

MA107 FINAL EXAM REVIEW

- Find the vertex of the graph of the quadratic function $2x^2 - 5x + 7$.
- List all possible rational zeros of $f(x) = x^3 - x^2 - 4$. Find the quotient and remainder if $f(x)$ is divided by $(x - 2)$.
- Factor completely: $x^3(x - 6)^2 + x^4(x - 6)$
- A rancher has 500 feet of fencing and wants to construct two adjacent pens as shown.
 - Find a formula for the total area of the pens as a function of its side, x .
 - What is the maximum total area that can be enclosed?
- Find the domain of $f(x) = \sqrt{7 - 3x}$
- If $f(x) = x - x^2$, find $\frac{f(x+h)-f(x)}{h}$.
- Solve for x if $\log_5(x + 4) + \log_5(x) = 1$
- Describe the transformations that take place on $f(x)$ for each of the following:
 - $y = f(3x) + 2$
 - $y = -2f(x - 4)$
- If $f(x) = 2x^2 - x$ and $g(x) = \frac{1}{x+2}$, find
 - $(f \circ g)(x)$
 - $(g \circ f)(x)$
- Given the polynomial $f(x) = x^2(x - 3)(x - 1)$, find the degree, end behavior, and all zeros and their multiplicity. Then use this information or a sign chart to sketch the graph of the function.
- For the rational function $f(x) = \frac{x^2+3x-10}{x^2+8x+15}$ find the vertical and horizontal asymptotes and the x intercepts of the function.
- If \$15,000 is invested at an interest rate of 8% per year, compounded quarterly, find the value in the account after 10 years.
- Write $\log\left(\frac{a^2}{b^4\sqrt{c}}\right)$ in expanded form.
- Find an exact value for $\log_8(16) - \log_8(2)$.
- Solve for x
 - $\log(2 - x) = 2$
 - $4^x = 5^{x-1}$
- For $g(x) = x^3 - 1$,
 - Show that $g(x)$ is one-to-one.
 - Find $g^{-1}(x)$.
- Use special triangles to find exact value of $\sin^2(60^\circ) - \sec(45^\circ)$
- Find the exact value of each of the remaining trig functions if $\cos(\theta) = \frac{4}{5}$ and θ is in Quadrant IV.
- Find reference angles for
 - $\theta = 450^\circ$
 - $\theta = -60^\circ$
- A wire 80 feet long is attached to the top of a radio transmission tower, making an angle of 25° with the ground. How high is the tower?