Name _____ MAT111- __

YELLOW SHEET **2**

Due Tuesday, February 1, 2005

INSTRUCTIONS: You must show your work on this sheet.

1 Solve the following inequality:

4 $0 < \frac{x-1}{3} + \frac{3x}{4} < 7$

$0 < \frac{(x-1)4}{12} + \frac{3x(3)}{12} < 7$

$0 < \frac{4x-4+9x}{12} < 7$

$0 < 13x - 4 < 84$

$4 < 13x < 88$

$\frac{4}{13} < x < \frac{88}{13}$

2. Solve the following absolute value inequalities algebraically and graphically:

4 a. $3|2-7m| - 1 > 4$

$3|2-7m| > 5$

$|2-7m| > \frac{5}{3}$

$2-7m < \frac{-5}{3}$ OR $2-7m > \frac{5}{3}$

$-7m < \frac{-5}{3} - \frac{6}{3}$ $\quad -7m > \frac{5}{3} - \frac{6}{3}$

$-7m < \frac{-11}{3}$ $\quad -7m > \frac{-1}{3}$

$m > \frac{-11}{-21}$ $\quad m < \frac{-1}{-21}$

$m > \frac{11}{21}$ $\quad m < \frac{1}{21}$

$\{x \mid x < \frac{1}{21}$ or $x > \frac{11}{21}\}$

3. Find an equation of the lines that are (a) perpendicular and (b) parallel to the line $4x - 5y = 9$ and passes through the point $(-1, 2)$.

4

$4x - 5y = 9$

$-5y = -4x + 9$

$5y = 4x - 9$

$y = \frac{4}{5}x - \frac{9}{5}$

$m = \frac{4}{5}$

$m_{\parallel} = \frac{4}{5}$

$m_{\perp} = \frac{-5}{4}$

$y = m_{\parallel}x + b$

$2 = \frac{4}{5}(-1) + b$

$2 = \frac{-4}{5} + b$

$\frac{10}{5} + \frac{4}{5} = b$

$\frac{14}{5} = b$

$y = \frac{4}{5}x + \frac{14}{5}$

$y = m_{\perp}x + b$

$2 = (\frac{-5}{4})(-1) + b$

$2 = \frac{5}{4} + b$

$\frac{8}{4} - \frac{5}{4} = \frac{3}{4} = b$

$y = \frac{-5}{4}x + \frac{3}{4}$

4. Write the standard and general form of the equation of a circle with radius 7 and center (5, -3).

4

S.F.: $(x-5)^2 + (y+3)^2 = 49$

$x^2 - 10x + 25 + y^2 + 6y + 9 = 49$

G.F.: $x^2 - 10x + y^2 + 6y = 15$

5. Solve the following inequality, and sketch the solution on the number line provided.

4

$4|2 - 3x| + 1 \leq 7$

$4|2 - 3x| \leq 6$

$|2 - 3x| \leq \frac{3}{2}$ $\Rightarrow$ $-\frac{3}{2} \leq 2 - 3x \leq \frac{3}{2}$

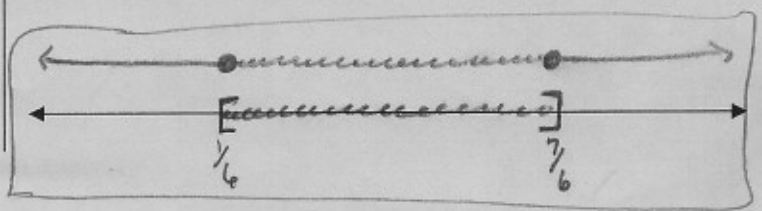
$2 - 3x \geq -\frac{3}{2}$ AND $2 - 3x \leq \frac{3}{2}$

$-\frac{3}{2} - \frac{4}{2} \leq -3x \leq \frac{3}{2} - \frac{4}{2}$

$-\frac{7}{2} \leq -3x \leq \frac{-1}{2}$

$\frac{7}{6} \geq x \geq \frac{1}{6}$

● or [,]



6. For the function f defined by $f(x)=4x^2-3x+9$, evaluate $f(x+1)$.

$f(x+1) = 4(x+1)^2 - 3(x+1) + 9$

$= 4(x^2+2x+1) - 3x - 3 + 9$

$= 4x^2 + 8x + 4 - 3x + 6$

$= 4x^2 + 5x + 10$

+1

7. Find the domain of each of the following functions:

+1 a) $g(x)=\sqrt{14-4x}$

$14 - 4x \geq 0$

$-4x \geq -14$

$x \leq \frac{14}{4} = \frac{7}{2} = 3.5$

$(-\infty, 7/2]$

b) $f(x)=4x^3-3x$

Polynomial

All real #'s

c) $f(n)=\dfrac{n^2-25}{n^2-6n+8}$

$(n-4)(n-2) \neq 0$

$n \neq 4 \quad n \neq 2$

8. Suppose that a company has just purchased a new computer for $4500. The company chooses to depreciate the computer using the straight-line method over 5 years.

a. Write a linear function that expresses the book value of the computer as a function of its age.

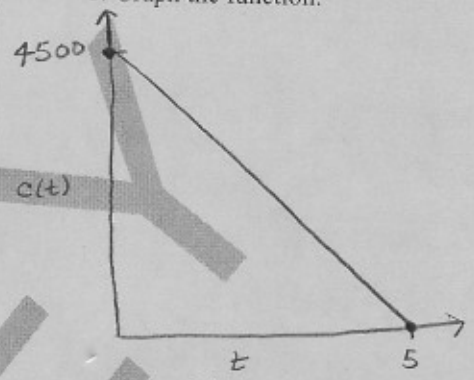
+1 $C(0) = 4500 = b$ Depreciation

$\frac{-4500}{5}$

$= -900 = m$

$C(t) = -900t + 4500$

b. Graph the function.



c. What is its book value after 3.5 years?

$C(3.5) = -900(3.5) + 4500$

$= \$1,350$

14. The budget for books in a New York Public Library branches has declined recently as shown in the table. Budgets are given in millions of dollars.

* change

Year (x)	Budget (y)
91	~~8.4~~ 8.3
92	~~8.3~~ 8.1
93	7.8
94	7.6
95	7.5
96	~~7.6~~ 7

+1

a. Find and write the line of best fit.

$y = -0.243x + 30.424$

b. What will the budget approximately be in ~~2001~~ 1999?

$y = -0.243(99) + 30.424$

$y = \$6.367$ million

$\$6,367,000$