Integrated Geometry
Complex # Test Review

Name: KEY
Date: _____ Period: _____

**Simplify the expression.**

1. $\sqrt{525} = \sqrt{25 \cdot 21} = 5\sqrt{21}$
2. $\sqrt{567} = \sqrt{81 \cdot 7} = 9\sqrt{7}$
3. $\sqrt{192} = \sqrt{64 \cdot 3} = 8\sqrt{3}$
4. $\sqrt{\frac{49}{81}} = \frac{\sqrt{49}}{\sqrt{81}} = \frac{7}{9}$
5. $\sqrt{\frac{128}{25}} = \frac{\sqrt{128}}{\sqrt{25}} = \frac{\sqrt{64 \cdot 2}}{5} = \frac{8\sqrt{2}}{5}$
6. $\sqrt{\frac{53}{9}} = \frac{\sqrt{53}}{\sqrt{9}} = \frac{\sqrt{53}}{3}$

**Write the complex number in standard form.**

7. $\sqrt{-99} = \sqrt{-9 \cdot 11} = 3i\sqrt{11}$
8. $\sqrt{-196} = 14i$
9. $\sqrt{-80} = \sqrt{-16 \cdot 5} = 4i\sqrt{5}$
10. $2 + \sqrt{-27} = 2 + \sqrt{-9 \cdot 3} = 2 + 3i\sqrt{3}$
11. $6 - \sqrt{-162} = 6 - \sqrt{-81 \cdot 2} = 6 - 9i\sqrt{2}$
12. $-3 + \sqrt{-44} = -3 + \sqrt{-4 \cdot 11} = -3 + 2i\sqrt{11}$

**Write the expression as a complex number in standard form.**

13. $6i + (-2 - 7i)$
14. $(1 - 4i) - (1 + 3i) = 0 - 7i = -7i$
15. $(2 + 5i) + (5 - 2i)$
16. $(-7 - 12i) + (4 + 5i) = -3 - 7i$
17. $(1 - i) - (6 + i)$
18. $(9 - 8i) - (4 - 13i) = 5 + 5i$
19. $(-2 + 3i) + (2 - 3i)$
20. $(4 - i) - (-6 + 7i) = 10 - 8i$
21. $6i + (-7 + i) - 2$
22. $7 - (-10 + i) + 4i = 17 + 3i$
23. $(1 + 3i)(-2 + i)$
24. $(-2 - 5i)(2 - 2i) = -4 + 4i - 10i + 10i^2 = -14 - 6i$
25. $(3 - 2i)7i$
26. $(7 + i)5i = 35i + 5i^2 = -5 + 35i$
27. $(-2 + 2i)^2$
28. $(1 - i)(2 - 6i) = 2 - 6i - 2i + 6i^2 = -4 - 8i$
29. $-(2 + 3i)(1 - 4i)$
30. $(3 + 5i)^2 = (3 + 5i)(3 + 5i) = -16 + 30i$
31. $4i(3 - i)(-2 + 8i)$
32. $-3i(2 - i)(4 - 5i) = (-6i - 3)(4 - 5i) = -42 - 9i$
33. $\frac{3i}{4 - i}$
34. $\frac{6 + 2i}{4 + 8i} \cdot \frac{4 - 8i}{4 - 8i} = \frac{78 - 40i}{80} = \frac{39}{40} - \frac{1}{2}i$

~~$\frac{1 + 2i}{2 - 4i}$~~ ~~$\frac{2 + 4i}{1 - 2i}$~~

~~$\frac{-3 + i}{5 + 2i}$~~

**Find the real numbers x and y to make the equation true:**

1. $x - 3yi = 5 + 15i$
2. $-6x + 7yi = 18 + 28i$ ($-6x = 18$, $7y = 28$; $x = -3$, $y = 4$)
3. $4x - 7i = 22 - 2yi$
4. $5x - 7yi = -\frac{7}{10} - 56i$ ($5x = -\frac{7}{10}$, $-7y = 56$; $x = -\frac{7}{50}$, $y = +8$)
5. $27 - 8i = -13x + 3yi$
6. $-5x - yi = 20 - 9i$ ($-5x = 20$, $-y = -9$; $x = -4$, $y = 9$)
7. $-4x + 5yi = -2 - 35i$
8. $\frac{3}{4} - 2yi = 2x + 5i$ ($\frac{3}{4} = 2x$, $-2y = 5$; $\frac{3}{8} = x$, $y = -\frac{5}{2}$)
9. $-2x - \frac{1}{3}yi = 26 + 4i$
10. $-14 + 12i = 7x - 6yi$ ($-14 = 7x$, $12 = -6y$; $-2 = x$, $-2 = y$)

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**Simplify the Expression:**

1. $-\sqrt{27}+2\sqrt{12}-2\sqrt{18}$

$-3\sqrt{3}+4\sqrt{3}-6\sqrt{2} = \boxed{1\sqrt{3}-6\sqrt{2}}$

2. $\frac{5}{4+5\sqrt{2}} \cdot \frac{4-5\sqrt{2}}{4-5\sqrt{2}} = \frac{20-25\sqrt{2}}{16-20\sqrt{2}+20\sqrt{2}-50} = \frac{20-25\sqrt{2}}{-34} = \boxed{-\frac{10}{17}+\frac{25\sqrt{2}}{34}}$

3. $(4+\sqrt{3})^2 = (4+\sqrt{3})(4+\sqrt{3}) = 16+4\sqrt{3}+4\sqrt{3}+3 = \boxed{19+8\sqrt{3}}$

4. $\frac{\sqrt{5}}{3\sqrt{16}} = \frac{\sqrt{5}}{3\cdot 4} = \boxed{\frac{\sqrt{5}}{12}}$

5. $x^{\frac{1}{2}} \cdot x^3 = x^{1/2+3} = x^{1/2+6/2} = \boxed{x^{7/2}}$

6. $\frac{y^{\frac{5}{4}}}{y^{\frac{1}{4}}} = y^{5/4-1/4} = y^{4/4} = \boxed{y}$

7. $\sqrt[4]{768p^{12}r^{24}t^{18}} = \sqrt[4]{256\cdot 3p^{12}r^{24}t^{18}} = \boxed{4p^3r^6t^4\sqrt[4]{3t^2}}$