Winter 2014 Math 123A Test 1 Name: SOLUTION

Show all reasonable work clearly, neatly, systematically, and understandably. Any understatement and/or incorrect statement may be penalized. Continue on the back-page if you need more space. There are 103 points available.

A. Basic, 5 points each:

1. Solve: $3.1x - 9.4 = 1.3x + 8.6$

$3.1x - 1.3x = 8.6 + 9.4$

$1.8x = 18$

$x = \frac{18}{1.8}$

$x = \frac{180}{18}$

$x = 10$

2. Simplify according to the order of operations: $-5x - 3[2 - 4(3 - 2x)]$

$= -5x - 3[2 - 12 + 8x]$

$= -5x - 3[-10 + 8x]$

$= -5x + 30 - 24x$

$= 30 - 29x$

3. Compute according to the order of operations: $(25 - 31)^2 \div 4(-2) + 3(-5 + 1)^2$

$= (-6)^2 \div 4(-2) + 3(-4)^2$

$= 36 \div 4(-2) + 3 \cdot 16$

$= 9(-2) + 48$

$= -18 + 48$

$= 30$

4. Compute: $6 \times 0.9 - 0.1 \div 4 + 8.7 \times 0.4$

$= 5.4 - 0.025 + 3.48$

$= 5.375 + 3.48$

$= 8.855$

5. Simplify: $\left(-\frac{2}{3}\right)^2 \cdot \left(-\frac{3}{4}\right)^3$

$= \frac{4}{9} \cdot \left(-\frac{27}{64}\right)$

$= -\frac{3}{16}$

6. Simplify: $-\frac{5}{6}\left(\frac{4}{3}y - \frac{5}{2}\right) - \frac{5}{8}\left(-\frac{5}{6}y + \frac{7}{4}\right)$

$= -\frac{10}{9}y + \frac{25}{12} + \frac{25}{48}y - \frac{35}{32}$

$= -\frac{10}{9}y + \frac{25}{48}y + \frac{25}{12} - \frac{35}{32}$

$= -\frac{160}{144}y + \frac{75}{144}y + \frac{200}{96} - \frac{105}{96}$

$= -\frac{85}{144}y + \frac{95}{96}$

7. Solve and write the solution in set-builder notation: $-4x+\frac{2}{3}\geq -\frac{1}{4}$

$\times 12$

$-48x+8 \geq -3$

$-48x \geq -3-8$

$-48x \geq -11$

$x \leq \frac{-11}{-48}$

$x \leq \frac{11}{48}$

$\{x \mid x \leq \frac{11}{48}\}$

8. Evaluate: $(a-b)^4 \div c^2$, for $a=-3, b=-7$, and $c=-2$

$[(-3)-(-7)]^4 \div (-2)^2$

$= [-3+7]^4 \div (-2)^2$

$= 4^4 \div (-2)^2$

$= 256 \div 4$

$= 64$

B. Intermediate, 6 points each:

9. Solve: $5+3[1+2(2x-3)]=6(x+5)$

$5+3[1+4x-6] = 6x+30$

$5+3[4x-5] = 6x+30$

$5+12x-15 = 6x+30$

$12x-10 = 6x+30$

$12x-6x = 30+10$

$6x = 40$

$x = \frac{40}{6}$

$x = \frac{20}{3}$

10. Solve: $\frac{5}{6}(3x-8)-\frac{1}{4}=\frac{2}{3}x-\frac{1}{2}$

$\frac{5}{2}x-\frac{20}{3}-\frac{1}{4}=\frac{2}{3}x-\frac{1}{2}$

$\times 12$

$30x-80-3 = 8x-6$

$30x-83 = 8x-6$

$30x-8x = -6+83$

$22x = 77$

$x = \frac{77}{22}$

$x = \frac{7}{2}$

$x = 3\frac{1}{2}$

11. Solve: $-3(x+4)-4(3-x)+35=-43+3x$

$-3x-12-12+4x+35 = -43+3x$

$x+11 = -43+3x$

$11+43 = 3x-x$

$54 = 2x$

$\frac{54}{2} = x$

$27 = x$

12. Solve and graph the solution: $2(x-1.1) \leq 5x-4.3$

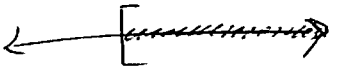
$2x-2.2 \leq 5x-4.3$

$-2.2+4.3 \leq 5x-2x$

$2.1 \leq 3x$

$\frac{2.1}{3} \leq x$

$0.7 \leq x$



0.7

13. Solve: $-0.2(0.3x+7)+0.3(1.2x-0.7)=x$

$-0.06x-1.4+0.36x-0.21=x$

$0.3x-1.61=x$

$-1.61=x-0.3x$

$-1.61=0.7x$

$\frac{-1.61}{0.7}=x$

$\frac{-16.1}{7}=x$

$-2.3=x$

14. Compute according to the order of operations: $\frac{-0.6^2-0.8^2}{(-1.2)^2-(-0.56)}$

$=\frac{-0.36-0.64}{1.44-(-0.56)}$

$=\frac{-1.00}{1.44+0.56}$

$=\frac{-1}{2}$

$=-0.5$

15. Evaluate: $-\frac{3}{4}a+\frac{1}{2}(bc+ad)$ for $a=4, b=-2, c=-1, d=3$

$\Rightarrow -\frac{3}{4}(4)+\frac{1}{2}[(-2)(-1)+4\cdot 3]$

$=-\frac{3}{4}(4)+\frac{1}{2}[2+12]$

$=-\frac{3}{4}(4)+\frac{1}{2}\cdot 14$

$=-3+7$

$=4$

C. Advanced, 7 points each:

16. Simplify: $2\frac{2}{3}\left(\frac{3}{5}x-1\frac{1}{2}\right)-3\frac{5}{7}\left(2\frac{4}{5}-7x\right)$

$=\frac{8}{3}\left(\frac{3}{5}x-\frac{3}{2}\right)-\frac{26}{7}\left(\frac{14}{5}-7x\right)$

$=\frac{8}{5}x-4-\frac{52}{5}+26x$

$=1\frac{3}{5}x-4-10\frac{2}{5}+26x$

$=27\frac{3}{5}x-14\frac{2}{5}$

NOTE: You can also approach with improper fractions.

(From step 2) $=\frac{8}{5}x-4-\frac{52}{5}+26x$

$=\frac{8}{5}x-\frac{20}{5}-\frac{52}{5}+\frac{130}{5}x$

$=\frac{138}{5}x-\frac{72}{5}$

$=27\frac{3}{5}x-14\frac{2}{5}$

17. Solve and write the solution in interval notation: $1.3(x-7.2)<0.4(x+8.6)+2.14$

$1.3x - 9.36 < 0.4x + 3.44 + 2.14$

$1.3x - 9.36 < 0.4x + 5.58$

$1.3x - 0.4x < 5.58 + 9.36$

$0.9x < 14.94$

$x < \frac{14.94}{0.9}$

$x < \frac{149.4}{9}$

$x < 16.6$

$(-\infty, 16.6)$

$\begin{array}{r} 1.3 \\ \times\ 7.2 \\ \hline 26 \\ 91 \\ \hline 9.36 \end{array}$ $\quad$ $\begin{array}{r} 8.6 \\ \times\ 0.4 \\ \hline 3.44 \end{array}$

18. Solve and graph the solution:

$\frac{2}{3}+\frac{1}{3}x-\frac{3}{4}x<\frac{1}{4}+\frac{3}{4}\left(x-\frac{2}{3}\right)$

$\frac{2}{3}+\frac{1}{3}x-\frac{3}{4}x<\frac{1}{4}+\frac{3}{4}x-\frac{1}{2}$ $\times 12$

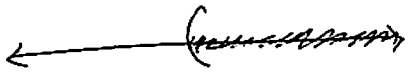
$8+4x-9x<3+9x-6$

$8-5x<9x-3$

$8+3<9x+5x$

$11<14x$

$\frac{11}{14}<x$



$\frac{11}{14}$