Chapter 2 review

1. True or false? If a number is an integer, it is a rational number.

Let U be the set of whole numbers from 1 to 9. Let A = {1, 3, 6, 8, 9} and B={2, 6, 9}

2. $A \cup B \cap \overline{B}$

Let U be the set of whole numbers 1-10. A={2,4,6,8} and B= {1,3,6,7)}

3. $A \cap \sim B$

4. Consider the compound inequality a<2x+9 or a > -x+1. For which value of a does the solution consist of all numbers greater than 3?

   a. 3 b. 7 c. 11 d. 15 e. 19

5. Joel sells ice cream cones at the county fair. He has to rent the equipment for $36 and spend $0.52 on ingredients for each cone. What is the minimum number of ice cream cones Joel must sell at $1.40 each in order to **make a profit**?
6. Your veterinarian tells you that a healthy weight for your dog is between 70 and 80 pounds. Write an inequality to represent your dog's healthy weight *w* in *kilograms*. (Hint: 1 kilogram = 2.2 lbs)
7. Tina can type at least 40 words per minute. Write and graph an inequality to describe this statement.
8. The cost of a 5-lb bag of dog food ranges from $4.65 to $5.35. Write and graph an inequality to describe this statement.
9. Joe and his brother are collecting money for a charity. Joe has already collected $170 and plans to earn at least $20 per week. His brother has $80, but plans to earn at least $50 per week. How many weeks until Joe's brother has more money than Joe? How much money will they each have?

Solve and graph.

10. $-4 \leq 2x + 10 \leq 4$
11. $x + 5 < 7$
12. $-12y < -60$
13. $12a > 78$
14. $-5x - 20 < 10$
15. $1 - \frac{1}{3}x > 3$
16. $8b - 9 \leq 9b + 2$
17. $-3 > 2x - 1 > -5$
18. $-2 < -2x < 2$
19. $2x \geq 8$ or $-2x + 1 > -13$
20. $\left|\frac{3}{8}x - 10\right| < 0$
21. $5 > |-4 + 5x|$
22. $|x - 2| - 2 < 7$
23. $15 - |x| > 7$
24. $|3x + 2| \leq 1$
25. $|x + 7| \geq 9$
26. $|2 - x| \leq 2$

27. Graph the solution of $|x| > 2$

Write an inequality illustrated by the graph below.

28.


29. Solve the inequality $4x + 2 \leq 2(x - 1)$
   a. Graph the solution on a number line
   b. Explain how to check your answer.
   c. Name three values that would be appropriate to use when checking your solution.
   d. Compare the procedure for checking the answer to an inequality with the procedure for checking the answer to an equation.

# Chapter 2 Review

(1) True, all integers are real numbers.

(2) $A \cup B \cap \bar{B} = \{1,3,8\}$ $\quad A \cup B = \{1,2,3,6,8,9\}$, $\bar{B} = \{1,3,4,5,7,8\}$

(3) $A \cap \sim B = \{2,4,8\}$ $\quad \sim B = \{2,4,5,8,9,10\}$

(4) $a < 2x+9$ or $a > -x+1$

$\frac{a-9}{2} < \frac{2x}{2}$ $\quad -1 \quad -1$

$a-1 > -x$

$\frac{a-9}{2} < x$ or $-a+1 < x$

(11)

$\frac{15-9}{2} < x$

$3 < x$

(5) $36 + .52x < 1.4x$

$-.52x \quad -.52x$

$\frac{36}{.88} < \frac{.88x}{.88}$

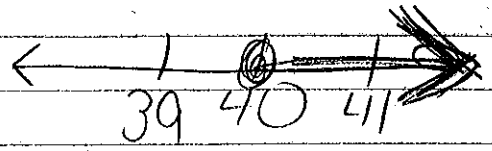
$40.91 < x$

Joel will need to sell at least 41 cones do make a profit.

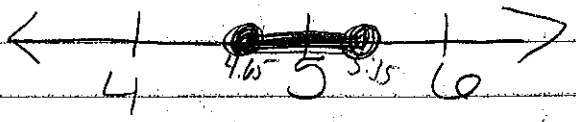
(6) $70 \leq x \leq 80$ lbs.

$31.8 \leq x \leq 36.4$

(7) $x \geq 40$




(8) $4.65 \leq x \leq 5.35$



(9) Joe: $170 + 20w$ < his brother: $80 + 50w$

$-20w \quad -20w$

$170 < 80 + 30w$

$-80 \quad -80$

$90 < 30w$

$30 \quad 30$

$3 < w$

* at 3 weeks they will be equal.

Joe's brother will have more money at week 4.

Joe: $250

Joe's brother: $280

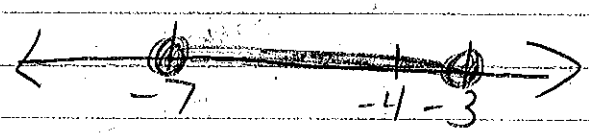
(10) $-4 \leq 2x + 10 \leq 4$

$-10 \quad -10 \quad -10$

$-14 \leq 2x \leq -6$

$\frac{-14}{2} \leq \frac{2x}{2} \leq \frac{-6}{2}$

$-7 \leq x \leq -3$

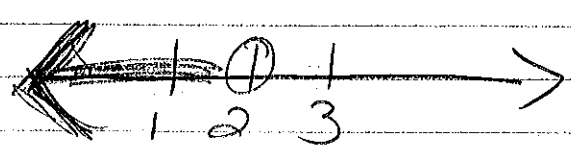



(11) $x + 5 < 7$

$-5 \quad -5$

$x < 2$

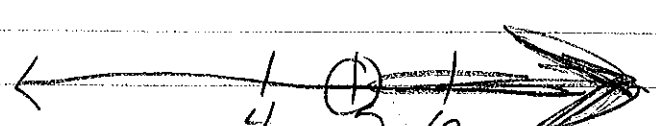
$\{x | x < 2\}$




(12) $\frac{-12y}{-12} < \frac{-60}{-12}$

$y > 5$

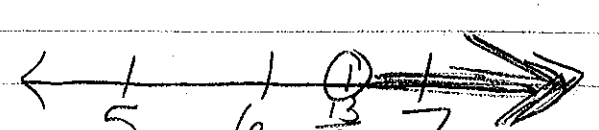
$\{y | y > 5\}$




(13) $\frac{12a}{12} > \frac{78}{12}$

$a > \frac{13}{2}$

$\{a | a > \frac{13}{2}\}$

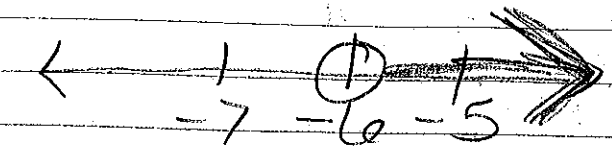


(14) $-5x - 20 < 10$

$+20 \quad +20$

$\frac{-5x}{-5} < \frac{30}{-5}$

$x > -6$ $\{x | x > -6\}$



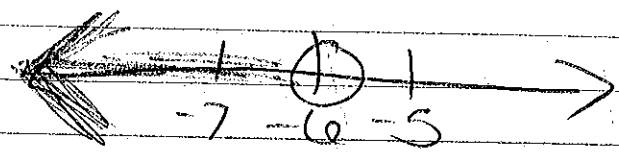

(15) $1 - \frac{1}{3}x > 3$

$-1 \quad -1$

$-\frac{1}{3}x > 2$

$\cdot -3 \quad \cdot -3$

$x < -6$ $\{x | x < -6\}$




(16) $8b - 9 \leq 9b + 2$

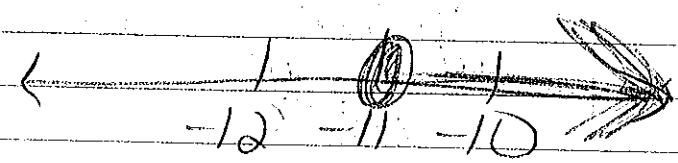
$-8b \quad -8b$

$-9 \leq b + 2$

$-2 \quad -2$

$-11 \leq b$

$\{b | b \geq -11\}$



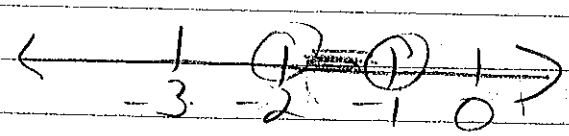

(17) $-3 > 2x - 1 > -5$

$+1 \quad +1 \quad +1$

$\frac{-2}{2} > \frac{2x}{2} > \frac{-4}{2}$

$-1 > x > -2$ * least greatest

$-2 < x < -1$ * 10 grades




(18) $\frac{-2}{2} < \frac{2x}{2} < \frac{2}{2}$

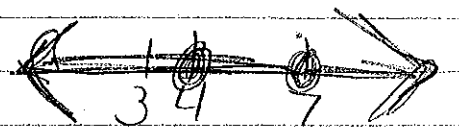
$-1 < x < 1$

(19) $\frac{2x}{2} \geq \frac{8}{2}$ or $-2x+1 > -13$

$x \geq 4$ or $-2x > -14$

$x \geq 4$ or $x < 7$

$x < 7$




{all real numbers}

(20) $\left|\frac{3}{8}x - 10\right| < 0$

$\emptyset$

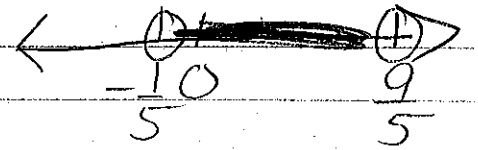
* remember that absolute value cannot be negative.

(21) $5 > |-4+5x|$

$-4+5x < 5$ and $-4+5x > -5$

$5x < 9$ $\quad 5x > -1$

$-\frac{1}{5} < x < \frac{9}{5}$

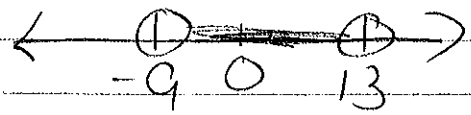



(22) $|x-2| - 2 < 7$

$|x-2| < 11$

$-11 < x-2 < 11$

$-9 < x < 13$

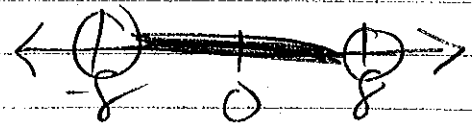



(23) $15 - |x| > 7$

$-|x| > -8$

$|x| < 8$

$-8 < x < 8$



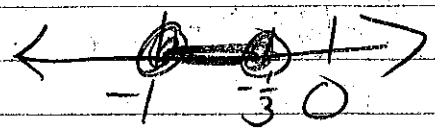
24) $|3x+2| \leq 1$

$3x+2 \leq 1$ and $3x+2 \geq -1$

$-2 \quad -2$ $\quad$ $-2 \quad -2$

$\frac{3x}{3} \leq \frac{-1}{3}$ $\quad$ $\frac{3x}{3} \geq \frac{-3}{3}$

$x \leq -\frac{1}{3}$ $\quad$ $x \geq -1$



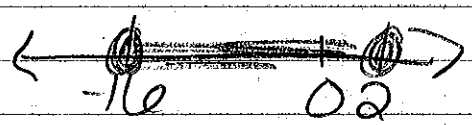

$-1 \leq x \leq -\frac{1}{3}$

25. $|x+7| \geq 9$

$x+7 \geq 9$ or $x+7 \leq -9$

$-7 \quad -7$ $\quad$ $-7 \quad -7$

$x \geq 2$ $\quad$ $x \leq -16$




$x \leq -16$ or $x \geq 2$

26) $|2-x| \leq 2$

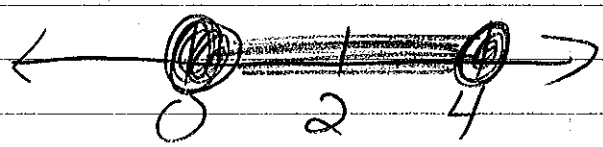
$-2 \leq 2-x \leq 2$

$-2 \quad -2 \quad -2$

$\frac{-4}{-1} \leq \frac{-x}{-1} \leq \frac{0}{-1}$

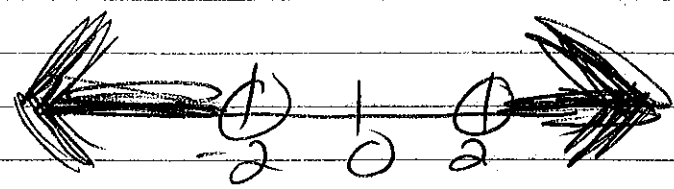
$4 \geq x \geq 0$ * least to greatest

$0 \leq x \leq 4$




27) $|x| > 2$

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




28) $x > -2$

29) $\frac{4x+2}{2} \leq \frac{2(x-1)}{2}$

$2x+1 \leq x-1$

$-x \quad -x$

$x+1 \leq -1$

$-1 \quad -1$

$x \leq -2$

$\{x \mid x \leq -2\}$

Method 2

$4x+2 \leq 2(x-1)$

$4x+2 \leq 2x-2$

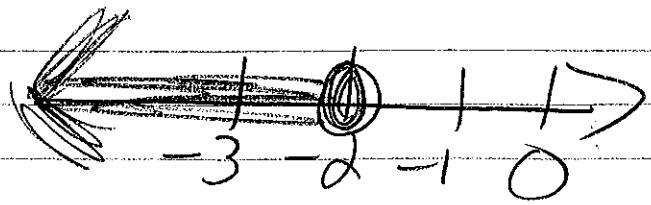
$-2x \quad -2x$

$2x+2 \leq -2$

$-2 \quad -2$

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

$x \leq -2$

a. 


b. Check your answer by substituting different values into the original problem.

c. $-3, -2, 0$

d. For an equation, you only need to check your answer, or answers, to be sure they work. For inequalities there is an infinite number of solutions, so instead you check the circle to verify if it is open or closed, and check a value on either side of the circle to be sure the graph is shaded correctly and the inequality symbol is correct.