

Write each expression as a pure imaginary number.

1. $\sqrt{-25}$
 $5i$

2. $\sqrt{-81}$
 $9i$

3. $\sqrt{-13}$
 $i\sqrt{13}$

4. $\sqrt{-45}$
 $3i\sqrt{5}$

Identify the real and imaginary parts of each complex number.

5. $4+5i$
real 4
imaginary 5

6. $-3+2i$
real -3
imaginary 2

7. $6-3i$
6 real
-3 imaginary

8. $13i$
13-imaginary

Write each expression as a complex number in standard form (a+bi).

9. $5+\sqrt{-49}$

$5+7i$

10. $-2-\sqrt{-28}$

$-2-2i\sqrt{7}$

11. $\frac{10-\sqrt{-25}}{5}$

$2-i$
 $(\frac{10}{5} - \frac{5i}{5})$

12. $\frac{4-\sqrt{-8}}{12}$

$\frac{4}{12} - \frac{2i\sqrt{2}}{12}$
 $\frac{1}{3} - \frac{i\sqrt{2}}{6}$

Add or subtract as indicated. Write answers in standard form.

13. $(4+5i)+(2-7i)$

$6-2i$

14. $(4+i)-(8-5i)$

$-4+6i$

15. $(-4+\sqrt{-25})+(1-\sqrt{-16})$

$-4+5i+1-4i$
 $-3+i$

16. $(4-\sqrt{-4})-(2+\sqrt{-9})$

$4-2i-2-3i$
 $2-5i$

17. $(-2+\sqrt{-18})+(5-\sqrt{-50})$

$-2+3i\sqrt{2}+5-5i\sqrt{2}$
 $3-2i\sqrt{2}$

18. $(-10+\sqrt{-20})+(-6+\sqrt{-45})$

$-10+2i\sqrt{5}-6+3i\sqrt{5}$
 $-16+5i\sqrt{5}$

Multiply. Write answers in standard form.

19. $6i(2-4i)$

$$12i - 24i^2$$

$$\boxed{+24 + 12i}$$

20. $\frac{1}{3}i(12-15i)$

$$4i - 5i^2$$

$$\boxed{5 + 4i}$$

21. $(2+i)(4+3i)$

$$8 + 6i + 4i + 3i^2$$

$$\boxed{5 + 10i}$$

22. $(5-2i)(-1+2i)$

$$-5 + 10i + 2i - 4i^2$$

$$\boxed{-1 + 12i}$$

23. $(3+2i)^2$

$$9 + 12i + 4i^2$$

$$\boxed{5 + 12i}$$

24. $(2+\sqrt{-81})(-3-\sqrt{-100})$

$$(2+9i)(-3-10i)$$

$$-6 - 20i - 27i - 90i^2$$

$$\boxed{84 - 47i}$$

Write the complex conjugate of the following complex numbers:

25. $3+2i$

$$3-2i$$

26. $7-12i$

$$7+12i$$

27. $-8i$

$$+8i$$

28. $15i$

$$-15i$$

Simplify

29. $\frac{2}{3i} \cdot \frac{-3i}{-3i}$

$$\frac{6i}{-9i^2} = \frac{6i}{9} = \boxed{\frac{2i}{3}}$$

30. $\frac{10+6i}{5-3i} \cdot \frac{5+3i}{5+3i}$

$$= \frac{50+30i+30i+18i^2}{25+9}$$

$$= \frac{32+60i}{34} = \frac{2(16+30i)}{2(17)} = \boxed{\frac{16+30i}{17}}$$

31. $\frac{12-10i}{3+5i} \cdot \frac{3-5i}{3-5i}$

$$\frac{36-60i-30i+50i^2}{9+25}$$

$$= \frac{-14-90i}{34}$$

$$\boxed{-\frac{7-45i}{17}}$$

Review

1. State the zeros, multiplicity, and end behavior of $h(x) = (x+3)^2(x-2)$

2. Sketch a graph of the following polynomial $g(x) = -x(x-3)^2(x+4)$

Zero $x = -3$ (mult 2) 2

End. $\lim_{x \rightarrow -\infty} f(x) = -\infty$

$\lim_{x \rightarrow \infty} f(x) = \infty$

