Review Test 1 **Name**
Math 1113 **Id**

Read each problem carefully. Show all your work. Credits will be given mainly depending on your work, not just an answer. Put a box around the final answer to a question. Use the back of the page if necessary.

1 **[10]** Solve the quadratic equation $2x^2 - 8x + 3 = 0$

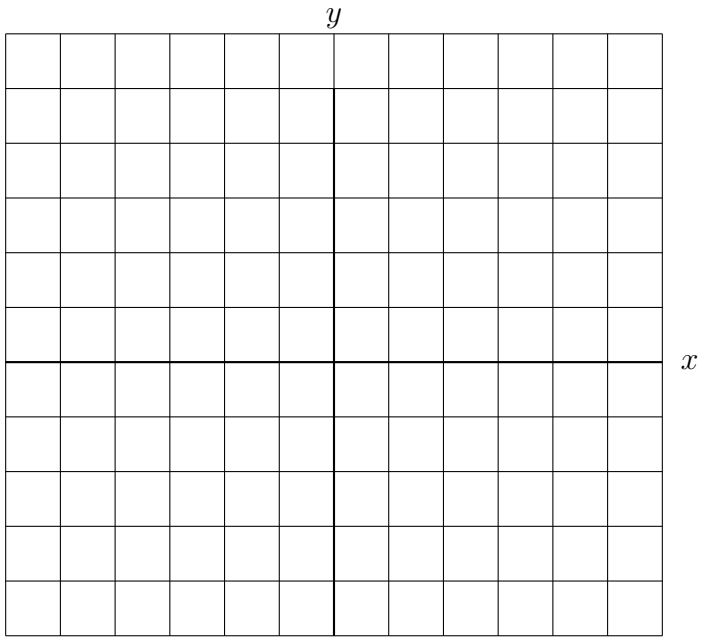
2 **[10]** Find the **real solution** of the equations

a) $x^6 - 7x^3 = 8$
b) $\sqrt{12 - x} = x$ (Check your answer!)
c) $|x^2 + 2x| = 8$

3 **[10]** Find the domain of the function $g(x) = \frac{x^2-9}{\sqrt{x+3}}$.

4 **[10]** a) Use the method discussed in class to graph the function $h(x) = -4x^2 + 12x + 17$.

Vertex _____
x-intercept _____
y-intercept _____



Domain _____ Range _____

Increasing over _____ Decreasing over _____

5 [10] For the function $f(x) = 32x^2 - 2x^6$ find:

Completely factored form _____

Zero _____ Multiplicity _____

Zero _____ Multiplicity _____

Zero _____ Multiplicity _____

Zero _____ Multiplicity _____

Zero _____ Multiplicity _____

Zero _____ Multiplicity _____

X-int _____

Y-int _____ End behavior _____

6 [10] a) Graph the rational function $f(x) = \frac{x^3+5x^2+6x}{x^2-4}$ (Hint: Factor the numerator and denominator first)

Domain _____ Range _____

Vertical Asymptote _____

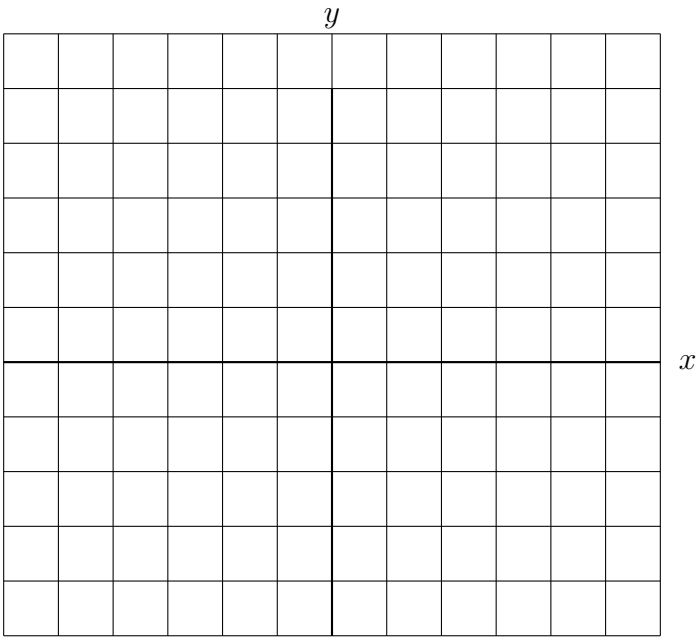
Horizontal Asymptote _____

Slant/Oblique Asymptote _____

X-int _____

Y-int _____

Sign Chart



b) (optional) Write down the formula of a rational function that has a graph with the following properties: Vertical asymptotes of $x = -2$ and $x = 3$, zeros at $x = 0, 2$ and 4, and a horizontal asymptotes of $y = -1$.

7 **[10]** Solve the inequality $-2x^4 + 20x^2 - 18 \leq 0$.

8 **[10]** a) Find the inverse of the function $r(x) = \frac{2x}{x-3}$.

b) Let $f(x) = \sqrt{2x}$ and $g(x) = \frac{x-1}{x+2}$.

i) Find the domain of $f \circ g$

ii) Find $f^{-1}(x)$

iii) What is the domain and range of $f^{-1}(x)$?

iv) Sketch $f(x)$ and $f^{-1}(x)$ on the same graph.

v) Do the same for $g^{-1}(x)$

9 **[10]** a) Graph $f(x) = 3^{x-1} + 1$. Find and label *all asymptotes and intercepts.*

Domain _____ Range _____

b) Let $u(x) = -3 + 2^{x-4}$ and $v(x) = 4 + \log_2(x + 3)$.

i) Sketch the graph of $u(x)$ by hand using transformations.

ii) Do the same for $v(x)$.

iii) Find the inverse of $v(x)$.

10 **[10]** a) Evaluate $\log_4 1$, $\log_4 4$, $\log_4(1/16)$.

b) Given that $\ln x = \frac{1}{2}$, $\ln y = 2$ and $\ln z = 3$, evaluate $\ln(\frac{x^8}{z\sqrt{y}})$.

c) Combine $3\log_2(x+1)+2\log_4(4x)-\log_2(4x+4)$ into one logarithm (Must be completely simplified for full credits)

d) Write $\ln\left(\dfrac{\sqrt{x+10}}{(x+4)^3}\right)$ as a sum and/or difference of logarithms.

11 **[10]** a) Solve $2^{3x+1}4^{-x} = 4^2$ for x.

b) Solve $2 + 7 \cdot 4^{2x+1} = 16$.

c) Solve the logarithmic equation $\log_4 x - \log_4(x - 3) = 1$.

d) Solve $2 + 7\log_4(2x + 1) = 16$

e) Solve $3^{x+1} = 2^{1-x}$ by taking the natural log of both sides.

12 **[10]** a) How much should be invested in an account that pays 5% annual interest compounded monthly in order to have \$5000 in the account after 6 years?

b) What yearly interest rate compounded continuously is required for an investment to double in value after 10 years?