

Math 130 Prereqs Hand In. Name: Answers

Review the material on the previous pages as needed. You may wish to consult Appendix A and Chapter 1 of your text.

1. Simplify and factor completely:  $(x+3)^2 - 4(x+3)$ .  $= (x+3) [(x+3) - 4]$   
 $= (x+3)(x-1)$

2. Notation and Piecewise Functions. (See pages 14–15, Examples 3 and 4.) Define

$$f(x) = \begin{cases} x+2 & \text{if } x < 1, \\ 2x-4 & \text{if } x \geq 1. \end{cases}$$

Evaluate the following:

a)  $f(3) = 2(3) - 4 = 2$

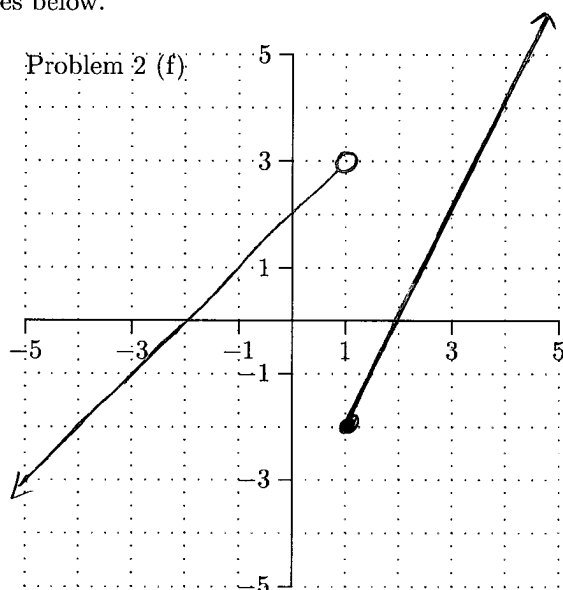
b)  $f(-6) = -6 + 2 = -4$

c)  $f(1) = 2(1) - 4 = -2$

d)  $f(0.99) = .99 + 2 = 2.99$

e)  $f(f(0)) = f(0+2) = f(2) = 2(2) - 4 = 0$

f) Draw a graph of  $f(x)$  on the axes below.



The next problems are in the text. **Show your work.**

3. Page 10 #32 (see Page 6, Example 9)

$$\begin{aligned}\frac{f(2+h) - f(2)}{h} &= \frac{((2+h)^2 - 4) - (2^2 - 4)}{h} = \frac{(4 + 4h + h^2 - 4) - 0}{h} \\ &= \frac{4h + h^2}{h} = \boxed{4+h}\end{aligned}$$

4. Page 11 #80. (See page 8 Example 11. Try #79 that has answers in the back.)

A) Even

B) ODD

C) ODD

5. Page 22 #20. Your answer should be similar in form to the function in Problem 2 of this assignment.

$$f(x) = \begin{cases} x+1, & \text{if } x < 3 \\ \frac{1}{3}x+3, & \text{if } x \geq 3 \end{cases}$$

Work, if needed.

6. a) According to the bottom of page 32,

$$y = \log_b x \text{ if and only if } \underline{b^y = x}$$

- b) Now do page 36 #42.

$$\log_5 x = -1, \text{ so } 5^{-1} = x \text{ or } \boxed{x = 1/5}$$

7. Give the exact value (no decimals) for each of these trig and inverse trig functions. (See pages 40 and 44.)

a)  $\sin(\frac{\pi}{3}) = \sqrt{3}/2$

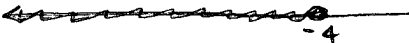

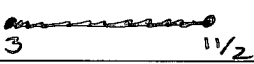
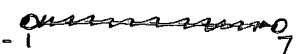
b)  $\cos(\frac{\pi}{2}) = 0$

c)  $\tan(\frac{\pi}{3}) = \sqrt{3}$

d)  $\sin^{-1}(\frac{1}{2}) = \pi/6$

e)  $\cos^{-1}(\frac{1}{2}) = \pi/3$

8. Complete the table, where each row describes the same interval. (See page 1152.)

Interval Notation	Set Notation (Inequalities)	Number Line Graph of the Interval
$(-\infty, -4]$	$\{x: x \leq -4\}$	
$[-2, 0)$	$\{x: -2 \leq x < 0\}$	
$[3, 11/2]$	$\{x: 3 \leq x \leq \frac{11}{2}\}$	
$(-1, 7)$	$\{x: -1 < x < 7\}$	

9. a) According to "Properties of the Absolute Value" in Appendix A page 1153:  $|x| < a$  means the same thing as:

$$-a < x < a$$

- b) Use the property above to solve  $|2x - 4| < 6$ .

so

$$-6 < 2x - 4 < 6$$

so

$$-3 < x - 2 < 3$$

or

$$-1 < x < 5$$

} divide by 2

} add 2

10. These are both optional **Extra Credit**.

a) Page 22 #38 (see Example 6 in the text).

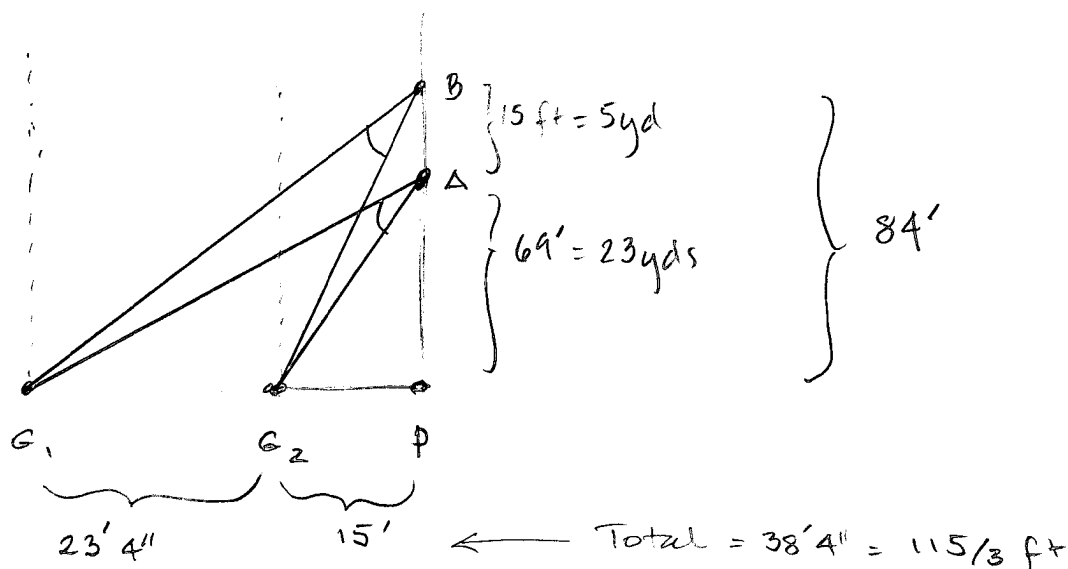
Slope of 1<sup>st</sup> line = 1 for  $x \leq 3$

Slope of 2<sup>nd</sup> line =  $-1/3$  for  $x > 3$

So

$$f(x) = \begin{cases} 1, & \text{if } x \leq 3 \\ -1/3, & \text{if } x > 3 \end{cases}$$

b) Page 49 #98. You will need to use a calculator. Hint: Be sure to convert all measurements to feet! Let  $P$  denote the point where the line  $BA$  meets the  $x$ -axis (end line). Determine angle  $\angle G_1AG_2$  as the difference between angles  $\angle G_1AP$  and  $\angle G_2AP$  by using the arctan function. Similarly for  $\angle G_1BG_2$ . What do you find? Give your answer in radians!



$$\angle G_1AG_2 = \angle G_1AP - \angle G_2AP = \arctan\left(\frac{115/3}{69}\right) - \arctan\left(\frac{15}{69}\right)$$

calculator  $\hookrightarrow$  = .29304 rad

$$\angle G_1BG_2 = \angle G_1BP - \angle G_2BP = \arctan\left(\frac{115/3}{84}\right) - \arctan\left(\frac{15}{84}\right)$$

= .25141 rad (smaller)

Coach was wrong!