

Unit 2B Day 01 Homework: Complex Numbers Practice

Name Master E
Date _____ Block _____

Remember: $i^2 = -1$! Correct form = $a + bi$

1-18: Simplify each operation completely.

1. $(-4 + 2i) + (6 - 3i)$
 $\frac{6-3i}{2-i}$

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

3. $(2+i)(3-i)$ $6 - (-1)$
 $\frac{3i - 2i}{-2i}$
 $7+i$

4. $(5-2i)(4-i)$ $20 + 2(-1)$
 $\frac{-8i}{-5i}$
 $18-13i$

5. $(4+2i)(4-2i)$
 $16 - 4i^2$
 $16 - 4(-1)$
 $16 + 4 = 20$

6. $(-3i)(4i)(-5i)$
 $(-12i^2)(-5i)$
 $12(-5i)$
 $-60i$

7. $(7i)^2(6i)$
 $49i^2(6i)$
 $-49(6i)$
 $-294i$

8. $(4+3i)(2-5i)$ $8 - 15(-1)$
 $\frac{6i}{-20i}$
 $23-14i$

9. $\frac{2i(4-2i)}{(4+2i)(4-2i)}$ $\frac{8i-4i^2}{20}$ $\frac{8i+4}{20}$ $\frac{1+2i}{5}$

10. $\frac{2(7+8i)}{(7-8i)(7+8i)}$
 $\frac{14+16i}{49-64i^2}$
 $\frac{14+16i}{113}$

11. $\frac{(3-i)(2+i)}{(2-i)(2+i)}$
 $\frac{6+3i-2i-i^2}{4-i^2}$
 $\frac{7+i}{5}$

12. $\frac{8-6i}{3i} \cdot \frac{i}{i} = \frac{8i-6i^2}{3i^2}$
 $\frac{8i+6}{-3}$ or $\frac{-6-8i}{3}$

13. i^{55}
 $\frac{55}{4} = 13.75$
 $i^{-1} = -i$
 $i^2 \cdot i^3 = -i$

14. i^{89}
 $\frac{89}{4} = 22.25$
 $i^{80} \cdot i = i$

15. i^{42}
 $\frac{42}{4} = 10.5$
 $i^{40} \cdot i^2 = -1$

16. $\sqrt{-36}$
 $\sqrt{-1} \cdot \sqrt{36}$
 $6i$

17. $\sqrt{-8} \sqrt{-32}$ $\frac{\sqrt{-8} \sqrt{-32}}{i\sqrt{4} \cdot 2 \cdot i\sqrt{16} \cdot 2}$ $\frac{2i\sqrt{2} \cdot 4i\sqrt{2}}{8i^2 \cdot 2 = 16i^2 = -16}$
** There are other ways to do this!*

18. $\sqrt{-108x^7}$
 $i\sqrt{36} \cdot 3(x^6) \cdot x$
 $6x^3 i \sqrt{3x}$

19-24: Solve each equation.

When you solve a quadratic, you have 2 solutions!

19. $3x^2 + 3 = 0$
 $3x^2 = -3$
 $x^2 = -1$
 $x = \pm i$

20. $5x^2 + 35 = 0$
 $5x^2 = -35$
 $x^2 = -7$
 $x = \pm \sqrt{-7}$
 $x = \pm i\sqrt{7}$

21. $4x^2 + 120 = 0$
 $4x^2 = -120$
 $x^2 = -30$
 $x = \pm i\sqrt{30}$

22. $-x^2 - 16 = 0$
 $-x^2 = 16$
 $x^2 = -16$
 $x = \pm 4i$

23. $8x^2 + 96 = 0$
 $8x^2 = -96$
 $x^2 = -12$
 $x = \pm i\sqrt{12} = \pm 2i\sqrt{3}$

24. $\frac{3}{4}x^2 + 12 = 0$
 $\frac{3}{4}x^2 = -12$
 $x^2 = -16$
 $x = \pm 4i$

25. ELECTRICITY: Using the formula $E = IZ$, find the voltage E in a circuit when the current I is $3 - j$ amps and the impedance Z is $3 + 2j$ ohms.

$E = (3-j)(3+2j)$
 $9 + 6j - 3j - 2j^2$ $11 + 3j$
 $9 + 3j - 2(-1)$