Section 1.2 Guided Notebook

Section 1.2 Linear Inequalities in One variable

Work through Section 1.2 TTK on page 1.2-1
Work through Section 1.2 TTK on page 1.2-1
Work through Section 1.2 TTK on page 1.2-1
Work through Section 1.2 TTK on page 1.2-1
Work through Objective 1
Work through Objective 2
Work through Objective 3
Work through Objective 4

Section 1.2 Linear Inequalities in One Variable

Work the You Try It Exercise: Identify Sets showing all steps below

Work the You Try It Exercise: Use Order of Operations to Evaluate Numeric Expressions showing all steps below
Section 1.2

Work the You Try It Exercise: **Evaluate Algebraic Expressions** showing all steps below

Work the You Try It Exercise: **Simplify Algebraic Expressions** showing all steps below
Section 1.2

Section 1.2 Objective 1: Determine If a Given Value Is a solution to an Inequality

What is the difference between equations and inequalities?

Watch the interactive video on 1.2-3.

Which of these is not an inequality? Why?

How can you determine if a value is a solution to an inequality?

Watch the interactive video with Example 1 answering the questions below.

Determine if the given value is a solution to the inequality.

a. $3x + 4 < 8; x = 2$

Is $x = 2$ a solution? Why or why not? Show all steps below.
Section 1.2

b. \( n^2 + 5n \geq 4; n = -6 \)

Is \( n = -6 \) a solution? Why or why not? Show all steps below.

---

**Section 1.2 Objective 2: Graph the Solution Set of an Inequality on a Number Line**

What is the solution set of an inequality?

What is the difference between finite and infinite?

What are two ways of expressing the solution set of an inequality?

Explain when to use an open circle and when to use a closed circle.
Show the graphs of a – h in Example 2 below. Click on the link to check your answers.

a. \( \{x \mid x \geq 0\} \)

b. \( \{x \mid 1 < x \leq 7\} \)

c. \( \{x \mid x < 3\} \)

d. \( \{x \mid 0 < x < 4\} \)

e. \( \{x \mid x \neq -2\} \)

f. \( \{x \mid -1 \leq x \leq 5\} \)

g. \( \{x \mid -3 \leq x < 2\} \)

h. \( \{x \mid x \text{ is any real number}\} \)
Section 1.2 Objective 3: Use Interval Notation to Express the Solution Set of an Inequality.

Explain the following terms:

**interval notation**

**lower bound**

**upper bound**

**endpoints**

In interval notation what is the difference between a **parenthesis**, ( ), and a **bracket**, [ ].
Section 1.2

Click on the link Table 1 on page 1.2-7 and write the summary of the three ways to express intervals.

Explain the Caution Statement on 1.2-7.

Watch the interactive video on 1.2-8 and answer the questions below.

a. Answer the following questions for part a

1. What is the lower bound? Why?

2. What is the upper bound? Why?
Section 1.2

b. Answer the following questions for part b.
   1. What is the lower bound? Why?
   
      2. Is infinity a number?

      3. What is the upper bound? Why?

c. Answer the following questions for part c.
   1. What is the lower bound? Why?

      2. What is the upper bound? Why?

      3. What does infinity indicate?

      4. Is there a biggest value greater than -2?
Write the intervals for a – f in Example 3. Click on the link to check your answers for c – f.

Write each solution set using interval notation.

a.  \( \{x | x < 5\} \)

b.  \( \{x | 2 \leq x < 10\} \)

c.  \( \{x | x \geq -3\} \)

d.  \( \{x | -6 < x < 0\} \)

e.  \( \{x | -1 \leq x \leq 5\} \)

f.  \( \{x | x \text{ is any real number}\} \)

Section 1.2 Objective 4: Solve Linear Inequalities in One Variable

Write down the Definition of a **Linear inequality in one variable**.
Section 1.2

Watch the interactive video on 1.2-10 and answer the questions below.

1. Which of the inequalities is linear? Why?

2. Rewrite the inequality in the form $ax + b \leq c$

Write down the properties of Inequalities

Write down the examples from the first link on 1.2-12 on how to use the inequality properties
What are the guidelines for solving linear equations in one variable?

Work through Example 4 showing all steps below.

Solve. Graph the solution set on a number line and write the solution set in interval notation.

\[4x - 8 \geq 3(x + 2) + 3x\]

Summarize the Caution statement on 1.2-14
Watch the video with Example 5 and answer the questions below.

Solve the inequality and write the solution set in set builder notation.

\[ 2 - 5(x - 2) < 4(3 - 2x) + 7 \]

1. Treat the inequality as if it were a(n) ______________.

2. Why did he choose to add 8x to both sides?

3. Show all steps to solve the inequality below.

4. How can the answer be displayed? Show each of them.

5. Why were parenthesis used in interval notation?
6. What does the vertical line mean in set builder notation?

Watch the video with Example 6 and answer the questions below.

Solve the inequality and write the solution set in interval notation.

\[ \frac{m}{2} - 5 + 2m > -\frac{m}{4} + \frac{1}{2} \]

1. Why do you multiply by the LCD?

2. Show the steps for clearing the fractions below.

3. Show all the steps to finish solving the inequality.

4. What is the implied coefficient on \( m \)?

5. Show 3 ways of writing the solution.
Section 1.2

6. Why are parenthesis used in interval notation?

Summarize the Caution statement on 1.2-15.

What is the difference between an identity and contradiction?

Work through Example 7 and show all steps below.

Solve and write each solution set in interval notation.

a. \[3 + 4(x - 5) \leq 7x - 3(x + 8)\]  
b. \[2(3 - x) - 7 > 4(x - 1) - 6x\]
What is a **three-part inequality**?

In a three-part inequality, where is the variable to be isolated?

Work through Example 8 showing all steps below.

Solve the inequality. Graph the solution set on a number line and write this solution set in interval notation.

\[-2 < \frac{3x - 5}{4} \leq 3\]
Watch the video with Example 9 and answer the questions below.

Solve the inequality and write its solution set in interval notation.

\[-1.4 < 5 - 3.2x < 3.4\]

1. What power of 10 should be used to multiply by to clear the decimals? Why?

2. Where should the variable term be isolated?

3. What happens when you divide by the coefficient of \( x \)? Show the steps to solve.

4. Why is the solution rewritten so that 2 is on the right and not the left?

5. Why is the inequality strict?

6. Why are parenthesis used in the interval?
Section 1.2

What is the Caution statement on 1.2-19?

Section 1.2 Objective 5: Use Linear Inequalities to Solve Application Problems.

Write down the strategy for Solving Application Problems with Linear Equations.

Write down the Strategy for Solving Application Problems Involving Linear Inequalities.
Section 1.2

Work through Example 10 explaining each step of the process.

Suppose AT & T Wireless offers a Nation 900 monthly plan that includes 900 anytime minutes and unlimited nights and weekends for $60. Each additional anytime minute (or fraction of a minute) costs the user $0.40. If Antoine subscribes to this plan, how many anytime minutes can he use each month while keeping his total monthly cost to no more than $75 (before taxes)?
Section 1.2

Watch the video with Example 11 and answer the questions below.

An online retailer sells plush toys. She purchases the toys at the wholesale price of $2.75 each and sells them online for $7.25. If her fixed costs are $900, how many plush toys must she sell in order to make a profit? Solve the inequality \( R > C \) with \( R \) as her revenue and \( C \) as her cost.

1. What information is given in the problem?

2. What is the problem asking for?

3. What is the relationship between revenue price and quantity?

4. What is the relationship between cost, variable costs and fixed costs?

5. What is the variable cost?

6. What is the revenue?

7. What is the inequality that will describe the situation?

8. Show the steps to solve the inequality.
Section 1.2

9. What is the answer to the question in the problem?

Work through Example 12 showing all work below.

In 2008, a single person in the 25% tax bracket was required to pay a tax of $0.25x – 3656.25, where x is the amount of taxable income. For this tax bracket, the tax due was more than $4481.25 but not more than $16,056.25. Determine the range of taxable income for this tax bracket.