

1 June 2007

**Quiz 1: Math 135, Section C7**

1. Solve for  $x$ :

$$x^2 - x = 0$$

2. Solve for  $x$ :

$$|1 - 5x| = 2$$

3. Find an equation of the line passing through  $(-1, 8)$  and parallel to the line  $3x + y = 7$ .

4. If  $f(x) = \sin x$  and  $g(x) = 2x + 3$ , then what is  $f(g(x))$ ?  $g(f(x))$ ?

5. If  $h(x) = \frac{2x-6}{3x+3}$ , then what is the inverse of  $h$ ?
- 

**Solutions.**

1. We factor:

$$x^2 - x = x(x - 1) = 0$$

so the solutions are  $x = 0$  and  $x = 1$ .

2. The absolute value splits things up into two equations:

$$\begin{array}{ll} 1 - 5x = 2 & 1 - 5x = -2 \\ 5x = -1 & 5x = 3 \\ x = -\frac{1}{5} & x = \frac{3}{5} \end{array}$$

3.  $3x + y = 7$  can be re-expressed as  $y = -3x + 7$ , which is a line that has a slope of  $-3$ . A perpendicular line will have slope  $\frac{1}{3}$ . Since our point is  $(-1, 8)$ , we can use the point-slope form and the equation of our line is

$$y - 8 = \frac{1}{3}(x + 1)$$

- 4.

$$\begin{array}{llll} f(g(x)) & = & f(2x + 3) & = & \sin(2x + 3) \\ g(f(x)) & = & g(\sin x) & = & 2(\sin x) + 3 \end{array}$$

5. Our function is

$$y = \frac{2x - 6}{3x + 3}$$

and so, switching the values of  $x$  and  $y$ , we have

$$\begin{aligned}x &= \frac{2y - 6}{3y + 3} \\(3y + 3)x &= 2y - 6 \\3xy + 3x &= 2y - 6 \\3xy - 2y &= -6 - 3x \\y(3x - 2) &= -6 - 3x \\y &= \frac{-6 - 3x}{3x - 2}\end{aligned}$$