Math 132.5. Worksheet 5

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(1) S17Q5 Given the parametric equations $x = t^2 - 2$ and $y = 5 - 2t$, find the Cartesian equation of the curve.

(2) F17Q4 Find the parametric equations for a particle traveling along the circle $(x-1)^2 + (y-2)^2 = 4$ when the particle moves clockwise halfway around the circle starting at the point $(3, 2)$.

(3) S18Q5 Find the equation of the tangent line for the parametric curve given by $x = 7\sin t$ and $y = 7\cos t$ at $t = \pi/4$.

(4) S18Q11ab Consider the curve defined by the parametric equations $x = t^2 + 1$, $y = t^3 - 3t$.

   (a) Find the point(s) at which the curve has a horizontal tangent line.

   (b) Set up but do not evaluate a definite integral representing the length of the curve for $0 \leq t \leq 3$.

(5) F16Q9a Consider the curve given by the parametric equations $x = \sin 4t$ and $y = -\cos t$ for $0 \leq t \leq \pi$. At what t value(s) is there a vertical tangent line? Find the equation(s) of the vertical tangent line(s).

(6) S17Q8b Find the exact length of the curve with parametric equations $x = t^3$ and $y = 2t^2$ for $0 \leq t \leq 1$.

(7) F17Q8ab Consider the curve given by the parametric equations $x = 9\sin t$ and $y = 9\cos t$ for $0 \leq t \leq \pi$.

   (a) Calculate $\frac{d^2y}{dx^2}$ at $t = 3\pi/4$.

(b) Find the exact length of the curve.

(8) F17Q3 Consider the the Cartesian point $(2\sqrt{2}, 2\sqrt{2})$. Which of the following represent this point in polar coordinates?
(i) $(-4, -7\pi/4)$, (ii) $(-4, \pi/4)$, (iii) $(4, -\pi/4)$, (iv) $(-4, 3\pi/4)$.

(9) S18Q4 Find the Cartesian equation for the following Polar equation:

$$r = \frac{1}{2\cos\theta - 3\sin\theta}.$$

(10) S17Q9b Find the Cartesian equation of the polar curve $r^2 = 36r\cos\theta$ and simplify to standard form.

(11) F17Q9b Calculate $\frac{dy}{dx}$ for $r = 4 + 4\cos\theta$.

(12) S17Q9a Find the slope of the tangent line to the polar curve $r = 2\theta$ at $\theta = \pi/3$.