

3.1 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.

Inequalities ($\geq \leq > <$) $2x - 4 \geq 8$

- Both sides are not equal
- You can still solve for x but it will have more than one solution

1

Solving for 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

Ex 2: Level II

$$x - 5 = -6$$

$$3x + 3 = 9$$

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)

3

Ex 4: Level IV

$$6(x - 2) = -4(2x + 1)$$



4

Ex 5: Level V

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

5

Ex 6: (page 75 # 3(b))

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



Trick:
Put all fractions over a common denominator;
now remove the denominator

6

Practice:

Day 1: Page 75 # 1—6 (aceg in each)



Day 2: P.76 # (8—20 even); 25, 26

7

More examples from page 76

#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		

8

#17) 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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3.2 Inequalities

-A- Properties of Inequalities

Adding / Subtracting:

→ When you **add (or subtract)** the same number on each side of an inequality, you get an inequality in the **SAME** direction.

Ex: $x - 5 < 16$

Sign stays the same direction

Solution set:

Interval:

Number line: 1

Multiplying/Dividing:

A) If you **multiply (or divide)** both sides by the same **positive** number, you keep the inequality sign the **same** direction

Ex: $3x \geq 12$

Sign stays the same

Solution Set:

Interval:

Number Line: 2

Multiplying/Dividing:

B) If you **multiply (or divide)** both sides by the same **negative** number, you **reverse** the inequality sign

Ex: $-3x \geq 12$

Sign changes direction

Solution Set:

Interval:

Number Line: 3

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

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. : 5

Practice:

W.S. 3.2-A- Solving Inequalities



3.2 Inequalities

-B- Solving inequalities with one 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)
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 (\therefore).

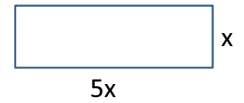
1

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

A) find the width if the perimeter is at least 60 m.

Let width be x

Then length be $5x$



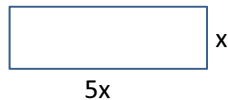
2

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

B) find the width if the area is at most 500 m^2 .

Let width be x

Then length be $5x$



3

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

C) find the width if the perimeter is at least 60 m and the area is at most 500 m^2 .

4

Practice:

W.S. 3.2-B- Solving Inequalities with one unknown



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3.2 Inequalities

-C- Solving inequalities in a given domain

- Recall: $\mathbb{N} \subseteq \mathbb{Z} \subseteq \mathbb{Q} \subseteq \mathbb{R}$

Domain	Description of Solution Set	Solution Set
\mathbb{R}		
\mathbb{Z}		
\mathbb{N}		

1

Do Activity 7 Page 84

a) $x + 1 \leq 4$

b) $-3x > 6$

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

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

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

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

3. If $x \in \mathbb{N}$

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

2

16) 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?

3

18) 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?

4

Practice:
W.S. 3.2-C- Solving in a domain



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