Math 152 Week in Review: Section 10.1, 10.2

1. Determine if the point is on the parametric curve $x(t) = t^2 - t + 1$, $y(t) = t - 2$

   (a) $(57, 6)$

   (b) $(40, 5)$

2. For each of the following parametric equations sketch the curve and indicate with an arrow the direction in which the curve increases as t increases. Then eliminate the parameter to find a a Cartesian equation of the curve.

   (a) $x(t) = 1 + 4t, \qquad y(t) = t^2 - t$

   (b) $x = 5\sin\theta, \qquad y = 3\cos\theta, \qquad \frac{\pi}{2} \leq \theta \leq \frac{3\pi}{2}$

(c) $x(t) = 4 + 4\cos\theta, \qquad y(t) = -5 + 4\sin\theta$

3. Find the length of the arc of the curve $x = t^2$, $y = t^3$ that lies between the points $(1, 1)$ and $(4, 8)$.

4. Find the length of the curve $y = \dfrac{x^3}{6} + \dfrac{1}{2x}$ for $1 \leq x \leq 3$

5. Find the length of the curve $x = e^t - t$, $y = 4e^{t/2}$, $0 \leq t \leq 2$

6. Find the length of the curve $x = e^t \sin(t)$, $y = e^t \cos(t)$, $0 \leq t \leq \pi$

7. Find the area of the surface obtained by rotating the curve about the $x-$axis.

$x = \dfrac{t^3}{3}$, $y = t^2$, $0 \leq t \leq 1$

8. Find the area of the surface obtained by rotating the curve about the $y-$axis.

   $x = 5\sin t,\ y = 5\cos t,\ 0 \leq t \leq \pi$

9. Find the area of the surface obtained by rotating the curve about the $y-$axis.

   $x = 3t^2,\ y = 2t^3,\ 0 \leq t \leq 5$

10. Setup the integral that would find the area of the surface obtained by rotating the curve about the $x-$axis.

    $x = 2t - t^2$, $y = 3 + t^2$, $0 \leq t \leq 2$

11. Setup the integral that would find the area of the surface obtained by rotating the curve about the $y-$axis.

    $x = 2t - t^2$, $y = 3 + t^2$, $0 \leq t \leq 2$