

Math 12 – Workshop #19

1. Let the letter i have the property that $i^2 = -1$.

(a) Compute the following

$i = i$	$i^5 =$	$i^9 =$
$i^2 = -1$	$i^6 =$	$i^{10} =$
$i^3 =$	$i^7 =$	$i^{11} =$
$i^4 =$	$i^8 =$	$i^{12} =$

(b) What pattern do you notice?

(c) Use this pattern to compute

• i^{21}

• i^{102}

• i^{616}

• i^{3273}

2. Add or subtract and combine like terms

(a) $(2 + 4x) + (1 - 3x)$

(c) $(2 + 3x) - (1 + 3x)$

(b) $(2 + 4i) + (1 - 3i)$

(d) $(2 + 3i) - (1 + 3i)$

3. Multiply out the following

(a) $\frac{1}{2}(2 - 4x)$

(c) $\frac{x}{2}(5 - 3x)$

(e) $(1 + x)(2 - 3x)$

(b) $\frac{1}{2}(2 - 4i)$

(d) $\frac{i}{2}(5 - 3i)$

(f) $(1 + i)(2 - 3i)$

4. Multiply the following

(a) $(2 + 3i)^2$

(c) $(\sqrt{3} - i)(\sqrt{3} + i)$

(e) $(a + 2i)(a - 2i)$

(b) $(2 + 3i)(2 - 3i)$

(d) $(\sqrt{2} + \sqrt{3}i)(\sqrt{2} - \sqrt{3}i)$

(f) $(a + bi)(a - bi)$

5. Use your answer from part f of the previous problem to find real numbers a and b such that

$$(2 + 3i)(a + bi) = 13.$$

Adjust your previous answer to find real numbers c and d such that

$$(2 + 3i)(c + di) = 1.$$