

§ 1.8 INEQUALITIES

21, 33, 39, 43, 56, 67, 81, 95, 96

21. $4x - 7 < 8 + 9x$

$-15 < 5x$

$-3 < x$

$(-3, \infty)$



33. $-2 < 8 - 2x \leq -1$

$-10 < -2x \leq -9$

$5 > x \geq \frac{9}{2}$

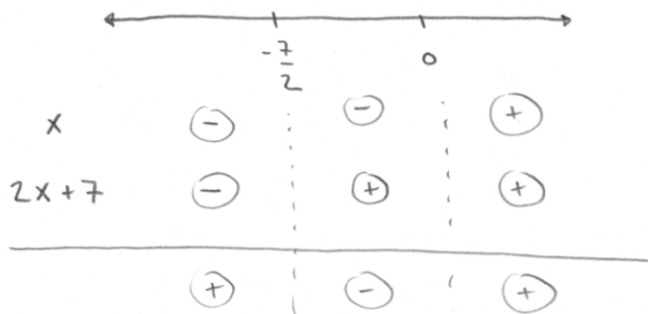
DIVIDE BY NEGATIVE
 \Rightarrow FLIP INEQ.'S

$[\frac{9}{2}, 5)$

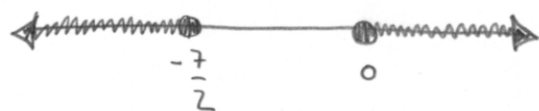


39. $x(2x + 7) \geq 0$

$x = 0$ $x = -\frac{7}{2}$



$(-\infty, -\frac{7}{2}] \cup [0, \infty)$

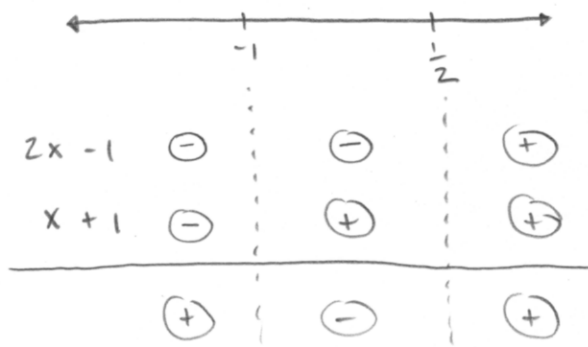


43. $2x^2 + x \geq 1$

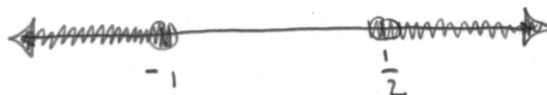
$2x^2 + x - 1 \geq 0$

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

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



$(-\infty, -1] \cup [\frac{1}{2}, \infty)$



56. $4x^2(x^2-9) \leq 0$

$4x^2(x+3)(x-3) \leq 0$

\checkmark \downarrow \searrow
 $x=0$ $x=-3$ $x=3$

		-3	0	3	
$4x^2$	(+)	(+)	(+)	(+)	(+)
$(x+3)$	(-)	(+)	(+)	(+)	(+)
$(x-3)$	(-)	(-)	(-)	(+)	(+)
	(+)	(-)	(-)	(+)	(+)

$[-3, 3]$



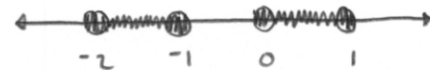
67. $1 + \frac{2}{x+1} \leq \frac{2}{x}$

$\frac{x(x+1) + 2x - 2(x+1)}{x(x+1)} \leq 0$

$\frac{x^2 + x + 2x - 2x - 2}{x(x+1)} = \frac{(x+2)(x-1)}{x(x+1)} \leq 0$

$[-2, -1] \cup [0, 1]$

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



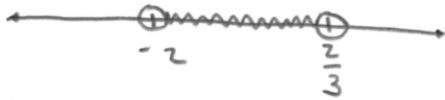
81. $|3x + 2| < 4$

$\Rightarrow -4 < 3x + 2 < 4$

$-6 < 3x < 2$

$-2 < x < \frac{2}{3}$

$(-2, \frac{2}{3})$



95. $|x| \leq 2$

96. $|x| \geq 1$

99. $|x - 1| \leq 3$

100. $|x - (-2)| > 1$

$\hookrightarrow |x + 2| > 1$