

Write the complex number in standard form.

1.) $3 + \sqrt{-9}$

$$= 3 + 3i$$

2.) $-3i^2 + i$

$$i^2 = -1$$

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

$$= 3 + i$$

3.) $(\sqrt{-75})^2$

$$= (5i\sqrt{3})^2$$

$$= 25i^2 \cdot 3$$

$$= -75$$

Perform the addition or subtraction and write the result in standard form.

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

$$= 11 - i$$

5.) $(11-2i) + (-3+6i)$

$$= 8 + 4i$$

6.) $(7 + \sqrt{-18}) - (3 + 3i\sqrt{2})$

$$= (7 + 3i\sqrt{2}) - (3 + 3i\sqrt{2})$$

$$= 4$$

7.) $13i - (14 - 7i)$

$$= -14 + 20i$$

8.) $22 + (-5 + 8i) + 10i$

$$= 17 + 18i$$

9.) $-\left(\frac{3}{4} + \frac{7}{5}i\right) - \left(\frac{5}{6} - \frac{1}{6}i\right)$

$$= -\frac{3}{4} - \frac{7}{5}i - \frac{5}{6} + \frac{1}{6}i$$

$$= -\frac{19}{12} - \frac{37}{30}i$$

Perform the multiplication and write the result in standard form.

10.) $\sqrt{-6} \cdot \sqrt{-2}$

$$= \sqrt{12}$$

$$= 2\sqrt{3}$$

11.) $(1+i)(3-2i)$

$$= 5 + i$$

12.) $(6-2i)(2-3i)$

$$= 6 - 22i$$

13.) $(\sqrt{14} + i\sqrt{10})(\sqrt{14} - i\sqrt{10})$

$$= (\sqrt{14})^2 - (i\sqrt{10})^2$$

$$= 14 - (-10)$$

$$= 24$$

Find the product of the number and its conjugate.

$$14.) (4+3i)(4-3i)$$

$$= 16 - 9i^2$$

$$= 16 + 9$$

$$= 25$$

$$15.) (-3+i\sqrt{2})(-3-i\sqrt{2})$$

$$= 9 - i^2 \cdot 2$$

$$= 11$$

Perform the division and write the result in standard form.

$$16.) \frac{6}{i} \cdot \frac{-i}{-i}$$

$$= \frac{-6i}{-i^2} = -6i$$

$$17.) \frac{4(4+5i)}{(4-5i)(4+5i)}$$

$$= \frac{16 + 20i}{16 - 25i^2} = \frac{16 + 20i}{41}$$

$$18.) \frac{8-7i}{1-2i} \cdot \frac{(1+2i)}{(1+2i)}$$

$$= \frac{22+9i}{5}$$

$$19.) \frac{1}{(4-5i)^2}$$

$$= \frac{1}{(41-40i)(41+40i)}$$

$$= \frac{41+40i}{41^2+40^2} = \frac{41+40i}{3281}$$

$$20.) \frac{(2-3i)(5i)}{2+3i}$$

$$= \frac{(15+10i)(2-3i)}{(2+3i)(2-3i)}$$

$$= \frac{60-25i}{2^2+3^2} = \frac{60-25i}{13}$$

$$21.) \frac{2i}{2+i} + \frac{5}{2-i}$$

$$= \frac{2+4i+10+5i}{(2+i)(2-i)}$$

$$= \frac{12+9i}{4+1} = \frac{12+9i}{5}$$

Simplify the complex number and write it in standard form.

$$22.) 4i^2 - 2i^3$$

$$= 4(-1) - 2i(-1)$$

$$= -4 + 2i$$

$$23.) -5i^5$$

$$= -5(-1)(-1)i$$

$$= -5i$$

$$24.) (\sqrt{-2})^6$$

$$= (i\sqrt{2})^6$$

$$= 8$$