

Perform the indicated operation. Write your answer in $a + bi$ form.

1. $(-6+12i)+(4-i)$
 $-2+11i$

2. $(3-i)-(-4+9i)$
 $3-i+4-9i$
 $7-10i$

3. $(11+i)+(2+8i)$
 $13+9i$

4. $(-8+4i)-(7-i)$
 $-8+4i-7+i$
 $-15+5i$

5. $(12+16i)-(12+11i)$
 $12+16i-12-11i$
 $5i$

6. $(4-12i)+7i$
 $4-5i$

7. $4i(-7+i)$
 $-28i+4i^2$
 $-4-28i$

8. $(3-i)(9+3i)$
 $27+9i-9i-3i^2$
 $27+3=30$

9. $(6-3i)(2+2i)$
 $12+12i-6i-6i^2$
 $12+6i+6$
 $18+6i$

10. $(2+5i)^2$
 $4+20i+25i^2$
 $4+20i-25$
 $-21+20i$

11. $\frac{(5-i)(5-i)}{(5+i)(5-i)}$
 $\frac{25-5i-5i+i^2}{25+1}$
 $\frac{25-10i-1}{26}$

12. $\frac{14-2i(3+2i)}{(3-2i)(3+2i)}$
 $\frac{42+28i-6i-4i^2}{9+4}$
 $\frac{42+22i+4}{13}$

$\frac{24}{26} - \frac{10i}{26} = \frac{12}{13} - \frac{5}{13}i$

$\frac{42}{13} + \frac{22i}{13}$

Write the conjugate of each complex number.

13. $15i$
 $-15i$

14. $27-4i$
 $27+4i$

15. $-12+19i$
 $-12-19i$

16. -13
 -13

17. $3i-9$ (be careful)
 $-9+3i$
 $-9-3i$

Simplify. Yank out the "i."

18. $\sqrt{-16}$
 $4i$

19. $\sqrt{-20}$
 $2i\sqrt{5}$

20. $\sqrt{-9} \cdot \sqrt{-25}$
 $3i \cdot 5i$
 -15

21. $\sqrt{-8} \cdot \sqrt{-18}$
 $2i\sqrt{2} \cdot 3i\sqrt{2}$
 $6i^2(2)$
 $12i^2$
 -12

Solve for x and y. Note: don't make these hard.

22. $7x-2yi=14+6i$
 $7x=14$ $\frac{-2yi}{-2} = \frac{6i}{-2}$
 $x=2$ $y=-3$

23. $-3x+4yi=21-16i$
 $-3x=21$ $4yi=-16i$
 $x=-7$ $y=-4$

Mixed Answers:

~~$-21+20i$~~ ; ~~30~~ ; ~~$-4-28i$~~ ; ~~$-2+11i$~~ ; ~~$13+9i$~~ ; ~~$5i$~~ ; ~~$4-5i$~~ ; ~~$18+6i$~~ ; ~~$7-10i$~~ ; ~~$-15+5i$~~ ; ~~$\frac{46}{13} + \frac{22}{13}i$~~ ; ~~$\frac{12}{13} - \frac{5}{13}i$~~ ; ~~$-13i$~~ ; ~~$-13$~~ ; ~~$-9-3i$~~ ; ~~$27+4i$~~ ; ~~$-12-19i$~~ ; ~~$-12$~~ ; ~~$-15$~~ ; ~~$4i$~~ ; ~~$2i\sqrt{5}$~~ ; ~~$x=2$ and $y=-3$~~ ; ~~$x=-7$ and $y=-4$~~

Simplify. Show work.

24. i^{52}

$$4 \overline{) 52}$$

$$\underline{40}$$

$$12$$
 $i^4 = 1$

25. $i^{62} = -1$

$$4 \overline{) 62}$$

$$\underline{40}$$

$$22$$

$$\underline{20}$$

$$2$$
 i^2

26. $i^{41} = i$

$$4 \overline{) 41}$$

$$\underline{40}$$

$$1$$
 $i^1 = i$

27. i^{83}

$$4 \overline{) 83}$$

$$\underline{80}$$

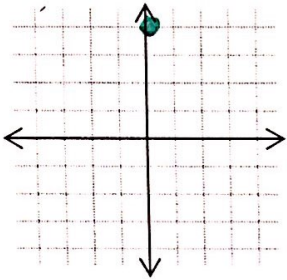
$$3$$

$$\underline{0}$$

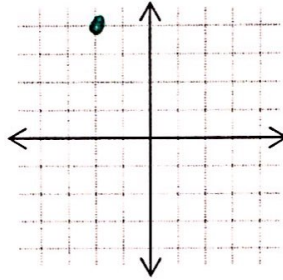
$$3$$
 $i^3 = -i$

Graph each complex number. Be sure to label the axes.

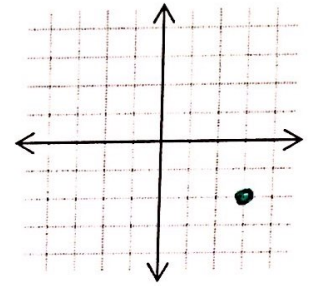
28. $4i$



29. $-2 + 4i$



30. $3 - 2i$



Evaluate. Hint: $|a + bi| = \sqrt{a^2 + b^2}$

31. $|4i|$

$$\sqrt{4^2}$$

$$\sqrt{16}$$

$$4$$

32. $|-2 + 4i|$

$$\sqrt{4 + 16}$$

$$\sqrt{20}$$

$$2\sqrt{5}$$

33. $|3 - 2i|$

$$\sqrt{9 + 4}$$

$$\sqrt{13}$$

Mixed Answers (except 28-30): -1 ; i ; $-i$; 1 ; $2\sqrt{5}$; 4 ; $\sqrt{13}$