

Math 196L (Spring 2017)

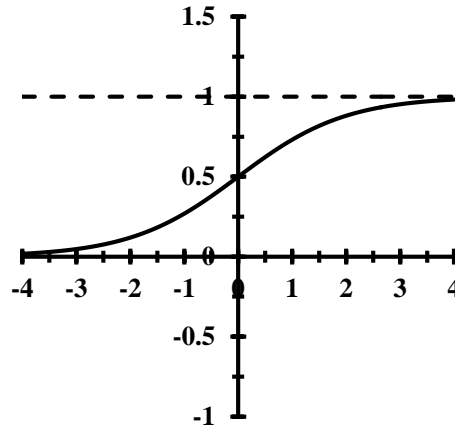
Problem Set 3 Part 2

4. A car gets its best mileage at highway speeds. Sketch a plausible qualitative graph of the gas mileage as a function of speed. Determine a reasonable domain and range for the function and justify your reasoning.
5. Oil is spilled from a tanker into the Pacific Ocean. Suppose the area of the oil spill is approximately a circle and that its radius is increasing at a rate of 2.5 miles per hour. Write the area function in terms of the time since the spill occurred.
6. A bird is collecting seed from a field that contains 100 grams of seed. The time in hours it takes to collect z grams of seed is given by

$$f(z) = \frac{4z+1}{100-z} \quad \text{with } 0 < z < 100$$

- (A) Find the inverse function of f
- (B) Find the domain and range of the inverse function.
- (C) Calculate $f^{-1}(2)$ and give a practical interpretation.
7. Based on data from the Kelley Blue Book, the value V for a ford Focus ZX5 hatchback t years after today can be modeled by the linear model:
- $$V = -1504t + 14,632$$
- (Always in your description include value and the units)
- A) What is the practical interpretation of the number -1504 in the formula?
- B) What is the practical interpretation of the number 14,632 in the formula?
- C) What is the horizontal intercept? And what is the practical interpretation of this value?

8. Use the graph of the function $y = M(x)$ shown below to answer the following questions.



- Determine the intercepts and asymptotes for the function $y = M(x)$.
- Sketch a graph of $y = M^{-1}(x)$.
- Determine the intercepts and asymptotes for the function $y = M^{-1}(x)$.
- Sketch a graph of $y = \frac{1}{M(x)}$.
- Determine the intercepts and asymptotes for the function $y = \frac{1}{M(x)}$.

PART 3: Getting ready for the exam1.

9. . Let $f(x) = \sqrt{x - 4}$ and $g(x) = \sqrt{8 - x}$. State the domain of each of the following:

- | | |
|--|-------------------------------------|
| (A) Domain of f : _____ | (B) Domain of g : _____ |
| (C) Domain of $f + g, f - g, fg$: _____ | (D) Domain of $\frac{f}{g}$: _____ |
| (E) Domain of $\frac{g}{f}$: _____ | (F) Domain of $f \circ g$: _____ |
| (G) Domain of $g \circ f$: _____ | (H) Domain of $f \circ f$: _____ |

10. Solve the following inequalities.

a) $\frac{w-3}{w+5} > 0$

b) $\frac{t(t-A)}{t+A} \geq 0$ Assume A is a positive constant.

c) $y(y-1)^3 - 4y(y-1)^2 \geq 0$

d) $\frac{x}{x+1} \geq 1$