

For #'s 1-6 Factor completely. Show all steps.

1. $n^2 - 8n - 9$	2. $4x^3 + 12x^2 - 16x$
3. $x^3 - x^2 + 4x - 4$	4. $25y^2 - 90xy + 81x^2$
5. $3a^4 - 75b^2$	6. $3n^2 - 48n + 144$
7. Simplify i^{113}	8. Simplify $\frac{i^3}{i^{109}}$
9. Solve: $x^2 - 12 = -18$	10. Solve: $-3x^2 - 18 = 18$
11. Simplify: $3\sqrt{48} + 5\sqrt{27} - 2\sqrt{243} =$	12. Simplify: $\sqrt{-2} \times \sqrt{-72} =$

Solve the following by any means

13. $n^2 - 70n - 144 = 0$

14. $n^2 - 7n + 15 = 0$

15. $2x^2 + 6x + 11 = 0$

16. $5x^2 + 12x + 3 = 0$

17. Solve # 16 by completing the square.

18. Put #15 in vertex form.

19. What is the vertex for #14?

20. Find the vertex of $x^2 + 6x - 16 = 0$ using 3 different methods.

21. Without solving determine the type of solutions expected.

a) $3x^2 + 9x + 16 = 0$

b) $-x^2 - 9x - 16 = 0$

c) $x^2 + 9x - 10 = 0$

22. Provide a detailed graph for the problems in #21.