

← DISTRIBUTE (-1)

$$7) -(4n - 10) = 2 + 4(n - 4)$$

order of operations

- ① ()'s IN → OUT
- ② Exponents
- ③ \times, \div L → R
- ④ $+, -$ L → R

$$-4N + 10 = 2 + 4N - 16$$

$$-4N + 10 = 4N - 14$$

$$\begin{array}{r} -4N + 10 = 4N - 14 \\ +4N \quad +4N \\ \hline 10 = 8N - 14 \\ +14 \quad +14 \\ \hline 24 = 8N \end{array}$$

$$\frac{8N}{8} = \frac{24}{8} \quad N = 3$$

$$C: -(4(3) - 10) = 2 + 4(3 - 4)$$

$$-2 = -2 \checkmark$$

ABSOLUTE VALUE EQUATIONS

3 FORMS #'S 8-10

Ⓐ $|x| = +\text{number}$
2 solutions
 $x = \pm \text{number}$

Ⓑ $|x| = 0$
1 solution $x = 0$

Ⓒ $|x| = -\text{number}$
 $x = \text{NO SOLUTION}$

8) $|x| = 2$
 $x = \{2, -2\}$
C: $|2| = 2$
 $2 = 2 \checkmark$
C: $|-2| = 2$
 $2 = 2 \checkmark$

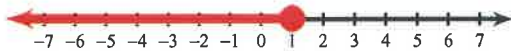
10) $|n| = -7$ Absolute value can not be negative
 $N = \text{No solution.}$

9) $|b| = 0$
 $B = \{0\}$
C: $|0| = 0$
 $0 = 0 \checkmark$

Chapter 6 -

Draw a graph for each inequality.

11) $m \leq 1$



12) $6 \geq x$ → $x \leq 6$ ↗



13) $x > -1$



14) $-3 < n$ → $n > -3$

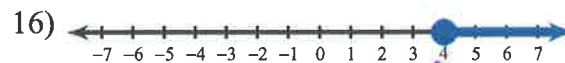


Write an inequality for each graph.



$x < 2$

open dot
 $>, <, \neq$



$x \geq 4$

closed dot
 $\geq, \leq, =$

Solve each inequality AND GRAPH its solution.

17) $-1 < r - 4$ $\xrightarrow{+4}$ $3 < r$ $\xrightarrow{\text{rewrite}}$ $r > 3$

Graph

18) $-3 < \frac{n}{5}$ $\xrightarrow{\cdot 5}$ $-15 < n$

Graph

Solve INEQUALITIES LIKE EQUATIONS. ADD RULES:

① When you multiply or divide variables by a negative number reverse the direction of THE SYMBOL.

② Graph the solution

Solve each inequality and graph its solution.

19) $-9 - 2x > 2(x - 2) - 1$

$x < -1$:

20) $-3(1 + 2x) > 2(-x - 2) - 3$

$x < 1$:

$$\begin{aligned} -3 - 6x &> -2x - 4 - 3 \\ -6x - 3 &> -2x - 7 \\ +2x & \quad +2x \\ \hline -4x - 3 &> -7 \\ +3 & \quad +3 \\ \hline -4x &> -4 \\ \div -4 & \quad \div -4 \\ \hline x &< 1 \end{aligned}$$

Reverse the symbol

$x < 1$

Solve each compound inequality and graph its solution. (6pts each)

21) $4 < 4m - 4 \leq 8$

$2 < m \leq 3$:

22) $-3 < -4n + 5 \leq 25$ "AND" Compound Ineq.

$-5 \leq n < 2$:

$$\begin{aligned} -3 < -4n + 5 &\leq 25 \\ -5 & \quad -5 \quad -5 \\ \hline -8 < -4n &\leq 20 \\ \div -4 & \quad \div -4 \quad \div -4 \\ \hline 2 > n &\geq -5 \end{aligned}$$

Reverse symbols

rewrite

$-5 \leq n < 2$

small # use only < > large #

23) $4r + 3 \geq -r + 3$ or $3r - 5 > 3 + 5r$



24) $-2 - 3x \geq 4 - x$ or $-5 + 5x > 3x + 5$



Bring down the OR

$$\begin{array}{r} -2 - 3x \geq 4 - x \\ +x \quad +x \\ \hline -2 - 2x \geq 4 \\ +2 \quad +2 \\ \hline -2x \geq 6 \\ \frac{-2x}{-2} \geq \frac{6}{-2} \end{array}$$

$$\begin{array}{r} -5 + 5x > 3x + 5 \\ -3x \quad -3x \\ \hline -5 + 2x > 5 \\ +5 \quad +5 \\ \hline 2x > 10 \\ \frac{2x}{2} > \frac{10}{2} \end{array}$$

$x \leq -3$ OR $x > 5$
Solution (graph above)

"OR" means either inequality is TRUE.
For #24 "X" is ALL THE NUMBERS LESS THAN OR EQUAL TO -3 PLUS ALL THE NUMBERS GREATER THAN 5

25) $5 + 3x > 4x - 5$ and $1 - 5x \leq 4 - 2x$



26) $b - 1 < -5$ and $-2b - 4 \leq 6$



$b < -4$ AND $b > -5$

$$\begin{array}{r} 5 + 3x > 4x - 5 \\ -4x \quad -4x \\ \hline 5 - x > -5 \\ -5 \quad -5 \\ \hline -x > -10 \\ \frac{-x}{-1} > \frac{-10}{-1} \end{array}$$

reverse symbol

$$\begin{array}{r} 1 - 5x \leq 4 - 2x \\ +2x \quad +2x \\ \hline 1 - 3x \leq 4 \\ -1 \quad -1 \\ \hline -3x \leq 3 \\ \frac{-3x}{-3} \leq \frac{3}{-3} \end{array}$$

reverse symbol

$x < 10$ AND $x > -1$

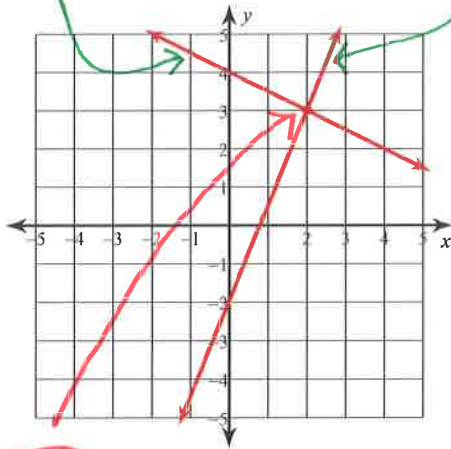
"AND" means both inequalities must be TRUE. IT IS WHERE THEY INTERSECT.
For #25 "X" IS ALL THE NUMBERS BETWEEN -1 AND LESS THAN 10

Chapter 7

Solve each system by graphing. Check!

27) $y = \frac{5}{2}x - 2$ $m = \frac{5}{2}$ $b = -2$

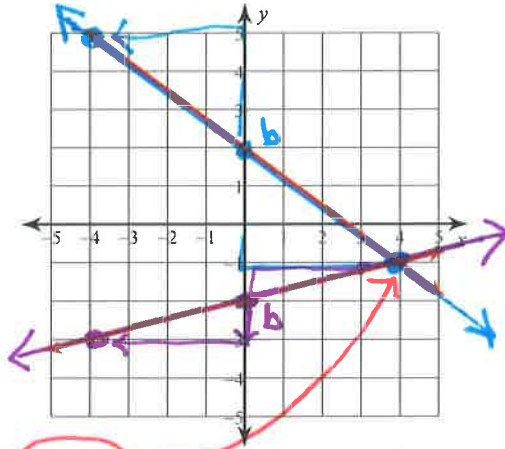
$y = -\frac{1}{2}x + 4$ $m = -\frac{1}{2}$ $b = 4$



(2, 3)

28) $y = -\frac{3}{4}x + 2$ $m = -\frac{3}{4}$ $b = 2$

$y = \frac{1}{4}x - 2$ $m = \frac{1}{4}$ $b = -2$

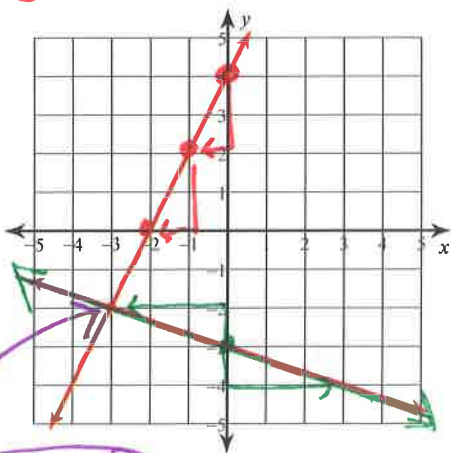


(4, -1) Solution
x=4
y=-1

C: $-1 = -\frac{3}{4}(4) + 2$
 $-1 = -1 \checkmark$
C: $-1 = \frac{1}{4}(4) - 2$
 $-1 = -1 \checkmark$

29) a) $x + 3y = -9$

b) $2x - y = -4$



(-3, -2)

a)
$$\begin{array}{r} x + 3y = -9 \\ -x \quad \quad -x \\ \hline 3y = -x - 9 \\ \frac{3y}{3} = \frac{-x-9}{3} \\ y = -\frac{1}{3}x - 3 \end{array}$$

b)
$$\begin{array}{r} 2x - y = -4 \\ -2x \quad \quad -2x \\ \hline -y = -2x - 4 \\ \frac{-y}{-1} = \frac{-2x-4}{-1} \\ y = 2x + 4 \end{array}$$

GRAPHING SYSTEMS

- 1) PUT EQUATIONS IN $y = mx + b$
- 2) Plot the y-intercept (0, b)
- 3) Use slope to plot 2 more points
 $m = \frac{\text{Rise}}{\text{Run}}$
- 4) FIND THE ORDERED PAIR WHERE THEY INTERSECT (X, Y)
- 5) Check solution in BOTH ORIGINAL EQUATIONS

Solve each system by substitution. Check!

30) $y = -4x + 28$
 $-2x + 5y = 8$

(6, 4) **Substitute**

$$\begin{aligned} -2x + 5(-4x + 28) &= 8 \\ -2x - 20x + 140 &= 8 \\ -22x + 140 &= 8 \\ -140 & -140 \end{aligned}$$

$$\frac{-22x = -132}{-22} \quad \boxed{X=6}$$

Now Find Y:

$$Y = -4(6) + 28$$

$$\boxed{Y=4}$$

Remember to check!!

Check in BOTH EQUATIONS

c: $4 = -4(6) + 28$ c: $-2(6) + 5(4) = 8$
 $4 = 4$ $8 = 8$

Solve each system by elimination. Check!

31) $-2x - 7y = 15$
 $4x + 7y = -23$

OPPOSITE COEFFICIENTS FOR 1 variable
 THEN ADD DOWN

$$\begin{aligned} 2x &= -8 \\ \frac{2}{2} & \frac{2}{2} \\ \boxed{X=-4} \end{aligned}$$

FIND Y:

$$\begin{aligned} 4(-4) + 7y &= -23 \\ -16 + 7y &= -23 \\ +16 & +16 \\ \frac{7y}{7} &= \frac{-7}{7} \\ \boxed{Y=-1} \end{aligned}$$

32) $-x + 3y = -7$
 $-1(-5x + 3y = 13)$

1 variable has same COEF
 multiply 1 EQ by -1

$$\begin{aligned} -x + 3y &= -7 \\ 5x - 3y &= -13 \\ \hline 4x &= -20 \\ \frac{4x}{4} &= \frac{-20}{4} \\ \boxed{X=-5} \end{aligned}$$

FIND Y:

$$\begin{aligned} -5(-5) + 3y &= 13 \\ 25 + 3y &= 13 \\ -25 & -25 \\ \frac{3y}{3} &= \frac{-12}{3} \\ \boxed{Y=-4} \end{aligned}$$

33) $-5x + 4y = 10$ → $-5x + 4y = 10$
 $-1(-5x + y = -5)$ → $5x - y = 5$

(2, 5)
 x-y

Keep going

34) $(-3x - 2y = 1) \cdot 4$
 $(4x - 3y = -7) \cdot 3$

NO COMMON COEF. MULTIPLY BOTH EQ'S

$$\begin{aligned} -12x - 8y &= 4 \\ 12x - 9y &= -21 \\ \hline -17y &= -17 \\ \frac{-17y}{-17} &= \frac{-17}{-17} \\ \boxed{Y=1} \end{aligned}$$

FIND X:

$$\begin{aligned} 4x - 3(1) &= -7 \\ 4x - 3 &= -7 \\ +3 & +3 \\ \frac{4x}{4} &= \frac{-4}{4} \\ \boxed{X=-1} \end{aligned}$$

Check:

c: $-3(-1) - 2(1) = 1$ c: $4(-1) - 3(1) = -7$
 $1 = 1$ $-7 = -7$

$$35) \begin{cases} 4x - 3y = 10 \\ 3x - 4y = 11 \end{cases} \begin{matrix} \times 3 \rightarrow 12x - 9y = 30 \\ \times -4 \rightarrow -12x + 16y = -44 \end{matrix}$$

$$x = 1 \\ y = -2$$

$$36) \begin{cases} -3x + 3y = -12 \\ 2x - 4y = 10 \end{cases} \begin{matrix} \times 2 \rightarrow -6x + 6y = -24 \\ \times 3 \rightarrow 6x - 12y = 30 \end{matrix}$$

$$x = 3 \\ y = -1$$

Chapter 8

Simplify. Your answer should contain only positive exponents.

$$37) 3y^1 \cdot 4x^2y^4$$

① mult numbers
② same base, add exponents

$$3 \cdot 4 x^2 y^{1+4}$$

$$12x^2y^5$$

$$38) -4x \cdot 2xy^4$$

$$-8x^2y^4$$

$$39) -2x^2y^3 \cdot -3xy$$

$$6x^3y^4$$

$$40) (4xy^3)^2 \leftarrow \text{power to power distribute 2}$$

$$16x^2y^6$$

$$41) (-3x^3y^4)^4 \text{ DISTRIBUTE}$$

$$(-3)^4 x^{3 \cdot 4} y^{4 \cdot 4}$$

$$81 x^{12} y^{16}$$

CALC
 $(-3)^4$
 remember ()'s with negative numbers

$$42) (-2m^4n^2)^3 \text{ Distribute}$$

$$(-2)^3 m^{4 \cdot 3} n^{2 \cdot 3} =$$

$$-8m^{12}n^6$$

$$43) 2y^0 \cdot 3x^3y^0 \cdot x$$

$$6x^4$$

$y^0 = 1$
 anything to the zero exponent is 1

$$44) x^3y^4 \cdot (yx^2)^0$$

$$x^3y^4$$

45) $2xy^3 \cdot (2x^4y^2)^3$ ← follow order of operations

$2xy^3 \cdot 2^{1 \cdot 3} x^{4 \cdot 3} y^{2 \cdot 3} =$

$2xy^3 \cdot 2^3 x^{12} y^6 =$ ← now add exponents and multiply numbers

$2 \cdot 8 x^{1+12} y^{3+6}$

$16 x^{13} y^9$

Simplify. Leave answers with improper fractions and only positive exponents.

46) $-\frac{4x^3y^3}{x^2y^2}$

Division
• Same base
subtract exponents

$-4xy$

47) $-\frac{2a^5}{5a^5}$

$-\frac{2}{5}$

Simplify. Your answer should contain only positive exponents.

48) $\frac{4x^3}{2xy^4}$

$\frac{2x^2}{y^4}$

Use only positive exponents
More y's in bottom
so keep y's in denominator

49) $\frac{m^3}{2m^3}$

$\frac{1}{2}$

50) $-\frac{4xy^2}{3x^4y^3}$

$-\frac{4}{3x^3y}$

more x's + y's in bottom. (subtract exponents AND keep in the part of the fraction with more.)

51) $\left(\frac{m^3n^4}{m^2}\right)^2$

① simplify ()'s
② distribute
 $(m^3n^4)^2 = m^{1 \cdot 2} n^{4 \cdot 2} = m^2 n^8$

52) $\left(\frac{x}{y^2}\right)^2 \frac{x^2}{y^4}$

53) $\left(\frac{2v^4}{2u^2}\right)^4 \frac{v^{16}}{u^8}$

54) $\frac{2x^2}{y^{-4}}$

$2x^2y^4$

Negative → Positive Exponents

- Just swap between top + bottom
- Don't swap numbers or variables with positive exponents

55) $-\frac{4x^4y^4}{2yx^4}$

$-2y^3$

divide numbers
subtract exponents

$\frac{3}{-2x^4y^3}$