Grade 7 Math, Explained

Unit 12 · Equation, Inequality and Graph

HARDER PRACTICE QUESTIONS

Full marks 35

Write your answers on separate paper. Show your working, one step a line. Say what each letter stands for before you write an equation, and check every answer with a number. Draw graphs on graph paper. The amounts on this sheet are made up for the problems.

1 Spot the errors [4]

Apsan worked out these four. Each answer is wrong. Find the right answer, and say what went wrong.

i. $-5x < 20$, so $x < -4$.

ii. $3 - x > 5$, so $x > -2$.

iii. For $y = 2x - 1$, when $x = -3$, $y = -5$.

iv. He showed $x \leq -1$ on a number line with a hollow circle at -1 and an arrow to the left.

2 Coins in a purse [4]

Pratiksha has Rs 50, all in Rs 5 and Rs 10 coins.

i. Write an equation for her coins. Say what your letters stand for.

ii. Find every pair of whole numbers that fits.

iii. She has 7 coins in all. How many of each kind does she have?

iv. Explain why she can't have an odd number of Rs 5 coins.

3 The goods lift [4]

A goods lift in a shop can carry at most 600 kg. Its operator weighs 70 kg, and it carries boxes of 40 kg each.

i. Write an inequality for the number of boxes, x, the lift can carry with the operator.

ii. Solve it. What is the greatest number of boxes?

iii. Show the answer to ii on a number line, and say why the answer must be a whole number.

iv. Two more people, 65 kg each, ride with the operator. How many boxes can the lift carry now?

4 Both at once [4]

i. Solve $2x + 1 > 5$ and $3x - 4 \leq 11$.

ii. Show each answer on its own number line, one under the other, and list the whole numbers that make both true.

iii. Solve $-2x < 8$ and $x + 3 < 4$.

iv. List the integers that make both inequalities in iii true.

5 Find the rule [4]

These pairs all fit one linear equation.

x	0	1	2	3
y	3	5	7	9

i. Write the equation as $y = \ldots$.

ii. Find y when $x = 10$.

iii. Which of the points $(5, 13)$, $(-2, -1)$ and $(4, 12)$ are on its graph?

iv. Where does the graph cross the x-axis?

6 The taxi fare [4]

A taxi charges Rs 100 to start and Rs 40 for every kilometer.

i. Write the fare, Rs y, for a trip of x km as an equation. Make a table of the fares for 0, 2, 4 and 6 km.

ii. Draw the graph on graph paper, with 1 cm for 1 km across and 1 cm for Rs 50 up.

iii. From your graph, read the fare for 3 km, and how far you can go for Rs 300. Check both with the equation.

iv. Another taxi charges Rs 60 for every kilometer and nothing to start. Write an inequality, and solve it, to find the trips for which the second taxi is cheaper.

7 The fenced plot [4]

Pemba has 40 m of fence for a rectangular plot. Its length is x m and its breadth y m, both whole meters.

i. Write an equation for the fence, and make it as simple as you can.

ii. Copy and complete the table, then say which plot has the biggest area.

Length x (m)	**15**	**13**	**11**	**10**
Breadth y (m)	.....	.....	.....	.....
Area (m^2)	.....	.....	.....	.....

iii. The length must be at least 3 m more than the breadth. Write this as an inequality.

iv. Which plot that keeps both rules has the biggest area?

8 Think: always, sometimes or never? [4]

a and b are two numbers, and $a > b$. Say whether each of these is always true, sometimes true or never true. Test it with $a = 3$, $b = 2$, with $a = 1$, $b = -4$ and with $a = -1$, $b = -4$, and give a reason.

i. $a + 5 > b + 5$

ii. $2a > 2b$

iii. $-a > -b$

iv. $a^2 > b^2$

9 Make your own [3]

i. Write an equation in two variables that has $x = 2$, $y = 3$ as an answer, and find one more answer of it.

ii. Write an inequality that you must divide by a negative number to solve, and whose answer is $x < -2$.

iii. Write a short story for the equation $3x + 2y = 20$, and find two whole-number answers to it.