MAT 1320D
Due Wednesday, January 21, 2009

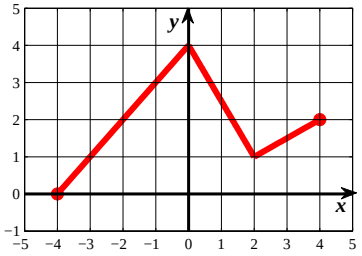
HOMEWORK 1

Please check the following when you turn in your homework:

- Show all work, clearly and in order.
- Circle or otherwise indicate your final answers.
- This Homework has 6 problems and is worth 30 points. It is your responsibility to make sure that you have all of the pages!
- Homework should have a header with YOUR NAME and STUDENT NUMBER.
- Staple your Homework.

1. (1.3 #4) The graph of f is given. Draw the graphs of the following functions.

(a) $y = f(x+4)$ (b) $y = f(x)+4$ (c) $y = 2f(x)$ (d) $y = -\frac{1}{2}f(x)+3$



2. (1.3 #40) Find the functions $f \circ g$, $g \circ f$, $f \circ f$, and $g \circ g$ and their domains:

$$f(x) = \sqrt{2x+3}, \qquad g(x) = x^2 + 1.$$

3. (1.3 #50) Use the table to evaluate each expression.

(a) $f(g(1))$ (b) $g(f(1))$ (c) $f(f(1))$ (d) $g(g(1))$ (e) $(g \circ f)(3)$ (f) $(f \circ g)(6)$

x	1	2	3	4	5	6
$f(x)$	3	1	4	2	2	5
$g(x)$	6	3	2	1	2	3

4. (1.5 #28) An isotope of sodium, ^{24}Na, has a half-life of 15 hours. A sample of this isotope has mass 2g.

(a) Find the amount remaining after 60 hours.
(b) Find the amount remaining after t hours.
(c) Find the amount remaining after 4 days.
(d) Estimate the time required for the mass to be reduced to 0.01g.

5. (1.6 #26) Find a formula for the inverse of the function:

$$y = \frac{1+e^x}{1-e^x}.$$

6. (1.6 #58) When a camera flash goes off, the batteries immediately begin to recharge the flash's capacitor, which stores electric charge given by

$$Q(t) = Q_0\left(1 - e^{-t/a}\right)$$

(The maximum charge capacity is Q_0 and t is measured in seconds.)

(a) Find the inverse of this function and explain its meaning.
(b) How long does it take to recharge the capacitor to 90% of capacity if $a = 2$?