Math 271
Preparation for Calculus

Factor completely:

1. $16x^3 - 9x^5$

2. $21x^2 - 11x - 40$

3. $x^4 + 27$

4. $18x^4 - 50y^4$

5. $125x^3 - 1$

6. $x^3 + 2x^2 - 3x - 6$

Simplify completely

7. $\dfrac{x^3 - 1}{x^2 - 1}$

8. $\dfrac{3}{x - 2} + \dfrac{5}{x - 1}$

9. $\dfrac{2}{x - 1} + 4$

Rationalize the denominator:

10. $\dfrac{5 + \sqrt{3}}{5 - \sqrt{2}}$

11. $\dfrac{6}{4 - \sqrt{x + 2}}$

Rationalize the numerator:

12. $\dfrac{5 - \sqrt{6}}{6}$

13. $\dfrac{3 + \sqrt{5}}{3 - \sqrt{2}}$

14. $\dfrac{8 + \sqrt{x + 1}}{2}$

Write the equation of the following lines:

15. The line through the point (3, -4) with slope -5.

16. The line through the point (4, -3) and (6, -7).

17. The line through the point (-4, -3) that is parallel to the line $y = {}^{2}/_{3}x + 4$.

18. The line through the point (-4, 5) that is perpendicular to the line $3x + 6y = 8$

19. The horizontal line through the point (-4, -5).

20. The vertical line through the point (-3, 4).