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Show all necessary work NEATLY, CLEARLY, and SYSTEMATICALLY. Any understatement and/or incorrect statement may be penalized.

1. (5) Perform indicated operations: $\left(\sqrt{4}+\sqrt{-9}\right)-\left(\sqrt{16}-\sqrt{-25}\right)+\left(\sqrt{36}-\sqrt{-49}\right)$.

2. (5) Perform indicated operations: $(8+9i)(10-11i)$.

3. (5) Perform indicated operations and write in standard form: $\dfrac{12+13i}{\sqrt{196}-\sqrt{-225}}$.

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4. (5) Perform indicated operations: $2\sqrt[3]{5x^7} + 4x\sqrt[3]{40x^4} - x\sqrt[3]{135}$.

5. (5) Rationalize the denominator: $\dfrac{\sqrt{3}-4\sqrt{2}}{2\sqrt{3}+5\sqrt{2}}$.

6. (5) Solve: $\sqrt{1-4x}-5=x$.

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7. (8) Solve: $\sqrt{3w+4}-\sqrt{w}=2$.

8. (8) Perform indicated operations and simplify:

$$\frac{q^2+6q}{6q+12}\cdot\frac{q^2-5q}{2q+10}\div\frac{q^2+q-30}{4q+8}.$$

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9. (8) Perform indicated operations and simplify: $\frac{m+n}{m+3n}-\frac{m-4n}{m-7n}+\frac{7mn+n^2}{m^2-4mn-21n^2}$.

10. (8) Solve : $\frac{2}{a+3}-\frac{4}{a^2-4}=\frac{a+1}{a^2+5a+6}$.

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11. (8) Solve and express the solution set in interval notation : $\frac{4}{c-2} < \frac{3}{c}$.

12. (8) Simplify: $\frac{\left(4x^{\frac{1}{2}}y^{-\frac{1}{3}}\right)\left(x^{6}y^{-9}\right)^{\frac{1}{3}}}{\left(27x^{-4}y^{-\frac{1}{2}}\right)^{\frac{1}{3}}}$.