MAT 201 SA #s 1, 2, 7, 8, 21, 25, 27, 34, 40, 51, 53, 57, 59, 63

#s 1-12 Re-write w/o absolute value

(1) $|5-23| = |-18| = 18$

(2) $|5| - |-23| = 5 - 23 = -18$

(7) If $x < 2$, then $x-2 < 0$, so

$|x-2| = -(x-2) = 2-x$

(8) If $x > 2$, then $x-2 > 0$, so

$|x-2| = x-2$

#s 13-39 Solve in terms of intervals & illustrate the soln on the real # line

(21) $0 \le 1-x < 1$

$\Rightarrow -1 \le -x < 0$

$\Rightarrow 1 \ge x > 0$

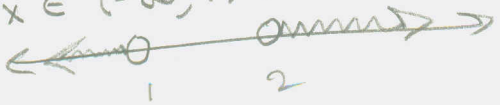
$\Rightarrow 0 < x \le 1$

$\Rightarrow x \in (0, 1]$

(25) $(x-1)(x-2) > 0$

Key pts: $x = 1, 2$

$x \in (-\infty, 1) \cup (2, \infty)$



(29) $x^2 + x + 1 > 0$

$x^2 + x + \left(\frac{1}{2}\right)^2 - \frac{1}{4} + 1 > 0$

$\left(x + \frac{1}{2}\right)^2 + \frac{3}{4} > 0$

is always true.

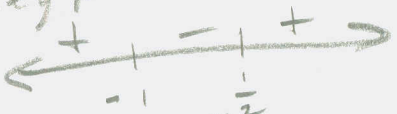
$x \in \mathbb{R} = (-\infty, \infty)$

(27) $2x^2 + x \le 1$

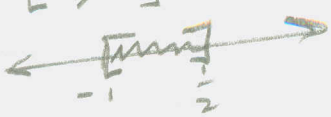
$2x^2 + x - 1 \le 0$

$(2x-1)(x+1) \le 0$

Key pts $x = -1, \frac{1}{2}$



$x \in [-1, \frac{1}{2}]$



MAT 201 SA #s 34, 40, 51, 53, 57, 59, 63

(34) $(x+1)(x-2)(x+3) \geq 0$

Key pts: $-3, -1, 2$

$x \in [-3, -1] \cup [2, \infty)$

$=$

(39) Let C = Celsius Temp
& F = Fahrenheit Temp

Then $C = \frac{5}{9}(F - 32)$

What interval on C-scale corresponds to $50 \leq F \leq 95$?

$50 - 32 \leq F - 32 \leq 95 - 32$

$\frac{5}{9}(18) \leq \frac{5}{9}(F-32) \leq \frac{5}{9}(63)$

$10 \leq C \leq 35$

(40) What about Fahrenheit for $20 \leq C \leq 30$?

$20 \leq \frac{5}{9}(F-32) \leq 30$

$\frac{9}{5}(20) \leq F - 32 \leq \frac{9}{5}(30)$

$36 \leq F - 32 \leq 54$

$68 \leq F \leq 86$

MAT 201 5.A #s 51, 53, 57, 59, 63

#s 47-56 Solve the inequality

(51) $|x+5| \geq 2$

$x+5 \geq 2$ or $x+5 \leq -2$

$x \geq -3$ or $x \leq -7$

$\Rightarrow [-3, \infty) \cup (-\infty, -7]$

$= (-\infty, -7] \cup [-3, \infty)$

(53) $|2x-3| \leq 0.4$

$-.4 \leq 2x-3 \leq .4$

$2.6 \leq 2x \leq 3.4$

$1.3 \leq x \leq 1.7$

$\Rightarrow x \in [1.3, 1.7]$

(57) Solve for x. Assume $a, b, c > 0$

$a(bx-c) \geq bc$

$abx - ac \geq bc$

$abx \geq ac + bc$

$x \geq \frac{ac+bc}{ab}$

(59) Same. Assume $a, b, c < 0$ this time

$ax+b < c$

$ax < c-b$

$x > \frac{c-b}{a}$

(63) If $a < b$, then $a < \frac{a+b}{2} < b$.

PROOF:

$a < b \Rightarrow$

$a+a < a+b \Rightarrow$

$2a < a+b \Rightarrow$

$a < \frac{a+b}{2}$.

Likewise

$a < b \Rightarrow$

$a+b < b+b = 2b \Rightarrow$

$\frac{a+b}{2} < b$. Combine:

$a < \frac{a+b}{2} < b$ ∎