Practice Test for Unit Assessment 8

Unit 9

1. Classify and Write the Standard form for the following conics

(a) $4x^2 + y^2 - 14x + 8y - 20 = 0$

(b) $9x^2 - 25y^2 - 36x - 50y + 6 = 0$

2. Find all possible equations of the conic with given characteristics (write your answer in standard forms)

(a) a parabola with a directrix $x = 4$ and passes through $(0, 6)$ and the distance between the focus and the directrix is 4.

(b) a circle passes through $(2,5), (3,1)$ and $(2,0)$

(c) an ellipse with eccentricity $e = \frac{2}{\sqrt{5}}$, covertices at $(-3, 2), (5, 2)$

(d) a hyperbola with asymptotes $y = \frac{1}{4}x + \frac{7}{4}, y = -\frac{1}{4}x + \frac{9}{4}$ and a focus at $(-3, 2)$

3. Find all possible tangent lines for

(a) $y^2 - 4x + 8y = -28$ that passes through (1,-5)

(b) $(x-3)^2 + y^2 = 10$ that passes through (4, -3)

4. Rotate the axes of x and y so that the xy term in the general form below will be eliminated. Write the general form into the standard form in the rotated coordinate, and classify the conic.

(a) $9x^2 - 6xy + y^2 - x - 3y - 10\sqrt{10} = 0$

(b) $3x^2 - 24xy - 4y^2 - 20x - 15y + 7 = 0$

5. Graph the parametric equation

(a) $\begin{cases} x = \cos\theta \\ y = 2\sin\theta \end{cases}, 0 \le \theta < \pi$

(b) $\begin{cases} x = 3\cos\theta \\ y = 2\sin 3\theta \end{cases}, 0 \le \theta < 2\pi$

6. Graph the polar equation, identify the possible symmetry and zeros

(a) $r = 1 + 2\cos\theta$

(b) $r = \frac{6}{2 - 3\sin\theta}$

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7. Graph the following functions, and find the possible x-intercept, y-intercept, asymptotes, and holes

(a) $f(x)=3+\log_{1/2}(x-2)$

(b) $f(x)=\dfrac{x-x^2}{x^3-2x^2-5x+6}$

8. Solve the following equations

(a) $2e^{x}-e^{-x}=1$

(b) $\log_2(x-2)+\log_2(2x-3)=2$

(c) $3\tan^2 x-1=2\tan x,\ x\in\left[0,\dfrac{\pi}{2}\right)$

9. Let $f(x)=\dfrac{x^3-7x+8}{\left(x^2-x\right)\left(x^2-4x+4\right)}$. If $f(x)$ can be uniquely written into the form of $f(x)=-\dfrac{a}{x}+\dfrac{b}{x-1}+\dfrac{c}{x-2}+\dfrac{d}{(x-2)^2}$ where a,b,c and d are real numbers. Evaluate $\sqrt{\dfrac{a^2+c^2}{b^2+d^2}}$

10. Let $g(x)=ax^3+bx^2+cx+d$ where a,b,c and d are from question 9.

(a) Find the possible x-intercepts

(b) Find the y-intercept

(c) Describe the ending behaviors of g(x)

(d) Evaluate the points in the following table

x	$-\frac{3}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$	1
g(x)				

(e) Sketch $g(x)$ on a coordinate plane with information from (a)-(d)