Unit 9 Assessment

Before you start your response, please read the information here:
You may attempt as many questions as you can.
Your Summative Assessment grade will be based on the performance you did here, following the curve below:

$$f(x)=\begin{cases} \frac{5}{2}x, x\le 40 \\ -\frac{1}{20}(x-60)^2+120, x>40 \end{cases}$$

1. (10 points) $f(x)=\dfrac{9x^3+36x^2-33x-6}{x(x-2)(x+1)^2}$ can be uniquely written into as $f(x)=\dfrac{b}{x}+\dfrac{a}{x+1}+\dfrac{c}{(x+1)^2}+\dfrac{d}{x-2}$

Where $a,b,c,d\in\mathbb{R}$,

(1) find a, b, c and d

(2) evaluate $\sqrt{\dfrac{a^4+b^4}{c^2+d^2}}$

2. (5 points) Let $g(x)=ax^3+bx^2+cx+d$ where a,b,c and d are from question 1.

(1) find all possible x-intercepts

(2) find the y-intercept

(3) describe the ending behavior of g(x)

(4) evaluate g(x) with given x in the table below

x	-3	-1	3	5
g(x)				

(5) properly choose the viewing window and scale, sketch g(x) on a coordinate plane with the information found from (a) – (d)

3. (5 points) Solve the trigonometric equation: (If solution exists, write the solution in its exact value)

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

4. (5 points) Solve the logarithmic equation: (If solution exists, write the solution in its exact value)

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

5. (5 points) Graph the polar equation, identify the possible symmetry and zeros

$$r=1+2\cos\theta, 0\le\theta<2\pi$$

6. (5 points) Graph the parametric equation

$$\begin{cases} x=2\cos\theta \\ y=1+\sin\theta \end{cases}, \frac{\pi}{2}\le\theta<\frac{7\pi}{4}$$

7. (5 points) write the following conic in its standard form, classify the conic and find its possible x and y intercepts.

$$4x^2 + y^2 - 16x + 8y + 16 = 0$$

8. (5 points) Find the possible tangent lines for a parabola $y^2 - 4x + 8y = -28$ that passes through a point off the parabola $(1, -5)$

9. (10 points) Given a conic in its general form below, there exists θ such that when rotated the axes of x and y about the origin for θ , the xy term in the general can be eliminated in the new coordinate (x', y'). (1) Find the exact value of the angle of rotation of θ between the original coordinate and the rotated coordinate. (2)Write the general form into the standard form in the rotated coordinate (x', y'), and (3) classify the conic.

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

10. (5 points) Find a parabola with the directrix $x = -2$, x-intercept @ $(-12, 0)$, the distance between its focus and $x = -2$ is 2.

Standard forms of conics

circle: $(x-h)^2 + (y-k)^2 = r^2$	parabola: $4c(x-h) = (y-k)^2$ $4c(y-k) = (x-h)^2$
ellipse: $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$ $\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$	hyperbola: $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$ $-\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$