MATH 1592 - Review of Chapter 9

1 Main Topics

1. Definitions and standard equations of parabola, ellipse, and hyperbola (Section 9.1).
2. Definition of parametric equations on page 665.
3. Conversion between parametric equations and rectangular equations
4. Parametric form of derivatives on page 675.
5. Arc length in Parametric form (page 678) and polar form (page 698).
6. Area of a surface of revolution in Parametric form (page 680) and polar form (page 699).
7. Polar coordinates on page 684.
8. Coordinate conversion on page 685.
9. Sketch of polar graphs on page 686.
10. Slope in polar form on page 688.
11. Area of a polar region.
12. Parameter equations used frequently:
    - Circle:
    $$x = h + a\cos\theta, \quad y = k + a\sin\theta, \quad 0 \le \theta < 2\pi.$$
    - Ellipse:
    $$x = h + a\cos\theta, \quad y = k + b\sin\theta, \quad 0 \le \theta < 2\pi.$$
    - Hyperbola:
    $$x = h + a\sec\theta, \quad y = k + a\tan\theta.$$
    - Cycloid:
    $$x = a(\theta - \sin\theta), \quad y = a(1 - \cos\theta).$$
13. Polar graphs used frequently:
    - Circle:
    $$r = a, \quad \text{or } r = a\sin\theta, \quad \text{or } r = a\cos\theta.$$
    - Line:
    $$\theta = \alpha, \quad \text{or } r = \sec\theta.$$
    - Rose:
    $$r = a\sin(n\theta), \quad \text{or } r = a\cos(n\theta).$$
    - Limaçons:
    $$r = a \pm b\sin\theta, \quad \text{or } r = a \pm b\cos\theta \quad a > 0, b > 0.$$

2 Review Exercises

Review all problems handed out on Fridays and the Review Exercises for Chapter 9 on page 709: 5, 6, 7, 8, 23, 24, 25, 26, 27, 30, 31, 37, 43, 49, 51, 53, 55, 60, 61, 65, 67, 69, 73, 81, 90, 95.