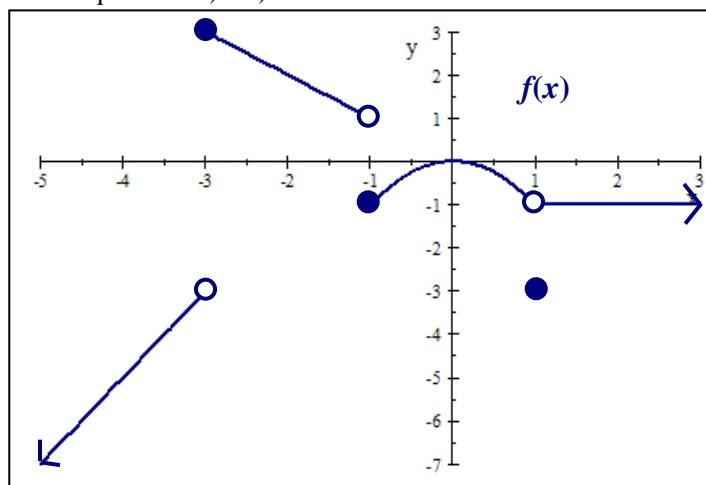


**Math 142 Week In Review**  
**Problem Set #4 (Exam 1 Review 1.2 – 3.3)**  
**Instructor: Jenn Whitfield**

1. Use the graph of  $f(x)$  below to answer questions a) – h).



- a) Find  $\lim_{x \rightarrow -3} f(x)$ .      b) Find  $\lim_{x \rightarrow \infty} f(x)$ .      c) Find  $f(1)$       d) Find  $\lim_{x \rightarrow 1} f(x)$   
e) Find the intervals for which  $f(x)$  is continuous.      f) Find all intervals for which  $f(x) > 0$ .  
g) Is  $f(x)$  a one-to-one function?      h) Find all points of discontinuity.

2. Determine the intervals where the following functions are continuous.

a)  $f(x) = 4 + \ln(2x + 5)$       b)  $g(x) = \frac{x + 3}{x^2 + 5x + 6}$

3. Determine all values of  $x$  for which  $g(x)$  is discontinuous.

$$g(x) = \begin{cases} \frac{x+3}{x+2} & x < 0 \\ 3x+1.5 & x \geq 0 \end{cases}$$

4. Given  $f(x) = \frac{x^2 + x - 2}{x - 1}$  and  $g(x) = \begin{cases} x^2 + 1 & x \leq -1 \\ \sqrt{2x^2 + 3} & x > -1 \end{cases}$  find  $\lim_{x \rightarrow 1} ([g(x)]^2 + f(x))$ .

5. Find the following:

a)  $\lim_{x \rightarrow \infty} \frac{3x - 3 + 4x^2}{8x^2 + 2}$ .      b)  $\lim_{x \rightarrow \infty} \frac{3x - 3 + 4x^2}{8x + 2}$       c)  $\lim_{x \rightarrow \infty} \frac{3x - 3}{4x - 8x^2 + 2}$

6. Find the domain of the following functions.

a)  $f(x) = \frac{\ln(x+3)}{x-2}$       b)  $g(x) = \frac{\sqrt{x-9}}{e^{-3x}}$

7. Currington Clothing produces game day wear for Aggie alumni. They can produce 31 polo style shirts for a total cost of \$416 and 86 polo style shirts for a total cost of \$636. They also know that when 100 shirts are demanded they can sell each shirt at \$3 each, and when 30 shirts are demanded they can sell each shirt for \$17.70 each.

- a) How many shirts must Currington Clothing produce and sell to break-even? (Assume the demand and cost functions are linear.)  
b) How many shirts must be produced for the company to reach their maximum profit?  
c) At what price does the company need to sell their shirts to obtain maximum profit?

8. If Jay deposits \$3400 in an account that pays 5.25% annual interest compounded monthly, what will the balance be after 18 months? (Assume no withdrawals or additional deposits.)

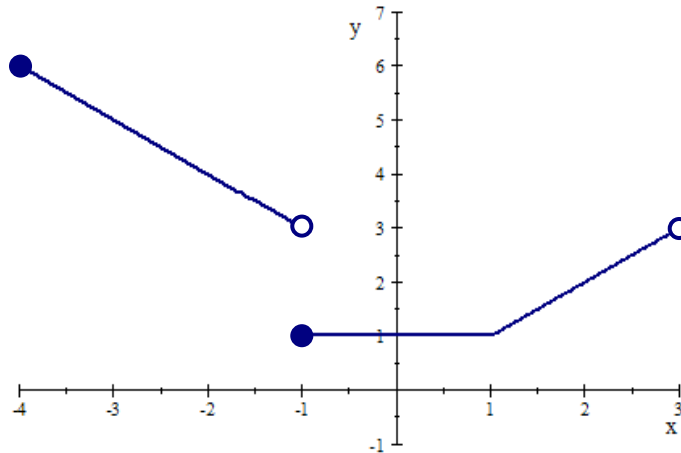
9. Given  $f(x) = \frac{4x^2 + 17x - 42}{-12 + 4x + x^2}$  find the domain, all vertical asymptotes, horizontal asymptotes,  $x$  values of any “holes”, all intercepts.

10. Solve the following equations for  $x$ .

a)  $\ln(\log_{12}(x^2 - 4x)) = 0$       b)  $\frac{9^{7x}}{81^2} = 27^{2x}$       c)  $2 \cdot 4^x - 12 = 6$

11. Given  $g(x) = x^2 + 1$ , find  $\frac{g(x+h) - g(x)}{h}$ .

12. Write the equation for the graph of  $g(x)$  below.



13. Describe how the graph of  $f(x) = -2(x+1)^2 - 3$  compares to the graph of  $g(x) = x^2$ .

14. Rewrite  $f(x) = -2x^2 + 12x - 5$  in vertex form.

15. Use the data set below to answer questions that follow.

<b>x</b>	2	10	25	38	56	60
<b>y</b>	10	13	30	55	96	120

Using either linear, quadratic, or exponential models, find the best fitting regression model if

- used to predict a value of  $x = 50$ .
- used to predict a value of  $x = -30$ .