Name _____

Date _____ Period _____

Simplify.

1. $\sqrt{-1}$ i

2. $\sqrt{-4}$ $\sqrt{4i^2} = 2i$

3. $\sqrt{-16} = \sqrt{16i^2} = 4i$

4. $\sqrt{-25} = \sqrt{25i^2} = 5i$

72
$36 \cdot 2$

5. $\sqrt{-50} = \sqrt{50i^2} = 5i\sqrt{2}$

6. $\sqrt{-72} = \sqrt{72i^2} = 6i\sqrt{2}$

7. $\sqrt{-80} = \sqrt{80i^2} = 4i\sqrt{5}$

8. $\sqrt{-98}$ $\sqrt{98i^2} = 7i\sqrt{2}$

9. $\sqrt{-108}$ $\sqrt{108i^2} = 6i\sqrt{3}$

10. $\sqrt{-125}$ $\sqrt{125i^2} = 5i\sqrt{5}$

11. $3i(2 + 4i)$ $6i + 12i^2 = 6i - 12$ $-12 + 6i$

12. $2i(3 + 7i)$ $6i + 14i^2 = 6i - 14$ $-14 + 6i$

13. $5i(3 - i)$ $15i - 5i^2 = 15i + 5$ $5 + 15i$

14. $4i(2 - 3i)$ $8i - 12i^2 = 12 + 8i$

15. $(5 + i)(2 + 5i)$
$10 + 25i + 2i + 5i^2 = 5 + 27i$

16. $(2 + 3i)(4 + 2i)$ $8 + 4i + 12i + 6i^2$
$2 + 16i$

17. $(2 - i)(5 + 3i)$
$10 + 6i - 5i - 3i^2 = 13 + i$

18. $(3 - i)(4 + 5i)$
$12 + 15i - 4i - 5i^2 = 17 + 11i$

19. $(5 - 5i)(5 + 5i)$
$25 + 25i - 25i - 25i^2 = 25 + 25 = 50$

20. $(3 - 3i)(3 + 3i) = 9 + 9 = 18$

21. $\frac{5}{(1+i)}\frac{(1-i)}{(1-i)} = \frac{5-5i}{2}$

22. $\frac{(4)}{(1-i)}\frac{(1+i)}{(1+i)} = \frac{4+4i}{2} = 2 + 2i$

23. $\frac{(6i)}{(2-3i)}\frac{(2+3i)}{(2+3i)} = \frac{12i + 18i^2}{4+9} = \frac{-18+12i}{13}$

24. $\frac{(5i)}{(3+4i)}\frac{(3-4i)}{(3-4i)} = \frac{15i - 20i^2}{9+16} = \frac{20+15i}{25} = \frac{4+3i}{5}$

25. $\frac{(1+i)}{(1-i)}\frac{(1+i)}{(1+i)} = \frac{1 + 2i + i^2}{2} = \frac{2i}{2} = i$

26. $\frac{(2+3i)}{(2-3i)}\frac{(2+3i)}{(2+3i)} = \frac{4 + 12i + 9i^2}{4+9} = \frac{-5+12i}{13}$

Solve.

27. $x^2 + 1 = 0$ $\pm i$

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

29. $x^2 + 3x + 4 = 0$ $\frac{-3 \pm \sqrt{9 - 4(1)(4)}}{2} = \frac{-3 \pm \sqrt{-7}}{2} = \frac{-3 \pm i\sqrt{7}}{2}$

30. $x^2 + 5x + 8 = 0$ $x = \frac{-5 \pm \sqrt{25 - 4(1)(8)}}{2} = \frac{-5 \pm \sqrt{-7}}{2} = \frac{-5 \pm i\sqrt{7}}{2}$

31. $3x^2 + 2x + 1 = 0$ $\frac{-2 \pm \sqrt{4 - 4(3)(1)}}{2(3)} = \frac{-2 \pm \sqrt{4-12}}{6} = \frac{-2 \pm \sqrt{-8}}{6} = \frac{-2 \pm 2i\sqrt{2}}{6} = \frac{-1 \pm i\sqrt{2}}{3}$

32. $2x^2 + 3x + 5 = 0$ $x = \frac{-3 \pm \sqrt{9 - 4(2)(5)}}{4} = \frac{-3 \pm \sqrt{-31}}{4} = \frac{-3 \pm i\sqrt{31}}{4}$