

Unit 4 Study Guide: Equations & Inequalities

Vocabulary:

1. **Equation**__: a statement that shows two mathematical expressions are equal
2. **Inverse_ _Operations**__: pairs of operations that undo each other.

Addition and subtraction are inverse operations. For example, $1 + 4 = 5$, and $5 - 4 = 1$.
Multiplication and division are inverse operations. For example, $2 \times 3 = 6$, and $6 \div 3 = 2$.

3. **Solution**__: A number (or ordered pair of numbers, or set of numbers) that produces a true statement when substituted for the variable(s) in an equation or inequality.
 4. **Inequality**__: A mathematical sentence that contains the symbols $>$, $<$, \geq , or \leq .
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Part A:

Solving One-Step Equations

5. $X + 319 = 2084$

$X = 1765$

6. $Y - 482 = 912$

$y = 1394$

7. $2.5h = 80$

$h = 32$

8. $\frac{r}{3.2} = 20.1$

$r = 64.32$

9. $\frac{4}{5} + w = \frac{7}{8}$

$w = \frac{3}{40}$

10. $2\frac{1}{4}a = 1\frac{1}{4}$

$a = \frac{5}{9}$

11. $1.2y = -144$

$y = -120$

12. $\frac{n}{8.2} = -0.6$

$n = -4.92$

13. $-1.8 + v = -3.8$

$v = -2$

14. $-\frac{5}{26} + m = -\frac{7}{13}$

$m = -\frac{9}{26}$

15. $y - \frac{3}{4} = -\frac{9}{20}$

$y = \frac{3}{10}$

16. $-\frac{8}{13}v = -\frac{6}{13}$

$v = \frac{3}{4}$

17. Martin spends \$85 a month on his cell phone plan. He has saved \$1,105. How many months, m , will Martin be able to pay for his cell phone plan?

Equation: $85m = 1105$ _____

Solution: $m = 13$ months _____

18. Emily uses 3.5 cans of blue paint to paint her bedroom and, b , cans of blue paint to paint her kitchen. If she used 6.25 cans total, how much paint did she use to paint the kitchen?

Equation: $b + 3.5 = 6.25$ _____

Solution: $b = 2.75$ cans _____

19. Kyle is $3\frac{1}{4}$ years younger than her brother Sam. She is $4\frac{1}{2}$ years old. What is Sam's age, a ?

Equation: $a - 3\frac{1}{4} = 4\frac{1}{2}$ _____

Solution: $a = 7\frac{3}{4}$ years old _____

20. Julie wants to buy some fancy ribbon for an art project. The ribbon costs \$5 a yard. Julie spends \$2.25 on ribbon. How many yards, y , of ribbon did she buy?

Equation: $5y = 2.25$ _____

Solution: $y = 0.45$ yards _____

21. A bakery makes 24 rolls (1 batch) at a time. They have made 32 batches of rolls, so how many rolls, r , have they baked in total.

Equation: $\frac{r}{24} = 32$ _____

Solution: $r = 768$ rolls _____

Part B: Inequalities

Write an inequality for each situation.

22. The temperature today will be at most 50° F. $t \leq 50$ _____

23. The temperature tomorrow will be above 70° F. $t > 70$ _____

24. Yesterday, there was less than 2 inches of rain. $r < 2$ _____

25. Last Monday, there was at least 3 inches of rain. $r \geq 3$ _____

Solve each inequality. Then graph each solution set on a number line.

26. $s - 2 > 14$



shaded to the right

$s > 16$; open circle on 16

27. $c - 17 \leq -6$



shaded to the left.

$c \leq 11$; closed circle on 11

28. $-25 > y - 53$



shaded to the left.

$28 > y$; open circle on 28

29. $k + 3.2 \geq 8$



4.8 shaded to the right.

$k \geq 4.8$; closed circle on

30. $c - 6\frac{1}{2} < -1\frac{1}{4}$



shaded to the left.

$c < 5\frac{1}{4}$; open circle on $5\frac{1}{4}$

31. $\frac{s}{5} > 1.4$



shaded to the right.

$s > 7$; open circle on 7

32. $5z > -3$



shaded to the right.

$z > -\frac{3}{5}$; open circle on $-\frac{3}{5}$

33. $\frac{m}{4} < -13$



shaded to the left.

$m < -52$; open circle on -52

34. $\frac{2}{3}y \geq 12$



closed circle on 18 shaded to the right.

$y \geq 18$ mult. by reciprocal;

35. $5.6v \geq -14$



-2.5 shaded to the right.

$v \geq -2.5$; closed circle on

Write an inequality for each word problem and then solve.

36. A pilot must log at least 1000 training hours to fly a jet aircraft. Tom had logged 250 hours. How many more hours must be logged in order to make the qualification?

Inequality: $250 + h \geq 1000$

Solution: $h \geq 750$

37. In order for a field trip to be scheduled, at least 30 students must sign up. So far, 23 students have signed up. At least how many more students must sign up in order for the field trip to be scheduled?

Inequality: $23 + s \geq 30$

Solution: $s \geq 7$

38. It cost Sophia \$530 to make wind chimes. How many wind chimes must she sell at \$12 apiece to make a profit?

Inequality: $12w > 530$

Solution: $w \geq 45$

39. Mrs. Fox charges \$3 for a pencil to students who forgot to bring one to class. If Sean was charged at least \$45 in one marking period, how many times did he forget his pencil?

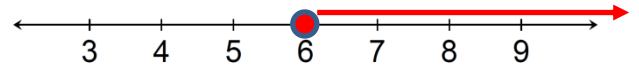
Inequality: $3p \geq 45$

Solution: $p \geq 15$

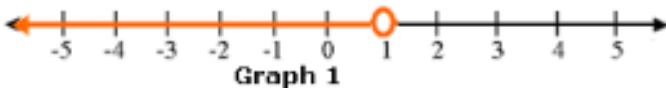
Write an inequality to represent the situation. Then, graph the solution.

40. Kasey has been mowing lawns to save up money for a concert. He earns \$15 per hour and needs at least \$90 to go to the concert. How many hours should he mow?

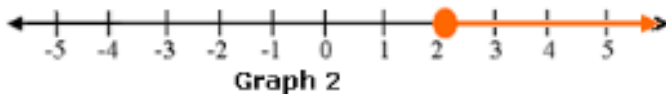
Inequality: $15h \geq 90$



Write an inequality for each graph.

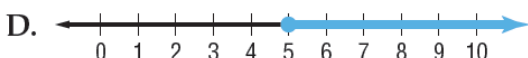
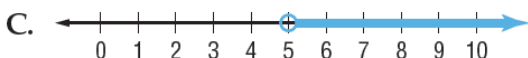


41. $x < 1$



42. $x \geq 2$

43. Which of the following graphs represent the inequality $x \geq 5$? **D**



Part C:

Open Ended

44. Justin can type w words per minute. Melvin can type 4 times as many words as Justin. Melvin types 60 words per minute. How many words can Justin type per minute?

15 wpm

45. Nolan recorded the number of hours, n , he spent reading over the summer for a library reading program.

Taylor read for twice as many hours as Nolan. If Taylor read for 54 hours, write an equation that can be used to find the number of hours Nolan read. Solve the equation to determine the number of hours Nolan read.

$$2n = 54$$

$$n = 27 \text{ hours}$$

46. Jessica bought an 8-pound ham to serve at a party. She plans to serve each adult $\frac{2}{5}$ pound.

Part A

Write an equation to represent the number of adult servings, x , Jessica can get from the 8-pound ham. Use your equation to determine the number of adult servings in an 8-pound ham. Show your work.

$$\frac{2}{5}x = 8$$

$$x = 20 \text{ servings}$$

Part B

The children at the party will each receive $\frac{5}{12}$ of an adult serving. Write and solve an equation to determine the number of children's servings, s , Jessica can get from the 8-pound ham. Show your work.

$$\frac{1}{6}x = 8$$

$$x = 48 \text{ servings}$$

47. The band is trying to raise money for new uniforms by holding a car wash. Their goal is to raise \$1000. If they charge \$15 per wash, what is the minimum number of cars they must wash?

Write and solve an inequality that describes the minimum number of cars they must wash.

Inequality: $15w \geq \$1000$

Solution Set: $w \geq 66\frac{2}{3}$; so must wash at least 67 cars