

- Show all intermediary steps, to illustrate what you're doing and why.
- Don't do your homework on this paper. There isn't room.
- Homework submitted early will receive bonus credit.

**Part 1: Simplify each expression.**

1.  $\frac{7x^3y^4}{14xy^8}$       2.  $6n^3 + 5n^2 + 11n^2 - 4n \cdot n^2$       3.  $(x-3)^2 \div (x-3) \times (x+4) - x^2 + 11$

4.  $(2(3x)^2)^{-2}$       5.  $\frac{3k^3 + 7k^2}{5k}$       6.  $\sqrt[3]{(2j^4 + 3j^4)^6}$       7.  $\frac{1}{4}a \cdot 8a^{-6} + \frac{1}{a^4}$

8.  $\frac{4x^2 - 49}{4x^2 - 14x}$       9.  $\frac{2x^2 - 2x}{x^2 - 2x + 1}$       10.  $\frac{6k^{-3}}{3k^2} \div \frac{2k^3}{9k^5}$

**Part 2: Factor each expression completely.**

11.  $3n^7 + 9n^6 - 56$       12.  $17k^5 - 68k^3$       13.  $21j^5 - 7j^3 + 28j^4$

14.  $20t + 5t^3 - 20t^2$       15.  $8x^4 + 12x^3 + 4x^2$

**Part 3: Find all solutions for each equation.**

16.  $5x^2 + 5x = 30$       17.  $3x^2 - 12x = 0$       18.  $2x^4 - 16x^2 = 14x^3$

19.  $\frac{6x^5 - 3x^4 - 18x^3}{3x^4 - 6x^3} = 11$       20.  $\frac{x^2 - 4}{x^2 - 5x + 6} = 2$