

Solve each equation or inequality for  $x$ . Show your work and write your answer in simplest form.

1.  $4(2x + 1) = 27 + 3(2x - 5)$

$$8x + 4 = 27 + 6x - 15$$

$$8x + 4 = 12 + 6x$$

$$2x = 8$$

$$x = 4$$

2.  $\frac{x}{7} - 12 = 8$

$$\frac{x}{7} = 20$$

$$x = 140$$

3.  $\frac{x-20}{6} = -9$

$$x - 20 = -54$$

$$x = -34$$

4.  $F = \frac{Gmx}{r^2}$

$$Fr^2 = Gmx$$

$$\frac{Fr^2}{Gm} = x$$

5.  $\frac{xy}{n} + k = t$

$$\frac{xy}{n} = t - k$$

$$xy = n(t - k)$$

$$x = \frac{n(t - k)}{y}$$

6.  $2y + 2x = P$

$$2x = P - 2y$$

$$x = \frac{P - 2y}{2}$$

7.  $-5n - 6n \leq 8 - 8n - n$

$$-11n \leq 8 - 9n$$

$$-2n \leq 8$$

$$n \geq -4$$

8.  $\frac{-3x}{2} - 6 < 9$

$$\frac{-3x}{2} < 15$$

$$-3x < 30$$

$$x > -10$$

9.  $2(x - 2) - 4x > 3x + 1$

$$2x - 4 - 4x > 3x + 1$$

$$-4 - 2x > 3x + 1$$

$$-5 > 5x$$

$$-1 > x$$

10.  $x + 2(x + 4) = 2 + 3(x + 2)$

$$x + 2x + 8 = 2 + 3x + 6$$

$$3x + 8 = 8 + 3x$$

$$8 = 8$$

All Solutions

For #7-9, graph your solution on the number lines below.



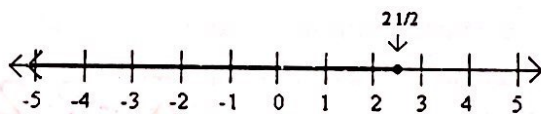
Rewrite each of the following as an inequality.

10. x is no less than 30  $x \geq 30$

11. x is a minimum of 0  $x \geq 0$

12. x is at most 25  $x \leq 25$

13. Write the inequality that is represented by the number line below.



$x \leq 2 \frac{1}{2}$

14. An equation is solved below. Explain what is being done in each step.

$$5x + 10 = 3(3x + 7)$$

$$5x + 10 = 9x + 21$$

Distribute 3

$$10 = 4x + 21$$

Subtract 5x

$$-11 = 4x$$

Subtract 21

$$\frac{-11}{4} = x$$

Divide by 4

For #15-19, define the variable. Write an equation or inequality you could use to solve the problem. Choose only 2 to actually solve.

15. You and your friends have a total of \$16 to spend on pizza. A large pizza with cheese costs \$11 plus \$0.50 for each additional topping, tax included. How many toppings can you and your friends afford?

Variable:

$t$ : # of toppings

Equation or inequality:

$$11 + .5t = 16$$

$$t = 10$$

16. Steve wants to take his family to the fair on Saturday night. He needs to take at least \$280 so that his family can eat dinner and lots of junk food and ride several rides. He is a plumber and he charges \$60 for the house visit and \$20 for each hour. He will only be able to work at one house on Saturday. How many hours will he need to work at that house to make sure he has at least \$280 to take his family to the fair later that night?

Variable:

$h$ : # of hours worked

Equation or inequality:

$$60 + 20h \geq 280$$

$$h \geq 11$$

17. More than 300 students went on a trip to the Durham Performing Arts Center. Ten buses were filled and 15 more students traveled by car. What is the minimum number of students on each bus?

Variable:

$s$ : # of students

Equation or inequality:

$$10s + 15 > 300$$

$$s > 28.5$$

29 students

18. Paul spent half of his paycheck at Game Stop. To make some extra money, he then sold his X-Box for \$100. How much is his pay check if he ended with \$230 after selling the X-Box?

Variable:

$p$ : paul's pay check

Equation or inequality:

$$\frac{1}{2}p + 100 = 230$$

$$p = 260$$

19. Amanda rented a bike from Shawna's Bikes. They charged her \$2 per hour, plus a \$10 fee. Amanda paid less than \$27. What is the maximum number of hours Amanda rented the bike?

Variable:

$h$ : # of hours

Equation or inequality:

$$10 + 2h < 27$$

$$h < \frac{17}{2}$$

20. Write a brief story or scenario that could be modeled by the equation. Be sure to define all variables, coefficients, and constants:  $100 - 2x = 34$

Ms. Mendoza has 100 water bottles. She has 34 left.  
How many days have passed?

21. Given the following variable definition and solution, write the solution in both interval and set notation. Be sure to consider whether the situation is discrete or continuous.

$s$  = number of students in each class  $15 < s \leq 35$

Set notation:

$\{s \in \mathbb{N}, 15 < s \leq 35\}$

Interval notation:

$(15, 35]$

22. Paul is hoping to improve his trumpet playing abilities. See the table below for definitions of variables he is tracking. Complete the units column of the table, then use the information in the table to answer the questions that follow.

Symbol	Variable (description of what the symbol means in context)	Units (what is counted or measured)
M	Number of minutes practiced on Mondays	minutes
W	Number of minutes practiced on Wednesdays	minutes
F	Number of minutes practiced on Fridays	minutes
B	Number of songs he can play by memory	Songs
S	Number of songs he can play by reading music	Song
T	Total number of songs he can play	Songs

a. Make meaning of each of the new variables defined below. Make sure you include labels for each individual variable and then explain what the new variable means in the context of the problem.

$$D = M + W + F$$

↑                    ↑  
min                min  
Monday        Friday

D: Total # of minutes practiced

$$A = \frac{M+W+F}{3}$$

A: Average # of minutes practiced per day.

b. Write an expression that defines T in terms of variables from the table.

$$T = B + S$$