

# Unit 3

## L1 Equations



Equalities (=)      $3x + 4 = 10$

- Both sides of the equation are equal
- There is one unique solution for x that would make the equation true.

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## Solving for X (aka isolating X)

**\*\* every operation you do to one side of the equation, you must do to the other side as well, it is like keeping the scale balanced\*\***



Ex 1: Level I

$$x - 5 = -6 \quad \underline{\hspace{2cm}}$$

Ex 2: Level II

$$3x + 3 = 9 \quad \underline{\hspace{2cm}}$$

2

Ex 3: Level III

$$5x + 25 = -3x - 23$$

**Note that we isolate our unknown cancelling the operations in the order of SAMDEB (backwards of BEDMAS)**

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Ex 4: Level IV

$$6(x - 2) = -4(2x + 1) \quad \underline{\hspace{2cm}}$$

4

Ex 5: Level V

$$\frac{3x + 5}{4} = \frac{4x + 10}{2}$$

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Ex 6:

$$-\frac{2}{3}x + \frac{1}{4} = \frac{3}{4}x + \frac{1}{2}$$



1. Put all fractions over a common denominator;
2. Multiply by the denominator to cancel it

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## Word Problems:

- #7) Nancy is 2 years older than her brother Eric. In 5 years, the sum of their ages will be equal to 40 years. What is the present age of each?

|            | Eric | Nancy |
|------------|------|-------|
| Now        |      |       |
| In 5 years |      |       |

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- # 8) Denise, Evelyn and Fran work at a convenience store. They earn an hourly rate of \$8. In one week, Denise worked 4 hours more than Evelyn whereas Fran worked 9 hours less than Denise. Together, they earned a total salary of \$856. What was Fran's salary that week?

Evelyn's hours:  
Denise's hours:  
Fran's hours:

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## Practice:

Day 1: 3.1 # 1—4 (ace in each)



Day 2: 3.2 # 1—9

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# L 2 Solving Inequalities

Inequalities (  $\geq$   $\leq$   $>$   $<$  ) 

- Both sides are not equal
- You can still solve for x but it will have more than one solution
- When solving an inequality we follow the same steps as solving equations.
- All operations are safe to do on both sides of the inequality sign
- **EXCEPTION:** when dividing (or multiplying) by a negative –we **FLIP** the inequality sign

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Ex: solve for x, write the solution set, interval notation and number line

1)  $5x - 7 < 13$

2)  $4x + 2 \geq 8x - 6$

|            |            |
|------------|------------|
| S.S. :     | S.S. :     |
| Interval : | Interval : |
| N.L. :     | N.L. :     |

4

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Ex: solve for x, write the solution set, interval notation and number line

3)  $2x - 7 \leq 9x + 14$

4)  $-\frac{1}{2}x + 3 \geq 9$

|            |            |
|------------|------------|
| S.S. :     | S.S. :     |
| Interval : | Interval : |
| N.L. :     | N.L. :     |

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Practice:  
3.4 # 1-9



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L 3 Solving inequalities in a domain

A **domain** is the set of all possible values for the unknown

Steps to solving Word Problems:

- 1. Read the problem. **Highlight key words** and important information.
- 2. Draw a **diagram** (if applicable) and label it.
- 3. Define your variables (**let statement with domain**)
- 4. Choose and write the **formulas** you will need.
- 5. **Solve** the problem showing all your work neatly.
- 6. Check your work (validate).
- 7. Write a **conclusion respecting the domain** ( $\therefore$ ).

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Warm up: Solve, then list all possible values in the given domain

- a)  $x + 1 \leq 4$

1. If  $x \in \mathbb{R}$ :

2. If  $x \in \mathbb{Z}$ :

3. If  $x \in \mathbb{N}$
- b)  $-3x > 6$

1. If  $x \in \mathbb{R}$ :

2. If  $x \in \mathbb{Z}$ :

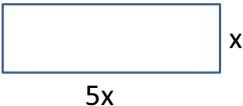
3. If  $x \in \mathbb{N}$   
no solution on  $\mathbb{N}$ .L

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Ex 1: The **length** of a rectangle is **5 times** its **width**.

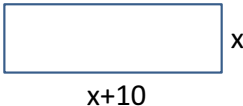
Find the width if the **area is at most 500 m<sup>2</sup>**.

Let width be  $x \in \mathbb{R}_+^*$   
Then length be  $5x$



2) The **length** of a rectangular field measures **10 m more** than its **width**. The **perimeter** of the field is **more than 80 m but less than 100 m**. In what interval will the width of the field be?

Let width be  $x \in \mathbb{R}_+^*$   
Then length is  $x + 10$



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3) A taxi driver charges an **initial fee of \$1.25** and then **\$0.75 per km** traveled. In what interval is the distance traveled if the **cost of the trip is more than \$11 but less than \$14**?

Practice:  
W.S. #2 Solving Inequalities word problems



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