T&T2 1.7 Solving inequalities

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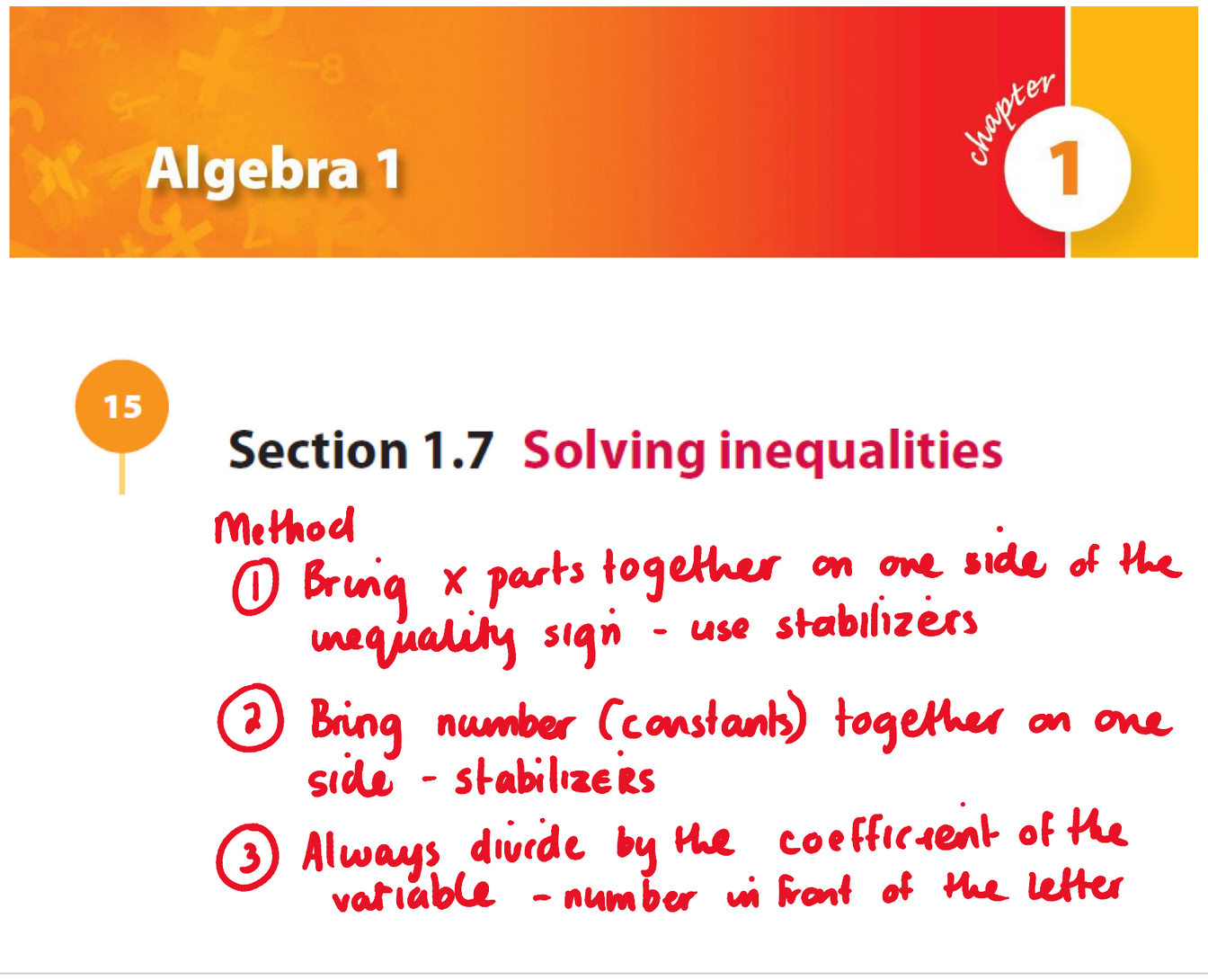
T&T2 1.7 Solving...



Example 1

Solve the inequality $5x - 3 \geqslant 12, x \in N$ and graph the solution on the number line.

Solve

+3	$5x \geq 15$	+3
÷5	$1x \geq 3$	÷5

N - dots

graph

C/W Pg 18 Q3 → 13

Example 2

Solve the inequality $4 - 3x > -5, x \in Z$ and graph the solution on the number line.

Example 3

Solve the inequality $-5 < 1 - 3x \leqslant 10, x \in R$ and illustrate the solution on the number line.

Exercise 1.7

1. Which of the following inequalities are equivalent to $a \geqslant 10$?

(A) $a - 5 \geqslant 5$ (B) $2a \geqslant 20$ (C) $a + 5 \geqslant 5$ (D) $\frac{1}{2}a \geqslant 5$ (E) $a + \frac{1}{2} \geqslant 10\frac{1}{2}$

2. Which of the following inequalities are equivalent to $m < 3$?

(A) $m + 2 < 5$ (B) $2m < 4$ (C) $3 > m$ (D) $8 > m + 5$ (E) $6 > 2m$

H/W Pg 18 Q3 - 13

Solve the following inequalities and graph the solution on the number line in each case:

3. $x - 1 \leqslant 4, x \in N$

Solve the following inequalities and graph the solution on the number line in each case:

4. $3x - 2 \leqslant 10, x \in N$

Solve the following inequalities and graph the solution on the number line in each case:

5. $4x - 5 \leqslant 11, x \in N$

Solve the following inequalities and graph the solution on the number line in each case:

6. $3x + 5 \leqslant 14, x \in N$

Solve the following inequalities and graph the solution on the number line in each case:

7. $2x + 5 \leqslant 1, x \in Z$

Solve the following inequalities and graph the solution on the number line in each case:

8. $3x - 5 \leqslant 7, x \in Z$

Solve the following inequalities and graph the solution on the number line in each case:

9. $3x - 1 < -10, x \in Z$

Solve the following inequalities and graph the solution on the number line in each case:

10. $5x - 2 \leqslant 8, x \in Z$

Solve the following inequalities and graph the solution on the number line in each case:

11. $3x - 5 \leqslant 7, x \in R$

Solve the following inequalities and graph the solution on the number line in each case:

12. $2x + 2 \leqslant 8, x \in R$

Solve the following inequalities and graph the solution on the number line in each case:

13. $5x + 7 < 17, x \in R$

Solve the following inequalities and graph the solution on the number line in each case:

14. $3 - x \leqslant 4, x \in R$

multiply (-1)

you need to get rid of the minus on the x part.

method 1) Multiply across the inequality by -1

2) The direction of the inequality sign changes

$-3 + x \geq -4$

$+3$ | $x \geq -1$ | $+3$

Solve the following inequalities and graph the solution on the number line in each case:

15. $5 - 2x \geqslant -7, x \in R$

Solve the following inequalities and graph the solution on the number line in each case:

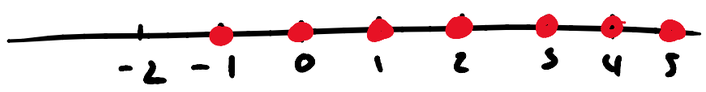
16. $1 - 5x > -14, x \in R$

Solve the following inequalities and graph the solution on the number line in each case:

17. $-2 < x \leq 5, x \in Z$ greater than / less than — Integers

$-\{-1, 0, 1, 2, 3, 4, 5\}$

Listing the values between -2 and 5 that are integers



Solve the following inequalities and graph the solution on the number line in each case:

18. $0 \leqslant x < 4, x \in R$

Solve the following inequalities and graph the solution on the number line in each case:

19. $-5 \leqslant 3x + 1 < 7, x \in R$

② ①

① $-5 \leq 3x+1$

$-1 \mid -6 \leq 3x \mid -1$

$\div 3 \mid -2 \leq x \mid \div 3$

② $3x+1 < 7$

$-1 \mid 3x < 6 \mid -1$

$\div 3 \mid x < 2 \mid \div 3$

Solution set $-2 \leq x < 2$

Double inequality Method

1) Break up into two inequalities between the inequality signs.
2) Use stabilizers to find the values of X.

Solve the following inequalities and graph the solution on the number line in each case:

20. $-9 < 2x + 1 \leqslant 7, x \in Z$

DOK

① ②

$-9 < 2x+1$

$-1 \mid -10 < 2x \mid -1$

$\div 2 \mid -5 < x \mid \div 2$

② $2x+1 \leq 7$

$-1 \mid 2x \leq 6 \mid -1$

$\div 2 \mid x \leq 3 \mid \div 2$

HW Pg 18
Q 15 + 21

$-5 < x \leq 3$

Solve the following inequalities and graph the solution on the number line in each case:

21. $-3 \leqslant 2x + 3 < 5, x \in Z$

Solve the following inequalities and graph the solution on the number line in each case:

22. $-5 \leqslant 1 - 3x < 10, x \in R$

Solve the following inequalities and graph the solution on the number line in each case:

23. $2 \leqslant 4x + 4 < 7, x \in R$

Solve the following inequalities and graph the solution on the number line in each case:

24. $-5 < 4x + 3 \leqslant 11, x \in R$

Solve the following inequalities and graph the solution on the number line in each case:

25. $4 \leqslant 5x - 6 \leqslant 29, x \in N$

Solve the following inequalities and graph the solution on the number line in each case:

26. $-7 \leqslant 3x - 1 < 14, x \in R$

27. Find the solution set of $0 \leqslant 2x - 11 < x$, where x is a prime number.

28. If $A = \{x \mid 2x - 4 \leqslant 6\}$ and $B = \{x \mid 4 - 2x < 0\}$ where $x \in N$ in each set, list the elements of $A \cap B$.

29. If $a > b$, which *one* of the following is not true for all $a, b \in R$?

(i) $2a > 2b$ (ii) $-a < -b$ (iii) $a - 3 < b - 3$ (iv) $\frac{a}{5} > \frac{b}{5}$

30. List all the integers, x, for which $x^2 < 24$.

31. A new toll-road is built and c represents the number of cars entering the city per hour.

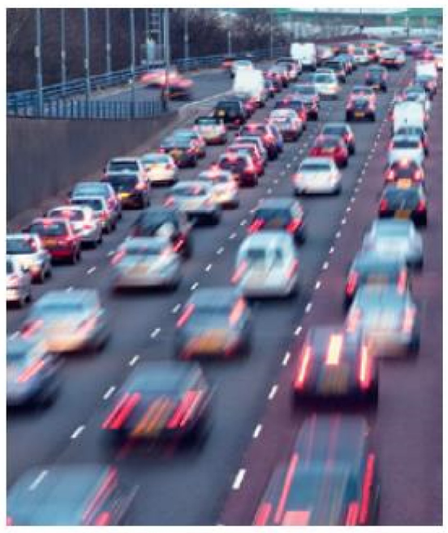
(i) Write an inequality for c, if the number of cars is known to be between 350 and 500 during peak hour.

(ii) Show the inequality on a number line.

(iii) Write a new inequality for c, if the number of cars is known to be between 120 and 200 inclusive during the middle of the day.

(iv) Show the inequality for c on a number line.

(v) Write a new inequality for c, if the traffic flow at night is thought to be about one-tenth of the traffic during the middle of the day.



Answers

Exercise 1.7

1. A, B, D, E **2.** A, C, D, E **3.** $z \leqslant 5$

4. $x \leqslant 4$ **5.** $x \leqslant 4$ **6.** $x \leqslant 3$

7. $x \leqslant -2$ **8.** $x \leqslant 4$ **9.** $x < -3$

10. $x \leqslant 2$ **11.** $x \leqslant 4$ **12.** $x \leqslant 3$

13. $x < 2$ **14.** $x \geqslant -1$ **15.** $x \leqslant 6$

16. $x < 3$ **17.** $\{-1, 0, 1, 2, 3, 4, 5\}$

18.

19. $-2 \leqslant x < 2$

20. $-5 < x \leqslant 3$ **21.** $-3 \leqslant x < 1$

22. $-3 < x \leqslant 2$ **23.** $-\frac{1}{2} \leqslant x < \frac{3}{4}$

24. $-2 < x \leqslant 2$ **25.** $2 \leqslant x \leqslant 7$

26. $-2 \leqslant x < 5$ **27.** 7

28. $\{3, 4, 5\}$ **29.** (iii)

30. $-4, -3, -2, -1, 0, 1, 2, 3, 4$

31. (i) $350 < c < 500$

(iii) $120 \leqslant c \leqslant 200$

(v) $12 \leqslant c \leqslant 20$