. Show that: $e^{ia} + e^{ib} = 2 \cos\left(\frac{a-b}{2}\right) e^{i\frac{(a+b)}{2}}$

10. Find the roots of: $x^6 - x^5 + x^4 - x^3 + x^2 - x + 1 = 0$

11. Let “z” be a root of $x^5 - 1 = 0$, with $z \neq 1$, evaluate the expression: $z^{15} + z^{16} + z^{17} + \dots + z^{50}$

12. The equation below has 10 roots: $r_1, \overline{r_1}, r_2, \overline{r_2}, r_3, \overline{r_3}, r_4, \overline{r_4}, r_5, \text{ and } \overline{r_5}$:

Given: $x^{10} + (13x - 1)^{10} = 0$ find the value of $\frac{1}{r_1 r_1} + \frac{1}{r_2 r_2} + \frac{1}{r_3 r_3} + \frac{1}{r_4 r_4} + \frac{1}{r_5 r_5}$