

Alg 1 Credit Recovery Sem 1Ch 1 Notes: Solving Equations**1.0 Notes: Solving One-Step Equations**

Solving an equation:
 * find the value(s) of a variable to make an equation true, if possible.
 letter = symbol
 represent an unknown

Inverse Operations:
 * to "undo" operations to get a variable (isolated)
 * Do the SAME THING to both sides of an equation.

$$\begin{array}{c} + \\ - \\ \times \\ \div \end{array} \leftrightarrow \begin{array}{c} - \\ + \\ \div \\ \times \end{array}$$

Examples: Solve each equation for the variable. Show your work! You may use a calculator.

$$1) x + 5 = 20$$

$$2) 15.45 = b + 3.1$$

$$3) a - 8 = -11$$

$$\boxed{x = 15}$$

$$\boxed{12.35 = b}$$

$$\boxed{a = -3}$$

For #4 – 5, write an equation to represent each situation. Then solve the equation to answer the question.

4) Clownfish and angelfish are popular tropical fish. An angelfish can grow to be 12 inches long. If an angelfish is 3.5 inches longer than a clown fish, how long is a clownfish?

$$\text{clownfish} + 8.5 = \text{angelfish}$$

$$\rightarrow x + 8.5 = 12 \leftarrow x$$

$$\begin{array}{r} +8.5 \\ -8.5 \\ \hline x \end{array}$$

$$\boxed{x = 3.5 \text{ inches}}$$

5) Jim is taller than Pete. The difference in their heights is 5.8 cm. Jim is 171.16 cm. How tall is Pete?

$$\text{Jim} = \text{Pete} + 5.8$$

$$171.16 = x + 5.8$$

$$\begin{array}{r} -5.8 \\ -5.8 \\ \hline x \end{array}$$

$$\boxed{165.36 = x}$$

$$\begin{array}{l} \text{Jim} - 5.8 = \text{Pete} \quad x \\ 171.16 - 5.8 = x \\ \hline 165.36 = x \end{array}$$

fraction

Examples: Solve for each variable. Show your work! You may use a calculator.

$$6) 30 = \frac{a}{3}$$

$$\rightarrow 30 \times 3 = 18 = 2$$

$$\boxed{a = -36}$$

$$\begin{array}{r} -36 \\ -24 \\ \hline -24 \end{array}$$

$$\boxed{a = -3.1}$$

$$\text{Complex: } \frac{3}{5}x - 2(4x+3) = 11x - 5(2x+1)$$

(algebra)

↓
simple

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Reciprocal of a Fraction: "flip" a fraction; switch the num + denom

$\frac{3}{2}$	$\frac{2}{3}$
fraction	reciprocal

$\frac{1}{3}$	$\frac{3}{1}$
fraction	reciprocal

-4	$\frac{1}{4}$
fraction	reciprocal

If a fraction multiplies a variable, mult BOTH SIDES by the reciprocal.

Solve each equation:

$$9) -5 = \frac{m}{3}$$

$$10) \frac{2}{3}x = 12$$

$$\begin{array}{r} -45 = m \\ -45 \end{array}$$

$$\begin{array}{r} \cancel{\frac{2}{3}} \cancel{x} = 12 \cdot \frac{3}{2} \\ x = 18 \end{array}$$

$$12) \frac{3}{2} = \frac{36}{2} = 18$$

For #11 – 12: Write an equation to represent each situation. Then solve your equation to answer the question.

11) Two-thirds of a class plans to participate in the school talent show. If 16 students from the class plan to participate, how many students are in the class?

$$\begin{array}{r} \frac{2}{3} \cdot \text{class} = \text{talent show} \\ \cancel{\frac{2}{3}} \cancel{x} = 16 \cdot \frac{2}{3} = \frac{32}{3} \end{array}$$

$$\begin{array}{r} x = 10.\overline{6} \text{ people} \\ \text{or } \frac{32}{3} \text{ people} \end{array}$$

12) Samir wants to buy as many apples as he can. He has \$4.80, and the apples cost \$.80 each. How many apples can he buy?

$$4.80 = .80 \text{ (apple)}$$

$$\begin{array}{r} 4.80 = .80 \cdot x \\ \cancel{.80} \cancel{x} = \cancel{.80} \end{array}$$

$$\boxed{\text{apples} = x}$$

Alg 1 Credit Recovery Sem 1**Ch 1 Notes: Solving Equations****1.1 Notes: Solving More Equations: 2-Step and with the Distributive Property**

Steps for solving 2-step equations: +, - with inverse operations

- ① cancel any + or - with inverse operations
- ② cancel any • or ÷ with inverse operations

Do the SAME thing to BOTH sides

Examples: Solve for each variable. Show your work! You may use a calculator.

1) $2y + 4 = 16$
 $\cancel{+4} \quad \cancel{-4}$
 $2y = 12$
 $\frac{2y}{2} = \frac{12}{2}$
 $y = 6$

2) $7 = -3x + 5$
 $\cancel{+5} \quad \cancel{-5}$
 $2 = -3x$
 $\frac{2}{-3} = \frac{-3x}{-3}$
 $\frac{2}{-3} = x$
 $x = -\frac{2}{3}$

3) $4x - 13 = 1$
 $\cancel{-13} \quad \cancel{+13}$
 $4x = 14$
 $\frac{4x}{4} = \frac{14}{4}$
 $x = 3.5$

4) $\frac{n}{3} - 1 = 5$
 $\cancel{-1} \quad \cancel{+1}$
 $\frac{n}{3} = 6$
 $3 \cancel{\cdot \frac{n}{3}} = 3 \cdot 6$
 $n = 18$

5) $11 - \frac{3}{2}h = 5$
 $\cancel{+5} \quad \cancel{-5}$
 $6 = \frac{3}{2}h$
 $\frac{2}{3} \cancel{\cdot \frac{6}{2}} = \frac{3}{2}h \cancel{\cdot \frac{2}{3}}$
 $4 = h$
 $10.6 = h$

6) $4.2x + 5.1 = 11.8$
 $\cancel{+5.1} \quad \cancel{-5.1}$
 $4.2x = 6.7$
 $\frac{4.2x}{4.2} = \frac{6.7}{4.2}$
 $x = 1.59$

Using the Distributive Property to Solve Equations

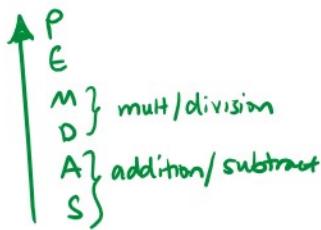
The Distributive Property:

$$5(3x + 2) = 15x + 10$$

$$-4(8 + 3a) = -32 - 12a$$

Steps for solving equations with the Distributive Property:

- ① Distribute!
- ② cancel + or -
- ③ cancel • or ÷



complex
 ↓
 algebra!
 ↓
 simple

Alg 1 Credit Recovery Sem 1**Ch 1 Notes: Solving Equations****1.1 Notes, continued...**

Solve each equation for the variable. Show your work. You may use a calculator.

7) $3(2y + 4) = 12$
 $\cancel{+4} \quad \cancel{-4}$
 $6y = 4$
 $\frac{6y}{6} = \frac{4}{6}$
 $y = \frac{2}{3}$

8) $24 = 6(4 + 3a)$
 $\cancel{+4} \quad \cancel{-4}$
 $24 = 24 + 18a$
 $-24 \quad -24$
 $0 = 18a$
 $\frac{0}{18} = \frac{18a}{18}$
 $a = 0$

9) $-(x - 3) = 7$
 $-1x + 3 = 7$
 $-1 \cancel{x} \quad \cancel{+3}$
 $-x = 4$
 $x = -4$

10) $21.5 = -3.5(2n + 0)$
 $+28 \quad \cancel{+0}$
 $49.5 = -7n$
 $\frac{49.5}{-7} = n$
 $-7.07 = n$

For #11 – 13: The clearance of the Golden Gate Bridge in San Francisco is 67 meters. This clearance is 16.8 meters less than 2 times the clearance of the Brooklyn Bridge in New York City. What is the approximate clearance of the Brooklyn Bridge?

11) Work with your group to try to solve the problem with any method.

?

\downarrow

67 m

12) Write an equation to represent the situation. $\text{Golden Gate} = 2 \cdot \text{Brooklyn} - 14.8$

$$67 = 2x - 14.8$$

13) Solve your equation from #12. Compare your answer to your result from #11.

$$\begin{aligned} 67 &= 2x - 14.8 \\ +14.8 &\quad +14.8 \\ 81.8 &= 2x \\ \frac{81.8}{2} &= x \\ 40.9 \text{ meters} &= x \end{aligned}$$

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Ch 1 Notes: Solving Equations

1.2 Notes: Solving Equations by Combining Like Terms

Like Terms: *same variable(s) to the same power(s)

$$3x + -5x \quad \left\{ \begin{array}{l} \text{like terms} \\ \text{not like terms} \end{array} \right\} \quad 2a^2 + 4a^2 \quad \left\{ \begin{array}{l} \text{like terms} \\ \cancel{2a^2 + 4a^2} \end{array} \right\} \quad 3x^2 + 3x^2$$

Combining Like Terms

- Change the coefficient (+ or -)
- Keep variables the same & powers

$$\begin{matrix} 5x \\ \downarrow \text{coeff. variable} \end{matrix} \quad 5x^2 + 8x^2 = 13x^2$$

Steps for Solving Equations with Like Terms

- ① Distribute
- ② Combine like term if on the SAME SIDE of = sign
- ③ cancel +, - } inverse operations
- ④ cancel ×, ÷ }

Examples: Solve for the variable. Show your work. You may use a calculator.

1) $5x - 3x = 8$

$$\begin{aligned} 5x - 3x &= 8 \\ \cancel{2x} &= 8 \\ x &= 4 \end{aligned}$$

2) $16 = 8y$

$$\begin{aligned} \frac{16}{8} &= y \\ 2 &= y \end{aligned}$$

3) $5x + 8 = -12$

$$\begin{aligned} 5x &= -12 - 8 \\ 5x &= -20 \\ x &= -4 \end{aligned}$$

4) $3b - 8b + 10 = 14$

$$\begin{aligned} 3b - 8b &= 14 - 10 \\ -5b &= 4 \\ b &= \frac{4}{5} \\ b &= 0.8 \end{aligned}$$

5) $3 + 10a - 4a = 24$

$$\begin{aligned} 3 + 6a &= 24 \\ 6a &= 21 \\ a &= \frac{21}{6} \\ a &= 3.5 \end{aligned}$$

6) $-16 = -4b + 8 + 2b$

$$\begin{aligned} -16 &= -4b + 8 \\ -16 - 8 &= -4b \\ -24 &= -4b \\ 6 &= b \end{aligned}$$

#($m + m$)

$1y$

$1x$

$1a$

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Ch 1 Notes: Solving Equations

7) $4.2h - 6 + 0.6h = 9$

$$\begin{aligned} 4.2h - 6 + 0.6h &= 9 \\ 4.8h - 6 &= 9 \\ 4.8h &= 15 \\ h &= \frac{15}{4.8} \\ h &= 3 \end{aligned}$$

8) $-12 = 5.5 - 4x + 2.2 + 2x$

$$\begin{aligned} -12 &= 5.5 - 2x + 2.2 + 2x \\ -12 &= 7.7 \\ -12 &= 7.7 \end{aligned}$$

$$\begin{aligned} -12 &= -2x \\ 6 &= x \\ 9.75 &= x \end{aligned}$$

9) $5x + 3(4 - bx) = 15$

$$\begin{aligned} 5x + 12 - 3bx &= 15 \\ -3bx &= 15 - 12 \\ -3bx &= 3 \\ x &= -\frac{3}{b} \end{aligned}$$

10) $42 = 6x + 3(4x - 1)$

$$\begin{aligned} 42 &= 6x + 12x - 3 \\ 42 &= 18x - 3 \\ 45 &= 18x \\ 2.5 &= x \end{aligned}$$

Some unusual situations: What do you think the value is for the variable in the two situations below?

Situation #1) $14x - 7(2x + 5) = 14$

$$\begin{aligned} 14x - 14x - 35 &= 14 \\ -35 &= 14 \\ \cancel{-35} &= \cancel{14} \\ \text{False} & \end{aligned}$$

No x s! Wah!

"No Solution"

NS
∅ "empty set"

Situation #2) $5a - 2(3a + 1) + a = 2$

$$\begin{aligned} 5a - 6a - 2 + a &= -2 \\ -2 &= -2 \\ \text{True} & \end{aligned}$$

No x s! Wah!

All real numbers

ARN

RR

Alg 1 Credit Recovery Sem 1**Ch 1 Notes: Solving Equations****1.3 Notes: Solving Equations with Variables on Both Sides**

$$3x + 5 = 7x - 8$$

Steps for solving equations with variables on both sides:

- ✓ ① Distribute.
- ✓ ② Combine like terms on SAME SIDE OF =
- ✓ ③ If needed, cancel one set of variables (+ or -)
- ④ Cancel +, -
- ⑤ Cancel • or ÷

Examples: Solve each equation below. Show your work.

$$1) 5x + 7 = 3x + 21$$

$$\begin{aligned} & -3x \\ 2x + 7 &= 21 \\ 2x &= 14 \\ \frac{2x}{2} &= \frac{14}{2} \\ x &= 7 \end{aligned}$$

$$4) 3(x - 5) = 2(4 - x)$$

$$\begin{aligned} 3x - 15 &= 8 - 2x \\ +2x &+2x \\ 5x - 15 &= 8 \\ +15 &+15 \\ 5x &= 23 \\ \frac{5x}{5} &= \frac{23}{5} \\ x &= 4.6 \end{aligned}$$

$$6) 18x + 3(5 - 2x) = 4 + 6x$$

$$\begin{aligned} 18x + 15 - 6x &= 4 + 6x \\ 12x + 15 &= 4 + 6x \\ 6x + 15 &= 4 \\ -15 &-15 \\ 6x &= -11 \\ \frac{6x}{6} &= \frac{-11}{6} \\ x &= -\frac{11}{6} \end{aligned}$$

$$2) -7x - 4 = x + 3$$

$$\begin{aligned} & +7x +7x \\ -4 &= 8x + 3 \\ -3 &-3 \\ -7 &= 8x \\ \frac{-7}{8} &= x \\ x &= -\frac{7}{8} \end{aligned}$$

$$5) 2(4a + 3) = 3(2 + 6a)$$

$$\begin{aligned} & -8a - 6 = 6 + 18a \\ +8a &+8a \\ -6 &= 24a \\ -6 &-6 \\ -12 &= 24a \\ \frac{-12}{24} &= a \\ a &= -\frac{1}{2} \end{aligned}$$

$$7) 6b - 2(3b - 6) = 5 - (5b - 2)$$

$$\begin{aligned} 8b - 6b - 12 &= 5 - 5b + 2 \\ 2b - 12 &= -5b + 3 \\ +5b &+5b \\ 7b - 12 &= 3 \\ +12 &+12 \\ 7b &= 15 \\ \frac{7b}{7} &= \frac{15}{7} \\ b &= \frac{15}{7} \end{aligned}$$

Alg 1 Credit Recovery Sem 1**Ch 1 Notes: Solving Equations**

8) Work with a partner! Make up an equation with variables on both sides, and then exchange with a partner. Solve the equation your partner made, and then exchange your packet back so you have your own packet. Examine the solution your partner created. Do you agree with their solution? Discuss and correct as needed.

?

SKIP

Unique Situations: Explore each unique situation below. What do you think the value of each variable will be?

$$9) 5g - 3 = 5g - 10$$

x no variable

-3 = 10
FALSE

No Solution

NS

$$10) 7h - 3 - h = 3 + 6h$$

x no variable

6h + 3 = 3 + 6h
-6h -6h

3 = 3
TRUE

All Real Numbers / ARN

11) Create a problem that will have no solution and two variables on both sides. Write it down below.

$$\begin{aligned} & (5x + 3) = (5x - 2) \\ & +3 = -2 \\ & 3 = -2 \\ & \text{False} \end{aligned}$$

same diff

New exchange papers with a partner. Solve the new problem (show your work above). Did you get no solution? Have a conversation with your partner about whether or not you agree with each other.

1.4 Notes: Solving Proportions and Equations with Fractions

What is a proportion? **Two or more fractions that are = to each other**

$$\frac{x}{3} = \frac{x-2}{11}$$

Example: Work as a group or with a partner to think of as many fractions as you can that are equivalent to the fraction $\frac{1}{2}$. Write them below:

$$\rightarrow \frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12} = \frac{100}{200} = \frac{30}{60} = \frac{130}{260} = \frac{2x}{4x}$$

Now create a proportion showing that these fractions (or "ratios") are equal to each other.

Solving Proportions by using Cross-Multiplication:

multiply the terms that are diagonal \rightarrow set those products EQUAL to each other

Example: Solve $\frac{4}{x} = \frac{15}{4}$ by using cross multiplication.

$$\frac{4}{x} = \frac{15}{4} \quad x = \frac{15}{4} \text{ or } 3.75$$

Examples: Solve each proportion below. Show your work.

$$1) \frac{4}{x} = \frac{7}{10} \quad x = \frac{7}{4} \text{ or } 1.75$$

$$2) \frac{2}{x} = \frac{10}{20} \quad -20x = 40 \quad x = -2$$

$$3) \frac{4}{x} = \frac{3}{5} \quad 4 \cdot 5 = 3x \quad x = \frac{20}{3} \text{ or } 6.\overline{6}$$

$$4) \frac{2(x+3)}{6} = 35 \quad 2(x+3) = 210 \quad x+3 = 105 \quad x = 102 \quad x = \frac{102}{2} \text{ or } 51$$

$$5) \frac{55b-2z}{2z} = 12 \quad 55b-2z = 24z \quad 55b = 26z \quad b = \frac{26}{55}z$$

More examples: Proportions \rightarrow cross-multiply! 😊

$$6) \frac{5}{x} = \frac{4}{x-1}$$

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

$$5x + 5 = 12 - 4x \quad 9x + 5 = 12 \quad 9x = 7 \quad x = \frac{7}{9} \text{ or } 0.\overline{7}$$

Clearing the Fractions:

① make an equivalent equation
② multiply ALL terms by common denominator

③ Solve

Solve each equation by clearing the fractions. Show your work. You may use a calculator.

$$8) \frac{x}{2} + 7 = -2x - 4$$

$$3x + 28 = -8$$

$$\frac{3x}{3} = \frac{-36}{3}$$

$$x = -12$$

$$9) \frac{1}{2}x + 7 = -2x - 4$$

$$18 + 4(3x+1) = 63$$

$$18 + 12x + 4 = 63$$

$$\frac{12x}{12} + \frac{22}{12} = \frac{63}{12}$$

$$2x + \frac{11}{2} = \frac{21}{2}$$

$$2x = \frac{11}{2}$$

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

$$10) \frac{11}{5}a - 5 = \frac{3}{5}a + \frac{1}{5}$$

$$-1/a + 15 = 18a + 1$$

$$\frac{15}{1} = \frac{7a}{1} + \frac{1}{1}$$

$$\frac{14}{7} = \frac{7a}{7}$$

$$2 = a$$

More examples: Proportions \rightarrow cross-multiply! 😊

7) $\frac{6}{x} = \frac{5(b+1)}{3}$

$$7(6-b) = 2(5b+3)$$

$$42 - 7b = 10b + 6$$

$$\frac{-17b}{-17} = \frac{36}{-17}$$

$$b = \frac{36}{17}$$

$$x = \frac{2}{3}b$$

$$x = \frac{2}{3} \cdot \frac{36}{17}$$

$$x = \frac{24}{17}$$

$$x = 1\frac{7}{17}$$

$$x = 1.41$$

Alg 1 Credit Recovery Sem 1 Linear Inequalities potentially not graphed

1.5 Notes: Solving Linear Inequalities

Inequality: (not using equal signs)

What do these symbols mean? How are they graphed on a number line?

For #1-4: Graph each inequality on the provided number line. You try #3 and 4!

- 1) $x < 3$ "less than 3" (graphed on a number line with an open circle at 3 and an arrow pointing left)
- 2) $x \geq 1$ "first find" (graphed on a number line with a closed circle at 1 and an arrow pointing right)
- 3) $x > 0$ (graphed on a number line with an open circle at 0 and an arrow pointing right)
- 4) $x \leq 2$ (graphed on a number line with a closed circle at 2 and an arrow pointing left)

Solving Inequalities with Addition and Subtraction:

- * Isolate the variable on the LEFT side!
- * Use inverse operations + ↔ -
- * Graph solution

Examples: Solve each inequality below. Graph your solution on the provided number line.

- 1) $g + 3 < 5$ "solution" (graphed on a number line with an open circle at 2 and an arrow pointing left)
- 2) $6 \leq x - 2$ "solution" (graphed on a number line with a closed circle at 8 and an arrow pointing right)
- 3) $a - 3 > -5$ "solution" (graphed on a number line with an open circle at -2 and an arrow pointing right)

Exploration: Consider the inequality $\frac{4}{5} < f$. Is this inequality true or false?

Multiply both sides of the inequality by -1. Write the new inequality. Is it true or false?

$$\begin{aligned} -1 \cdot \frac{4}{5} &< 6 \cdot -1 \\ -4 &< -6 \end{aligned}$$

False

$\frac{-4+0+1+2+3+4+5}{7} = -10$

What would we need to do to make the new inequality true?

$-4 > -6$ True

* flip the symbol

Alg 1 Credit Recovery Sem 1

Ch 1 Notes: Solving Equations

Solving Inequalities by Multiplication or Division

If you **MULT** or **DIVIDE** BOTH SIDES by a **NEGATIVE**,

You must flip the symbol.

Examples: Solve each inequality below. Graph your solution on the provided number line.

4) $3g < 15$

$$\begin{array}{l} g < 5 \\ \text{solution} \end{array}$$

7) $\frac{1}{3}y \geq 12$

$$y \geq 36$$

5) $20 \leq 4x$

$$\begin{array}{l} -5 \leq x \\ x \geq -5 \end{array}$$

8) $-2b > 20$

$$\begin{array}{l} b < -10 \\ b < -5 \end{array}$$

6) $\frac{y}{3} > 12$

$$\begin{array}{l} y > 36 \\ y < -6 \end{array}$$

10) $3g - 6 < 15$

$$\begin{array}{l} 3g < 21 \\ g < 7 \end{array}$$

$$\begin{array}{l} g < 7 \\ \text{solution} \end{array}$$

11) $-20 \leq 2x - 6$

$$\begin{array}{l} +6 \leq 2x \\ -14 \leq 2x \\ -7 \leq x \end{array}$$

$$\begin{array}{l} x \geq -7 \\ \text{solution} \end{array}$$

12) $-5g + 2 > 12$

$$\begin{array}{l} -5g > 10 \\ g < -2 \end{array}$$

$$\begin{array}{l} g < -2 \\ \text{solution} \end{array}$$

13) $3(3 - 2x) \geq 42$

$$\begin{array}{l} -9 - 6x \geq 42 \\ +9 \\ -6x \geq 51 \\ x \leq \frac{17}{2} \end{array}$$

$$\begin{array}{l} x \leq \frac{17}{2} \\ \text{solution} \end{array}$$

14) $5x - 1 > 8x + 11$

$$\begin{array}{l} 5x - 1 > 8x + 11 \\ -3x > 12 \\ x < -4 \end{array}$$

$$\begin{array}{l} x < -4 \\ -3 > x \\ x < -3 \end{array}$$

- ✓ Dist
- ✓ Combining terms
- ✓ SAME SIDE

- ③ mixed variables
- diff side
- (+ or -)

1.6 Notes: Solving Compound Linear Inequalities

Exploration. Work with your partner to name as many numbers as possible that fit each description.

A) A number that is larger than 4 and less than 7.

$$x > 4 \text{ and } x < 7$$

$S, 6, 4.1, 4.2, 4\frac{1}{2}, 5.9, 6.2,$
 $5.3 \quad 6\frac{1}{4} \quad 6\frac{5}{7}$

B) A number that is less than 4 or a number that is larger than 7.

$$0, 1, 2, 3, \quad \left\{ \begin{array}{l} 8, 9, 10, 11, \\ -7, -9, -11, \end{array} \right. \quad x < 4 \text{ or } x > 7$$

$-7, -9, -11, \quad 12, 7.1, 7.5, 7\frac{2}{5},$
 $3.9, 2\frac{1}{4}, \quad 8.362, 1000000$

C) As a class, create a compound inequality for each description above. Shade each solution on a number line.

more than symbol ($<, >, \geq, \leq$)

Compound Inequalities

or (or's)	and
$x < -5 \text{ or } x > 8$	$x > -5 \text{ and } x < 8$

AND
smaller $\leq x \leq$ bigger
 less than middle less than

$$-5 \leq x \leq 8$$

For #1–4, MATCH each compound inequality to its graph.

- 1) $\rightarrow x \leq 3$ AND $\rightarrow x > 5$ 2) $\rightarrow x < -5$ or $\rightarrow x \geq 0$ 3) $\rightarrow x \leq -5$ or $\rightarrow x > 8$ 4) $\rightarrow x < 0$ AND $\rightarrow x > 8$
-

Solving Compound Inequalities

or solve separately

$$x+7 < 10 \quad \text{or} \quad x-3 > 20$$

$$\cancel{x+7} \cancel{-7} \quad \cancel{x-3} \cancel{+3}$$

$\Rightarrow x < 3 \quad \text{OR} \quad x > 23$

and solve together

$$-3 \leq 5x + \frac{1}{2} \leq 8$$

$$\cancel{-\frac{1}{2}} \quad \cancel{-\frac{1}{2}}$$

$$-\frac{5}{2} \leq 5x \leq \frac{15}{2}$$

$$\cancel{\frac{1}{5}} \quad \cancel{\frac{1}{5}}$$

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

For #5–10: Solve each compound inequality, and then graph your solution on the provided number line. Show your work! You may use a calculator.

- 5) $x - \frac{3}{4} \leq -6 \quad \text{or} \quad 4x + 1 \geq 21$
- $$\cancel{x - \frac{3}{4}} \cancel{+\frac{3}{4}} \quad \cancel{4x} \cancel{+1} \cancel{-1}$$
- $x \leq -3 \quad \text{OR} \quad x \geq 5$
-
- 6) $5x + \frac{1}{4} \leq 16 \quad \text{or} \quad 4x \geq 21 - 4$
- $$\cancel{5x} \cancel{+ \frac{1}{4}} \cancel{- \frac{1}{4}} \quad \cancel{4x}$$
- $5x \leq 15 \quad \text{OR} \quad x \geq \frac{17}{4}$
- $x \leq 3 \quad \text{OR} \quad x \geq 4.25$
-
- 7) $-11 < x + 6 \leq 4$
- $$\cancel{-11} \quad \cancel{+6} \quad \cancel{6}$$
- $-17 < x \leq -2$
-
- 8) $-2 < 5x + 8 \leq 28$
- $$\cancel{-8} \quad \cancel{+8} \quad \cancel{8}$$
- $-10 < 5x \leq 20$
- $-2 < x \leq 4$
-
- 9) $4x - 1 > 3 \quad \text{or} \quad \frac{1}{2}x - 2 > 10$
- $$\cancel{4x} \cancel{-1} \cancel{+1} \quad \cancel{\frac{1}{2}x} \cancel{-2} \cancel{+2}$$
- $x \leq 1 \quad \text{OR} \quad x > 9$
-
- 10) $5 > \frac{1}{2}x - 3 \geq 0$
- $$\cancel{5} \cancel{-3} \cancel{+3} \quad \cancel{\frac{1}{2}x} \cancel{-3} \cancel{+3}$$
- $-40 \leq x \leq -15$
-

