Advanced Algebra – Ch. 1 Review Name Key hr___

Multiple Choice.

B **1.** Which number is not a solution of the inequality $-27 \le 3(1-2x) \le 3$?

$-27 \le 3-6x \le 3$
$-30 \le -6x \le 0$
$5 \ge x \ge 0$

a. 4 b. -1 c. ½ d. 0

D **2.** Which number is not a solution of the equation $|x+5| = x+5$?

$|5+5| = 5+5$ $|0+5| = 0+5$ $|-5+5| = -5+5$ $|-10+5| = -10+5$

a. 5 b. 0 c. -5 d. -10

$10=10$ ✓ $5=5$ ✓ $0=0$ ✓ $5 \neq -5$

A **3.** Which of the following equations have more than one solution?

I. $|x-3| = 4$ → $x-3=4$, $x=7$ and $x-3=-4$, $x=-1$

II. $2(x+\frac{1}{2}) = 2x+1$ → $2x+1=2x+1$ → $1=1$ IR

III. $|x+2| = -1$ → No Sol. (Abs val ≠ a neg.)

IV. $3x+5=14$ → $x=3$

a. I and II only b. I and III only c. II and III only d. I, II, III, and IV

Solve. Be sure to show all solutions.

4. $5-2(3x+2) = 2(-3x+1)+1$

$5-6x-4 = -6x+2+1$
$-6x+1 = -6x+3$
$+6x \quad +6x$
$1 \neq 3$

No solution

5. $\frac{a+4}{4} + \frac{2a}{3} = \frac{12}{1}$

$12\left(\frac{3a+12}{12} + \frac{8a}{12} = \frac{144}{12}\right)12$

$3a+12+8a = 144$
$11a+12 = 144$
$11a = 132$
$a = 12$

6. $\frac{x+6}{2} + \frac{x-7}{5} = \frac{3}{1}$

$10\left(\frac{5x+30}{10} + \frac{2x-14}{10} = \frac{30}{10}\right)10$

$5x+30+2x-14 = 30$
$7x+16 = 30$
$7x = 14$
$x = 2$

Solve.

7. The total length of three strings is 26 inches. The first string is twice the length of the second. The third string is one-fourth the length of the second. Find the lengths of the three strings.

Define the variable(s)

x = length of 2nd string
$2x$ = length of 1st string
$\frac{1}{4}x$ = length of 3rd string

Write and Solve an Equation

$x + 2x + \frac{1}{4}x = 26$
$3.25x = 26$
$x = 8$

Answer the question

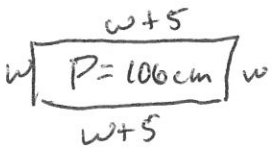
$x = 8$ in (2nd string)
$2x = 16$ in (1st string)
$\frac{1}{4}x = 2$ in (3rd string)

8. The length of a rectangle is 5 cm greater than its width. The perimeter is 106 cm. Find the dimensions of the rectangle.

Define the variable(s)

width = w

length = $w + 5$



Write and Solve an Equation

$w + w + 5 + w + w + 5 = 106$

$4w + 10 = 106$

$4w = 96$

$w = 24$

Answer the question

$w = 24$cm (width)

$w + 5 = 29$cm (length)

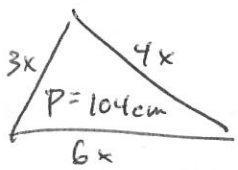
9. The sides of a triangle are in the ratio 3:4:6. What is the length of each side if the perimeter is 104 cm?

Define the variable(s)

$3x$ = 1st side

$4x$ = 2nd side

$6x$ = 3rd side



Write and Solve an Equation

$3x + 4x + 6x = 104$

$13x = 104$

$x = 8$

Answer the question

$3x = 24$ cm (1st side)

$4x = 32$ cm (2nd side)

$6x = 48$cm (3rd side)

10. Find 3 consecutive odd integers such twice the sum of the first and third integers is twenty-one more than the second integer.

Define the variable(s)

x = 1st odd integer

$x + 2$ = 2nd odd integer

$x + 4$ = 3rd odd integer

Write and Solve an Equation

$2(1^{st} + 3^{rd}) = 2^{nd} + 21$

$2(x + x + 4) = x + 2 + 21$

$2(2x + 4) = x + 23$

$4x + 8 = x + 23$

$3x + 8 = 23$

$3x = 15$

$x = 5$

Answer the question

$x = 5$ (1st odd)

$x + 2 = 7$ (2nd odd)

$x + 4 = 9$ (3rd odd)

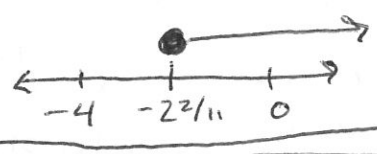
Solve and graph each inequality.

11. $4x-2 \le 15x+22$

$-11x-2 \le 22$

$-11x \le 24$

$x \ge -2.18\ (-2\frac{2}{11})$

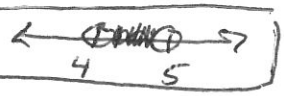


12. $9 < 1+2y \le 11$

$-1 \quad -1 \quad -1$

$\frac{8}{2} < \frac{2y}{2} < \frac{10}{2}$

$4 < y \le 5$

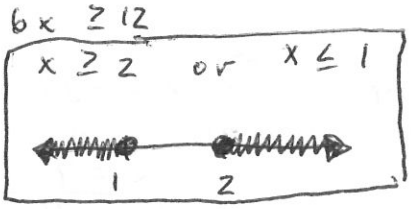


13. $6(x+2) \ge 24$ *or* $5x+10 \le 15$

$6x+12 \ge 24$ $\quad 5x \le 5$

$6x \ge 12$

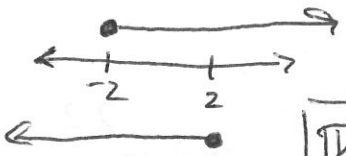
$x \ge 2$ or $x \le 1$



14. $5x+12 \ge 2$ *or* $7x-1 \le 13$

$5x \ge -10$ $\quad 7x \le 14$

$x \ge -2$ or $x \le 2$

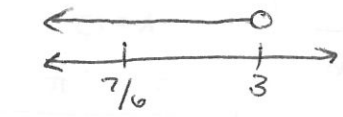


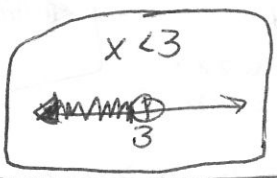
$\mathbb{R}$ = All Real Solutions

15. $6x-2 < 5$ *or* $7x-5 < 16$

$6x < 7$ $\quad 7x < 21$

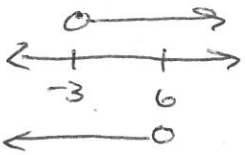
$x < 7/6$ or $x < 3$

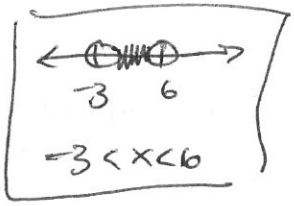




16. $9x < 54$ *and* $-4x < 12$

$x < 6$ and $x > -3$

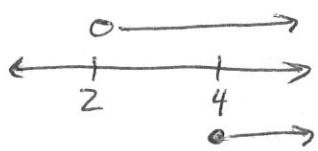


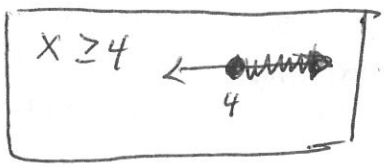


17. $2x-3 \ge 5$ *and* $3x-1 > 5$

$2x \ge 8$ $\quad 3x > 6$

$x \ge 4$ and $x > 2$



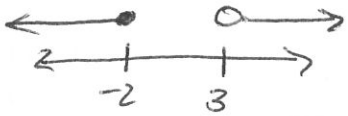


18. $10x+2 \le 2x-14$ *and* $9x-12 > 5x$

$8x+2 \le -14$ $\quad -12 > -9x$

$8x \le -16$ $\quad 3 < x$

$x \le -2$ $\quad x > 3$



No Solution

Solve. Be sure to show all solutions. Check for extraneous solutions.

19. $|x+4|=8$

$x+4=8$ $\quad$ $x+4=-8$

$x=4$ $\quad$ $x=-12$

$|4+4|=8$ $\quad$ $|-12+4|=8$

$|8|=8$ $\quad$ $|-8|=8$

$8=8$ ✓ $\quad$ $8=8$ ✓

Isolate 1st!

20. $2|x-3|+4=-16$

$2|x-3|=-20$

$|x-3|=-10$

No solution

Abs value cannot equal a neg. #

↓ or

$x-3=-10$ $\quad$ $x-3=10$

$x=-7$ ext. sol. $\quad$ $x=13$ ext. sol.

$2|-7-3|+4=-16$ $\quad$ $2|13-3|+4=-16$

$2|-10|+4=-16$ $\quad$ $2|10|+4=-16$

$20+4\neq-16$ $\quad$ $20+4\neq-16$

21. $2|5x+3|=16$

$|5x+3|=8$

$5x+3=8$ $\quad$ $5x+3=-8$

$5x=5$ $\quad$ $5x=-11$

$x=1$ $\quad$ $x=-2.2$

$2|5.1+3|=16$ $\quad$ $2|5(-2.2)+3|=16$

$2|5+3|=16$ $\quad$ $2|-11+3|=16$

$2|8|=16$ $\quad$ $2|-8|=16$

$2.8=16$ ✓ $\quad$ $2(8)=16$ ✓

22. $|x-3|=2x-4$

$x-3=2x-4$ $\quad$ $x-3=-2x+4$

$-3=x-4$ $\quad$ $3x-3=4$

$1=x$ $\quad$ $3x=7$

$x=7/3$

ext. sol.

$|1-3|=2(1)-4$ $\quad$ $|\frac{7}{3}-3|=2(\frac{7}{3})-4$

$|-2|=2-4$ $\quad$ $|-2/3|=14/3-4$

$2\neq-2$ $\quad$ $2/3=2/3$ ✓

Solve and graph each inequality.

23. $|8x-4|\leq 20$

$8x-4=20$ $\quad$ $8x-4=-20$

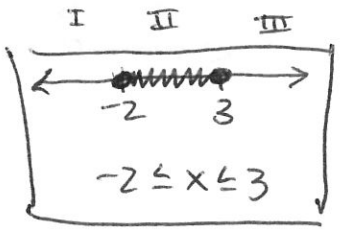
$8x=24$ $\quad$ $8x=-16$

$x=3$ $\quad$ $x=-2$

I $|8(-3)-4|\leq 20$ $\quad$ $28\leq 20$ F

II $|8(0)-4|\leq 20$ $\quad$ $4\leq 20$ T

III $|8(4)-4|\leq 20$ $\quad$ $28\leq 20$ F



$-2\leq x\leq 3$

24. $|2x|-6>20$

$+6\ +6$

$|2x|>26$

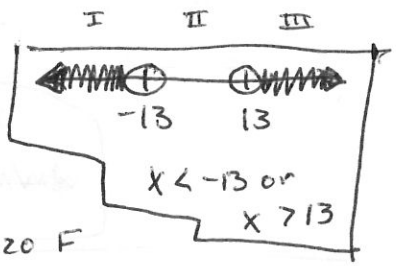
$2x=26$ $\quad$ $2x=-26$

$x=13$ $\quad$ $x=-13$

I $|2(-14)|-6>20$ $\quad$ $22>20$ T

II $|2(0)|-6>20$ $\quad$ $-6>20$ F

III $|2(14)|-6>20$ $\quad$ $22>20$ T

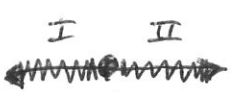


$x<-13$ or $x>13$

25. $|x+2|\geq 0$ ⟷ Always True (TR)

$x+2=0$

$x=-2$



I $|-3+2|\geq 0$ $\quad$ $1\geq 0$ T

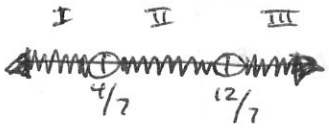
II $|-1+2|\geq 0$ $\quad$ $1\geq 0$ T

26. $-3|7x-8|<12$

$|7x-8|>-4$ Always True (TR)

$7x-8=-4$ $\quad$ $7x-8=4$

$x=4/7$ $\quad$ $x=12/7$



I $-3|7(0)-8|<12$ $\quad$ $-24<12$ T

II $-3|7(1)-8|<12$ $\quad$ $-3<12$ T

III $-3|7(2)-8|<12$ $\quad$ $-18<12$ T