

Section 3-7

Name: _____

1. Solve the following quadratic inequalities in one variable:

a. $x^2 + 3x - 10 > 0$

BOUNDARY POINTS → $(x-2)(x+5) = 0$

$x-2=0 \rightarrow x=2$ or $x+5=0 \rightarrow x=-5$

TEST $x=-6$
 $(-6)^2 + 3(-6) - 10 > 0$
 $36 - 18 - 10 > 0$
 $8 > 0$ TRUE

TEST $x=0$
 $(0)^2 + 3(0) - 10 > 0$
 $-10 > 0$ FALSE

TEST $x=3$
 $(3)^2 + 3(3) - 10 > 0$
 $9 + 9 - 10 > 0$
 $8 > 0$ TRUE

GRAPH

SET NOTATION
 $x < -5$ or $x > 2$

INTERVAL NOTATION
 $(-\infty, -5) \cup (2, \infty)$

b. $-x^2 + 1x + 12 \geq 0$

BOUNDARY POINTS → $(x+3)(x-4) = 0$

$x+3=0 \rightarrow x=-3$ or $x-4=0 \rightarrow x=4$

TEST $x=-4$
 $-(-4)^2 + 1(-4) + 12 \geq 0$
 $-16 - 4 + 12 \geq 0$
 $-8 \geq 0$ FALSE

TEST $x=0$
 $-(0)^2 + 1(0) + 12 \geq 0$
 $12 \geq 0$ TRUE

TEST $x=5$
 $-(5)^2 + 1(5) + 12 \geq 0$
 $-25 + 5 + 12 \geq 0$
 $-8 \geq 0$ FALSE

GRAPH

SET NOTATION
 $-3 \leq x \leq 4$

INTERVAL NOTATION
 $[-3, 4]$

c. $2x^2 + 2x \leq 24$

$2x^2 + 2x - 24 \leq 0$

BOUNDARY POINTS → $(x-3)(x+4) = 0$

$x-3=0 \rightarrow x=3$ or $x+4=0 \rightarrow x=-4$

TEST $x=-5$
 $2(-5)^2 + 2(-5) \leq 24$
 $40 \leq 24$ FALSE

TEST $x=0$
 $2(0)^2 + 2(0) \leq 24$
 $0 \leq 24$ TRUE

TEST $x=4$
 $2(4)^2 + 2(4) \leq 24$
 $40 \leq 24$ FALSE

GRAPH

SET NOTATION
 $-4 \leq x \leq 3$

INTERVAL NOTATION
 $[-4, 3]$

d. $-2x^2 + 14x > 20$

$-2x^2 + 14x - 20 > 0$

BOUNDARY POINTS → $(x-2)(x-5) = 0$

$x-2=0 \rightarrow x=2$ or $x-5=0 \rightarrow x=5$

TEST $x=0$
 $-2(0)^2 + 14(0) > 20$
 $0 > 20$ FALSE

TEST $x=3$
 $-2(3)^2 + 14(3) > 20$
 $24 > 20$ TRUE

TEST $x=6$
 $-2(6)^2 + 14(6) > 20$
 $12 > 20$ FALSE

GRAPH

SET NOTATION
 $2 < x < 5$

INTERVAL NOTATION
 $(2, 5)$

e. $3x^2 + 2x - 8 \leq 0$

GCF → $\frac{3x-4}{1} \cdot \frac{3x+6}{3}$

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

BOUNDARY POINTS → $(3x-4)(x+2) = 0$

$3x-4=0 \rightarrow x=1\frac{1}{3}$ or $x+2=0 \rightarrow x=-2$

TEST $x=-3$
 $3(-3)^2 + 2(-3) - 8 \leq 0$
 $13 \leq 0$ FALSE

TEST $x=0$
 $3(0)^2 + 2(0) - 8 \leq 0$
 $-8 \leq 0$ TRUE

TEST $x=3$
 $3(3)^2 + 2(3) - 8 \leq 0$
 $25 \leq 0$ FALSE

GRAPH

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

INTERVAL NOTATION
 $[-2, \frac{4}{3}]$

f. $2x^2 + 13x - 24 > 0$

GCF → $\frac{2x-3}{1} \cdot \frac{2x+16}{2}$

$(2x-3)(x+8) > 0$

BOUNDARY POINTS → $(2x-3)(x+8) = 0$

$2x-3=0 \rightarrow x=1.5$ or $x+8=0 \rightarrow x=-8$

TEST $x=-9$
 $2(-9)^2 + 13(-9) - 24 > 0$
 $21 > 0$ TRUE

TEST $x=0$
 $2(0)^2 + 13(0) - 24 > 0$
 $-24 > 0$ FALSE

TEST $x=2$
 $2(2)^2 + 13(2) - 24 > 0$
 $10 > 0$ TRUE

GRAPH

SET NOTATION
 $x < -8$ or $x > \frac{3}{2}$

INTERVAL NOTATION
 $(-\infty, -8) \cup (\frac{3}{2}, \infty)$