

Linear Functions & Applications

Exercise 4.3 — Complete Solutions

Class 10th Mathematics

Step-by-step worked solutions for Exercise 4.3

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EXERCISE 4.3

1. A function $B(t) = 5,000 + 200t$ represents the total balance (in rupees) after t months. What will be the balance after 6 months?
2. A function $f(k) = 150 + 20k$ represents the total fare (in rupees) for k kilometres. How much will the fare be for a 12 kilometres ride?
3. The cost of manufacturing fancy sofa set would be fixed charges Rs. 5500 which is modeled as $f(n) = 5500n$, where n is the number of sofa sets. Find the cost of 50 sofa sets.
4. A function $T(d) = \frac{d}{60}$ represents the time T in hours to travel a distance d kilometres. How long will it take to travel 180 km?
5. A company charges Rs. 100 for an encoding work. In addition, the company charges Rs. 5 per page of printed output. The model of function $f(x) = 100 + 5x$, where x represents the number of pages printed out. How much will company charge for 55 page encoding and printing work?
6. A chemical reaction is stable at 37°C . The process must be stopped if the temperature deviates by more than 2.5°C . The condition is modeled as: $|T - 37^\circ| > 2.5^\circ$, T be the temperature. For what temperature values must the process be stopped?
7. A factory produces metal rods that must be 2.5 metres long, with a tolerance of ± 0.04 metres. An absolute value inequality models this: $|x - 2.5| \leq 0.04$. What is the range of acceptable lengths?
8. A machine part must be aligned so that its centre is exactly at 0. If it shifts more than 0.1 mm, the part is rejected. The model is given by $|x| > 0.1$. What positions of the centre cause rejection?

EXERCISE 4.3 - Complete Solutions

Question 1

Given: , where = months

Find: Balance after 6 months

Solution:

Answer: Rs. 6,200

Question 2

Given: , where = kilometres

Find: Fare for 12 km ride

Solution:

Answer: Rs. 390

Question 3

Given: , where = number of sofa sets

Find: Cost of 50 sofa sets

Solution:

Answer: Rs. 275,000

Question 4

Given: , where = distance in km

Find: Time to travel 180 km

Solution:

Answer: 3 hours

Question 5

Given: , where = number of pages

Find: Charge for 55 pages

Solution:

Answer: Rs. 375

Question 6

Given: , where = temperature

Find: Temperature values where process must be stopped

Solution:

Step 1: Split into two inequalities:

Step 2: Solve each:

Answer:

Number Line:

text



(Shaded regions: below 34.5°C and above 39.5°C; o = open circles, endpoints excluded)

Interpretation: Process must be stopped when temperature is **less than 34.5°C** or **greater than 39.5°C**

Question 7

Given: , where = length in metres

Find: Range of acceptable lengths

Solution:

Step 1: Add 2.5 to all parts:

Step 2: Simplify:

Answer: metres

Number Line:

text

2.46 2.54

(Shaded region between 2.46 and 2.54 inclusive; [] = closed intervals, endpoints included)

Interpretation: Acceptable rod lengths are between **2.46 m** and **2.54 m** (inclusive)

Question 8

Given: , where = position in mm

Find: Positions that cause rejection

Solution:

Step 1: Split into two inequalities:

Answer: mm

Number Line:

text

<====○-----○====>

-0.1 0.1

(Shaded regions: left of -0.1 mm and right of 0.1 mm; ○ = open circles, endpoints excluded)

Interpretation: Part is rejected when centre shifts **less than -0.1 mm** or **greater than 0.1 mm**

Summary Table

Q#	Function/Equation	Input	Output	Answer
1				Rs. 6,200
2				Rs. 390
3				Rs. 275,000
4				3 hours
5				Rs. 375
6	(	T - 37	> 2.5)	— —
7	(	x - 2.5	$\leq$ 0.04)	— —
8	(	x	> 0.1)	— —

All Number Lines (Combined View)

Question 6:

text

<====○-----○====>

34.5

39.5

Question 7:

text

<====[=====]====>

2.46 2.54

Question 8:

text

<====○-----○====>

-0.1

0.1

Legend:

- = Closed circle (included)
- = Open circle (not included)
- [or] = Closed interval endpoint (included)
- (or) = Open interval endpoint (not included)
- ===== = Shaded region representing solution set