Chapter 5 Review

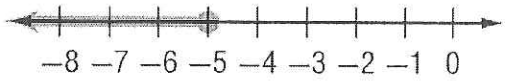
Students will be able to:

- Write inequalities representing word problems. Types include 1 variable inequalities, compound inequalities, 2 variable inequalities, and systems of inequalities.
- Solve 1 step 1 variable inequalities by addition/subtraction/multiplication/division.
- Solve multi-step inequalities including variables on both sides and distributive property.
- Represent solutions to 1 variable inequalities using a number line or coordinate plane.
- Represent solutions to 2 variable inequalities on the coordinate plane.
- Represent solutions to systems of inequalities on the coordinate plane.
- Identify solutions to inequalities algebraically and graphically.
- Solve real world problem situations using 1 variable inequalities, 2 variable inequalities and systems of inequalities.
- Solve absolute value inequalities.
- Solve and/or compound inequalities and represent solutions graphically.
- Write algebraic inequalities in 1 variable to represent given solution regions (including compound inequalities.)
- Write linear inequalities in 2 variables from the graph of solution region.
- Write systems of inequalities from the graph of solutions regions.

Skill 1 – Solving 1 variable inequalities by addition/subtraction

Match each inequality to the graph of its solution.

1. $x + 11 > 16$ $x > 5$ (C)
2. $x - 6 < 1$ $x < 7$ (E)
3. $x + 2 \leq -3$ $x \leq -5$ (A)
4. $x + 3 \geq 1$ $x \geq -2$ (B)
5. $x - 1 < -7$ $x < -6$ (D)

a.


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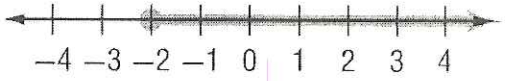
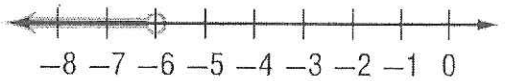
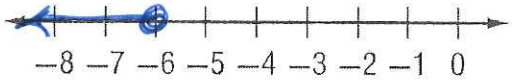


c.

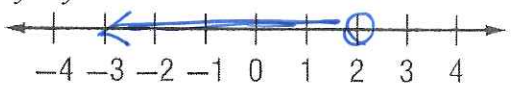

d.


e.


Solve each inequality. Check your solution, and then graph it on a number line.

12. $-2 \geq x + 4$


$-6 \geq x$ or $x \leq -6$

13. $2y < y + 2$


$y < 2$

Skill 2 – solving 1 variable inequalities using multiplication and division

Solve each inequality. Check your solution

15. $\frac{t}{12} \geq -90$ (-12) $t \leq 1080$ (flip the inequality)
16. $5z < -90$ $z < -18$
17. $-13m > -26$ $m < 2$ (flip the inequality!)
19. $-y < 36$ $y > -36$
20. $-16c \geq -224$ $c \leq 14$
21. $-\frac{h}{10} \leq 2$ (-10) $h \geq -20$

(flip the inequality!)

Skill 3: Solving multi-step inequalities including distributive property and variables on both sides.

Solve each inequality. Check your solution.

3. $-2b + 4 > -6$

$-4 \quad -4$

$\frac{-2b}{-2} > \frac{-10}{-2}$

$b < 5$

4. $3x + 15 \leq 21$

$-15 \quad -15$

$3x \leq 6$

$x \leq 2$

5. $\frac{d}{2} - 1 \geq 3$

$+1 \quad +1$

$2 \cdot \frac{d}{2} \geq 4 \cdot 2$

$d \geq 8$

6. $\frac{5}{5}a - 4 < 2$

$+4 \quad +4$

$a < 6$

7. $-\frac{t}{5} + 7 > -4$

$-7 \quad -7$

$-5\left(-\frac{t}{5}\right) > (-11)\cdot -5$

$t < 55$

8. $\frac{3}{4}j - 10 \geq 5$

$+10 \quad +10$

$\frac{4}{3}\left(\frac{3}{4}j\right) \geq (15)\frac{4}{3}$

$j \geq 20$

9. $-\frac{2}{3}f + 3 < -9$

$-3 \quad -3$

$-\frac{3}{2}\left(-\frac{2}{3}f\right) > (-12)\cdot -\frac{3}{2}$

$f > 18$

10. $2p + 5 \geq 3p - 10$

$-3p \quad -3p$

$-p + 5 \geq -10$

$-5 \quad -5$

$-p \geq -15$

$p \leq 15$

11. $4k + 15 > -2k + 3$

$+2k \quad +2k$

$6k + 15 > 3$

$-15 \quad -15$

$6k > -12$

$k > -2$

12. $2(-3m - 5) \geq -28$

$-6m - 10 \geq -28$

$+10 \quad +10$

$\frac{-6m}{-6} \geq \frac{-18}{-6}$

$m \leq 3$

13. $-6(w + 1) < 2(w + 5)$

$-6w - 6 < 2w + 10$

$-2w \quad -2w$

$-8w - 6 < 10$

$+6 \quad +6$

$\frac{-8w}{-8} < \frac{16}{-8}$

$w > -2$

14. $2(q - 3) + 6 \leq -10$

$2q - 6 + 6 \leq -10$

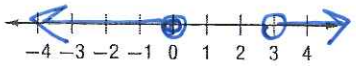
$2q \leq -10$

$q \leq -5$

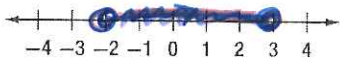
Skill 4 – Solving compound inequalities involving and/or.

Graph the solution set of each compound inequality.

1. $b > 3$ or $b \leq 0$

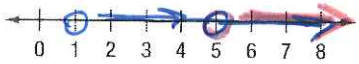


2. $z \leq 3$ and $z \geq -2$

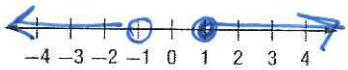


3. $k > 1$ and $k > 5$

must satisfy both!

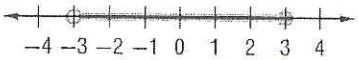


4. $y < -1$ or $y \geq 1$



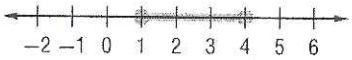
Write a compound inequality for each graph.

5.



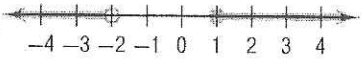
$x > -3$ and $x \leq 3$

6.



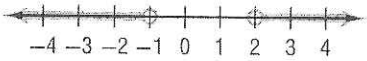
$x \geq 1$ and $x \leq 4$

7.



$x < -2$ or $x \geq 1$

8.

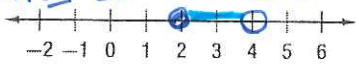


$x < -1$ or $x > 2$

Solve each compound inequality. Then graph the solution set.

9. $m + 3 \geq 5$ and $m + 3 < 7$

$m \geq 2$ $\quad m < 4$



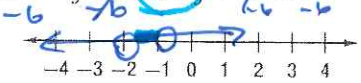
10. $y - 5 < -4$ or $y - 5 \geq 1$

$y < 1$ $\quad y \geq 6$

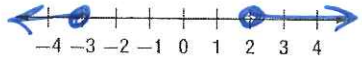
11. $4 < f + 6$ and $f + 6 < 5$

$f < -1$

$-2 < f$ or $f > -2$

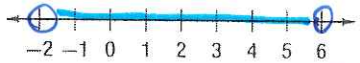


12. $w + 3 \leq 0$ or $w + 7 \geq 9$



$w \leq -3$ or $w \geq 2$

13. $-6 < b - 4 < 2$



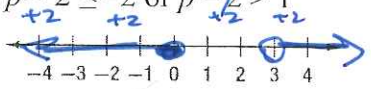
$-6 < b - 4$ and $b - 4 < 2$

$+4 \quad +4 \quad +4$

$-2 < b$ and $b < 6$

or $b > -2$

14. $p - 2 \leq -2$ or $p - 2 > 1$



$p \leq 0$ or $p > 3$

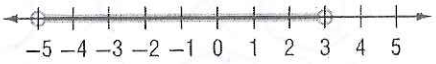
Skill 5 – Absolute value inequalities

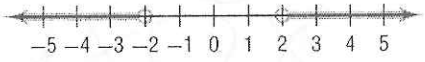
Match the following absolute value inequalities to the graphs of the solutions

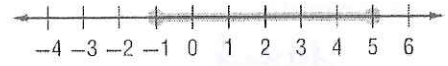
B 1. $|x| > 2$ $x > 2$ or $-x > 2$, $x < -2$; $|-x| > 2$

C 2. $|x - 2| \leq 3$ and $|-(x-2)| \leq 3$; $x - 2 \leq 3$, $x \leq 5$; $-x + 2 \leq 3$, $-x \leq 1$, $x \geq -1$

A 3. $|x + 1| < 4$ $x + 1 < 4$ and $-x - 1 < 4$; $x < 3$; $-x < 5$, $x > -5$

a.


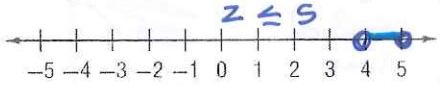
b.


c.


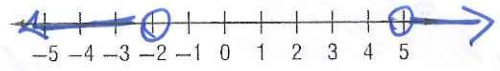
Solve each inequality. Then graph the solution set.

short cut

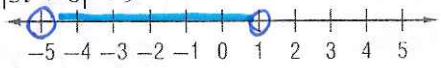
6. $|2z - 9| \leq 1$ $2z - 9 \leq 1$ and $2z - 9 \geq -1$; $2z \leq 10$, $z \leq 5$; $2z \geq 8$, $z \geq 4$



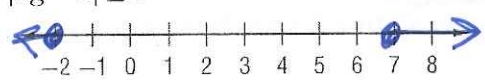
7. $|3 - 2r| > 7$ $3 - 2r > 7$ or $3 - 2r < -7$; $-2r > 4$, $r < -2$; $-2r < -10$, $r > 5$



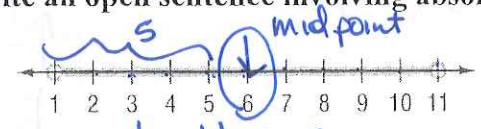
8. $|3t + 6| < 9$



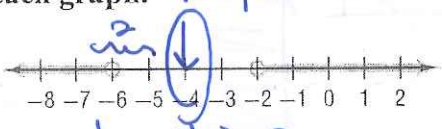
9. $|2g - 5| \geq 9$



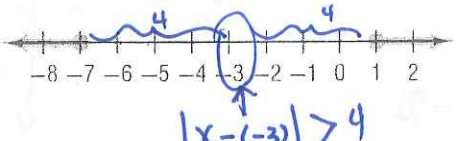
Write an open sentence involving absolute value for each graph.

10.


$|x - 6| < 5$

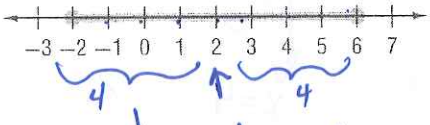
11.


$|x + 4| > 2$

12.


$|x - (-3)| > 4$

$|x + 3| > 4$

13.


$|x - 2| \leq 4$

8 $|3t + 6| < 9$

$3t + 6 < 9$ and $3t + 6 > -9$

$3t < 3$, $3t > -15$

$t < 1$ and $t > -5$

$|2g - 5| \geq 9$

$2g - 5 \geq 9$ or $2g - 5 \leq -9$

$2g \geq 14$, $2g \leq -4$

$g \geq 7$, $g \leq -2$

Skill 6 – Inequalities involving 2 variables

Determine which ordered pairs are part of the solution set for each inequality.

1. $3x + y \geq 6$, $\{(4, 3), (-2, 4), (-5, -3), (3, -3)\}$ $3(4)+3\geq 6$ ✓ $3(3)-3\geq 6$ ✓

2. $y \geq x + 3$, $\{(6, 3), (-3, 2), (3, -2), (4, 3)\}$ $2 \geq (-3)+3$

3. $3x - 2y < 5$, $\{(4, -4), (3, 5), (5, 2), (-3, 4)\}$ $3(3)-2(5)<5$ ✓ $3(-3)-2(4)<5$ ✓

Graph each inequality.

4. $2y - x < -4$ dashed line

x int: $-x=-4$, $x=4$

y int: $-2y=-4$, $y=-2$

test point (0,0)

$2(0)-0<-4$

$0<-4$ false!

5. $2x - 2y \geq 8$ solid line

x int: $2x=8$, $x=4$

y int: $-2y=8$, $y=-4$

test point (0,0)

$2(0)-2(0)\geq 8$

$0\geq 8$ false!

6. $\frac{3}{3}y > \frac{2}{3}x - \frac{3}{3}$ $y > \frac{2}{3}x - 1$ dashed line

test point (0,0)

$0 > \frac{2}{3}(0) - 1$

$0 > -1$ ✓ true!

Use a graph to solve each inequality.

7. $-5 \leq x - 9$

$+9 \quad +9$

$x = 4$

$x \geq 4$

8. $6 > \frac{2}{3}x + 5$

$-5 \quad -5$

$x = 3/2$

$6 > \frac{2}{3}x + 5$

-5

$\frac{3}{2}(1) > \left(\frac{2}{3}x\right)\frac{3}{2}$

$\frac{3}{2} > x$

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

9. $\frac{1}{2} > -2x + \frac{7}{2}$ $x = 3/2$

$\frac{1}{2} > -2x + \frac{7}{2}$

$-\frac{7}{2} \quad -\frac{7}{2}$

$-\frac{6}{2} > -2x$

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

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

or $x > \frac{3}{2}$