MTH 30, Midterm extra credit Name (first, last): ....

If you got an F or a D on the midterm exam, you can work on this and hand it in to get some extra credit. Make sure you understand these questions yourself - most will also be on the final exam as well.

Do any working out in the space provided. You must show your work and explain your answers to get full credit.

Q1. For the functions $f(x) = 3x^2 - 2x$ and $g(x) = 4x - 3$ find the composition $f(g(x))$

Q2. Solve the inequality $|2x - 3| \geq 3$ and give the answer in interval notation.

Q3. Define the function $f(x) = \dfrac{3x-4}{x+2}$

(a) Compute $f(-3)$

(b) Use the three step precedure to find the inverse function $f^{-1}(x)$

(c) Use your formula from part (b) to compute $f^{-1}(13)$

Q4. Give the domains of these functions. Write the answers in interval notation.

(a) $f(x) = \dfrac{13}{x+4}$

(b) $g(x) = 3 + 2\sqrt{2x+6}$

Q5. Let $h(x) = \sqrt{x}$.

(a) Sketch the graph of this square root function. Make sure to label and mark off numbers on the x and y axes.

(b) Explain how this picture changes for the graph of $2 + \sqrt{x-1}$

(c) Explain how this picture changes for the graph of $-\sqrt{x}$?

Q6. Give the equation of the line that passes through the point $(3, -4)$ and is parallel to the line $2y = -4x + 15$.

Q7. For the quadratic function $f(x) = 3x^2 - 6x + 5$ find the coordinates of its vertex.

Q8. Let $g(x) = -2(x-2)(x+3)^2$.

(a) Find its end-behavior.

(b) Find its x-intercepts.

(c) Find its y-intercept.

(d) Use parts (a), (b), (c) to sketch the graph of this function.

Q9. Let $h(x) = 2x^3 - x^2 - 5x - 2$.

(a) List all possible rational zeros of $h(x)$, according to the Rational Zeros Theorem.

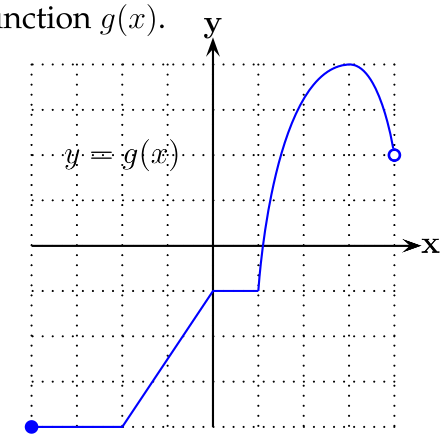
(b) Find the three actual zeros.

Q10. A linear function has a graph that passes through the points $(3, -2)$ and $(-1, 4)$.

(a) Find the slope of this line.

(b) Is this linear function increasing or decreasing? Explain.

Q11. This is the graph of the function $g(x)$.



Find the following:

(a) $g(-1)$

(b) the domain of g

(c) the range of g

(d) the y-intercept

(e) any x-intercepts

Q12. For the graph of $g(x)$ in question 11, find

(a) all intervals where it is decreasing

(b) all intervals where it is positive

(c) any x values where the function has a local minimum

(d) any x values where the function has a local maximum

(e) Lastly, is g a one-to-one function?