LESSON MAKER PRO

Models That Move

Write a function for a constant rate of change.

HIGH SCHOOL · A1.F.1.3

A1.F.1.3 "Write linear functions, using function notation, to represent mathematical models."

NAME _____ DATE _____

START AND CHANGE

A linear function changes by the same amount each time the input increases by one. Write f(x) = mx + b, where m is the change per input unit and b is the output when x = 0.

WORKED EXAMPLE

A print shop charges a setup fee plus a cost per poster. Write C(p), the cost of p posters.

Posters, p	Cost, C(p)
2	$25
5	$43

1. Cost per poster: (43 - 25)/(5 - 2) = 6.
2. Setup fee: 25 - 6(2) = 13.

Answer: C(p) = 6p + 13

PRACTICE 4 problems

1 A club has 11 members and gains 3 members each week. Write M(w), its membership after w weeks.

ANSWER _____

2 A tank starts with 47 liters and loses 4 liters each minute. Write V(t), its volume after t minutes.

ANSWER _____

3 A linear function has f(3) = 20 and f(7) = 36. Write f(x).

ANSWER _____

4 A linear function changes by -7 per input unit and has f(0) = 18. Write f(x).

ANSWER _____

APPLY IT Show your work

1 A student group sells hoodies. The table shows its profit P(n) after selling n hoodies. Write P(n).

Hoodies, n	Profit, P(n)
1	-$9
4	$18

ANSWER _____

2 A phone battery starts at 92% and drops 8 percentage points each hour. Write B(t) for the battery percentage after t hours. Find B(7).

WORK SPACE

ANSWER _____

CHALLENGE One step up

Club A has $110 and spends $9 each week. Club B has $26 and adds $3 each week. Write A(w) and B(w), then find when the balances match.

WORK SPACE AND ANSWER

ANSWER KEY

Models That Move

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A club has 11 members and gains 3 members each week. Write M(w), its membership after w weeks.	**M(w) = 3w + 11**
2	A tank starts with 47 liters and loses 4 liters each minute. Write V(t), its volume after t minutes.	**V(t) = 47 - 4t**
3	A linear function has f(3) = 20 and f(7) = 36. Write f(x).	**f(x) = 4x + 8**
4	A linear function changes by -7 per input unit and has f(0) = 18. Write f(x).	**f(x) = -7x + 18**

PART 2 · APPLY IT

1. **P(n) = 9n - 18** Profit rises by $27 over 3 hoodies, so the rate is $9 per hoodie. At n = 1, profit is -$9, giving a starting profit of -$18.
2. **B(t) = 92 - 8t; B(7) = 36%** Subtract 8 percentage points for each hour. After 7 hours, 92 - 8(7) = 36.

CHALLENGE

A(w) = 110 - 9w; B(w) = 26 + 3w. The balances match after 7 weeks, when each club has $47.

Accept equivalent linear expressions with the same input variable and correct function notation. In the challenge, accept w = 7 with both correct functions even if the matching balance is not stated.