

Answers to Complex Number Packet

1.	$110i$	2.	$6i\sqrt{2}$
3.	$45i\sqrt{2}$	4.	$28i\sqrt{6}$
5.	i	6.	1
7.	$-i$	8.	-1
9.	$8-3i$	10.	$12+i$
11.	20	12.	30
13.	50	14.	$-65+72i$
15.	$-\frac{1}{6}-\frac{2}{3}i$	16.	$\frac{21}{10}-\frac{7}{10}i$
17.	$-\frac{2}{5}+\frac{13}{10}i$	18.	$\frac{9}{10}+\frac{1}{5}i$
19.	$-\frac{7}{25}+\frac{24}{25}i$	20.	$x=7$ $y=13$
21.	$x=7$ $y=\frac{1}{3}$	22.	$x=\frac{1}{9}, y=\frac{1}{5}$

$$1. \begin{aligned} & 10\sqrt{-12i} \\ & = 10 \cdot 11i \\ & = \boxed{110i} \end{aligned}$$

$$11. \begin{aligned} & (-4i) \cdot (5i) \\ & = -20i^2 = -20(-1) \\ & = \boxed{20} \end{aligned}$$

$$2. \begin{aligned} & \frac{\sqrt{-72}}{i\sqrt{36 \cdot 2}} \\ & = \boxed{6i\sqrt{2}} \end{aligned}$$

$$12. \begin{aligned} & (6-3i)(4+2i) \\ & = 6(4+2i) - 3i(4+2i) \\ & = 24 + 12i - 12i - 6i^2 \\ & = \boxed{30} \end{aligned}$$

$$3. \begin{aligned} & 3\sqrt{-450} \\ & 3i\sqrt{2 \cdot 3^2 \cdot 5^2} \\ & = \boxed{45i\sqrt{2}} \end{aligned}$$

$$13. \begin{aligned} & (5-5i)(5+5i) \\ & = 25 - 25i^2 \\ & = \boxed{50} \end{aligned}$$

$$4. \begin{aligned} & 7\sqrt{-96} \\ & 7i\sqrt{2^5 \cdot 3} \\ & = \boxed{28i\sqrt{6}} \end{aligned}$$

$$14. \begin{aligned} & (4+9i)^2 \\ & = 4(4+9i) + 9i(4+9i) \\ & = 16 + 36i + 36i + 81i^2 \\ & = \boxed{-65 + 72i} \end{aligned}$$

$$5. \begin{aligned} & i^{13} = i \cdot (i^2)^6 \\ & = \boxed{i} \end{aligned}$$

$$15. \begin{aligned} & \frac{4-i}{6i} \cdot \frac{i}{i} = \frac{4i-i^2}{6i^2} \\ & = \frac{1+4i}{-6} = \boxed{\frac{-1-2i}{6}} \end{aligned}$$

$$6. i^{48} = (i^2)^{24} = \boxed{1}$$

$$7. i^{23} = i \cdot (i^2)^{11} = \boxed{-i}$$

$$8. i^{54} = (i^2)^{27} = \boxed{-1}$$

$$16. \begin{aligned} & \frac{7}{3+i} \cdot \frac{3-i}{3-i} = \frac{21-7i}{9-i^2} \\ & = \frac{21-7i}{10} = \boxed{\frac{21-7i}{10}} \end{aligned}$$

$$9. \begin{aligned} & 2-8i+6+5i \\ & = \boxed{8-3i} \end{aligned}$$

$$10. \begin{aligned} & 3+3i+9-2i \\ & = \boxed{12+i} \end{aligned}$$

$$17. \frac{-6+i}{2+4i} \cdot \frac{2-4i}{2-4i} = \frac{-6(2-4i)+i(2-4i)}{4-16i^2}$$

$$= \frac{-12+24i+2i-4i^2}{20} = \frac{-8+26i}{20} = \boxed{\frac{-2}{5} + \frac{13}{10}i}$$

$$18. \frac{3-5i}{2-6i} \cdot \frac{2+6i}{2+6i} = \frac{3(2+6i)-5i(2+6i)}{4-36i^2} = \frac{6+18i-10i-30i^2}{40}$$

$$= \frac{36+8i}{40} = \boxed{\frac{9}{10} + \frac{1}{5}i}$$

$$19. \frac{3+4i}{3-4i} \cdot \frac{3+4i}{3+4i} = \frac{3(3+4i)+4i(3+4i)}{9-16i^2} = \frac{9+12i+12i+16i^2}{25}$$

$$= \frac{-7+24i}{25} = \boxed{\frac{-7}{25} + \frac{24}{25}i}$$

$$20. 5x+4yi = 35+52i$$

$$5x = 35 \quad 4yi = 52i$$

$$\boxed{x = 7} \quad \boxed{y = 13}$$

$$21. 4+8xi = 12y+56i$$

$$4 = 12y \quad 8xi = 56i$$

$$\boxed{y = \frac{1}{3}} \quad \boxed{x = 7}$$

$$22. 3+9i = 27x+45yi$$

$$3 = 27x \quad 9i = 45yi$$

$$\boxed{x = \frac{1}{9}} \quad \boxed{y = \frac{1}{5}}$$