

## MTH 162 Homework 12

Do the first four problems. Due: Apr 16, 2014 (Wednesday). Hand in to me during the class.

### Compulsory:

#### Ex 9.2

**3–6** ■ Find an equation of the tangent to the curve at the point corresponding to the given value of the parameter.

6.  $x = \sin^3 \theta, \quad y = \cos^3 \theta; \quad \theta = \pi/6$

29. Find the area enclosed by the  $x$ -axis and the curve  
 $x = 1 + e^t, y = t - t^2$ .

(Hint: find the intersection of this curve with the  $x$ -axis to find the lower and upper limits for the area integral.)

**37–40** ■ Find the exact length of the curve.

37.  $x = 1 + 3t^2, \quad y = 4 + 2t^3, \quad 0 \leq t \leq 1$

#### Ex 9.3

**3–4** ■ Plot the point whose polar coordinates are given. Then find the Cartesian coordinates of the point.

3. (a)  $(1, \pi)$                       (b)  $(2, -2\pi/3)$       (c)  $(-2, 3\pi/4)$

**Recommended:** (These types of questions may also appear in the exams)

**Ex 9.2**

**1-2** ■ Find  $dy/dx$ .

1.  $x = t \sin t, \quad y = t^2 + t$       2.  $x = 1/t, \quad y = \sqrt{t} e^{-t}$

**3-6** ■ Find an equation of the tangent to the curve at the point corresponding to the given value of the parameter.

3.  $x = 1 + 4t - t^2, \quad y = 2 - t^3; \quad t = 1$

4.  $x = t - t^{-1}, \quad y = 1 + t^2; \quad t = 1$

5.  $x = t \cos t, \quad y = t \sin t; \quad t = \pi$

6.  $x = \sin^3 \theta, \quad y = \cos^3 \theta; \quad \theta = \pi/6$

**13-16** ■ Find the points on the curve where the tangent is horizontal or vertical. If you have a graphing device, graph the curve to check your work.

13.  $x = t^3 - 3t, \quad y = t^2 - 3$

14.  $x = t^3 - 3t, \quad y = t^3 - 3t^2$

15.  $x = 2 \cos \theta, \quad y = \sin 2\theta$

16.  $x = e^{\sin \theta}, \quad y = e^{\cos \theta}$

**37-40** ■ Find the exact length of the curve.

38.  $x = e^t + e^{-t}, \quad y = 5 - 2t, \quad 0 \leq t \leq 3$

39.  $x = t \sin t, \quad y = t \cos t, \quad 0 \leq t \leq 1$

40.  $x = 3 \cos t - \cos 3t, \quad y = 3 \sin t - \sin 3t, \quad 0 \leq t \leq \pi$

