

Grade 8 - Linear Functions as Models - Answer Key

Common Core 8.F.B.4, 8.F.B.5 · maths-pdf.fr/en/

This answer key gives a full worked solution for each of the 20 problems on the linear function models worksheet (Common Core 8.F.B.4 and 8.F.B.5). Compare each step with your own work, not only the final answer, and note any step where your method differed.

Grade 8 · Common Core State Standards: **8.F.B.4, 8.F.B.5**

Exercise 1 - Rate from a table

$$\frac{11-5}{3-1} = \frac{6}{2} = 3.$$

3

Exercise 2 - Initial value

Rate: $\frac{13-7}{2-0} = 3$. Initial value (at $x=0$): 7.

$$y = 3x + 7$$

Exercise 3 - Interpret an equation

4 is the rate: \\$4 for each visit. 12 is the initial value: a \\$12 fee when there are 0 visits.

\\$4 per visit; \\$12 starting fee

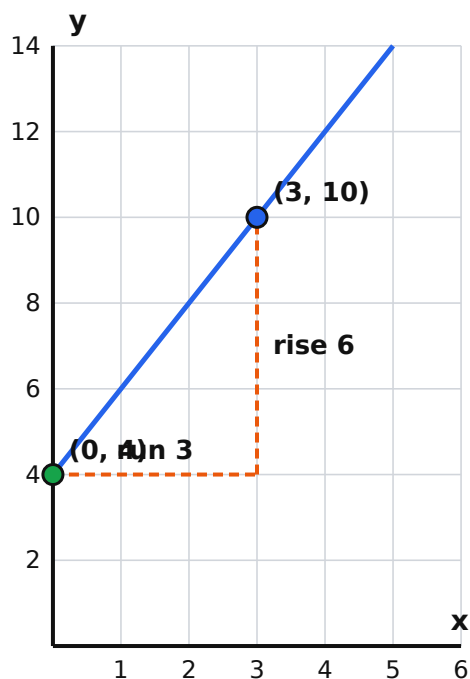
Exercise 4 - Two points

$$m = \frac{20-11}{5-2} = 3.$$

$$11 = 3 \cdot 2 + b, \text{ so } b = 5.$$

$$y = 3x + 5$$

Exercise 5 - Equation from a graph

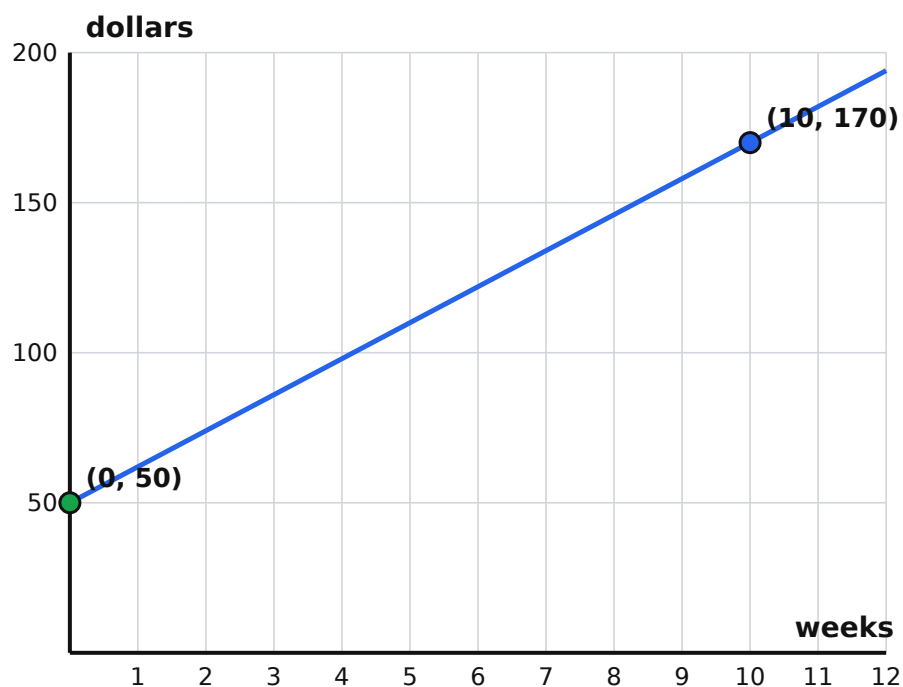


Rise 6, run 3.

$m = \frac{6}{3} = 2$; the y-intercept is 4.

$$y = 2x + 4$$

Exercise 6 - Savings model



Savings after 10 weeks.

$$S = 12w + 50.$$

$$S = 12 \cdot 10 + 50 = 170.$$

\\$170

Exercise 7 - Draining tank

$$V = 80 - 5t.$$

$$0 = 80 - 5t, \text{ so } t = 16.$$

$V = 80 - 5t$; **empty at 16 minutes**

Exercise 8 - Describe the graph

From 0 to 2 hours it increases, from 2 to 4 hours it is constant, and from 4 to 6 hours it decreases.

Increasing, then constant, then decreasing

Exercise 9 - Table to equation

Rate: $\frac{25-15}{2-0} = 5$. Initial value: 15.

$$y = 5x + 15$$

Exercise 10 - Plant height

Rate: $\frac{18-9}{5-2} = 3$ inches per week.

$$9 = 3 \cdot 2 + b, \text{ so } b = 3.$$

3 inches per week; 3 inches at week 0

Exercise 11 - Bike rental

$$C = 4h + 6.$$

$$30 = 4h + 6, \text{ so } h = 6.$$

$$C = 4h + 6; \text{ 6 hours}$$

Exercise 12 - Constant rate in a table

$$\frac{22-10}{4-1} = 4 \text{ and } \frac{34-22}{7-4} = 4.$$

4

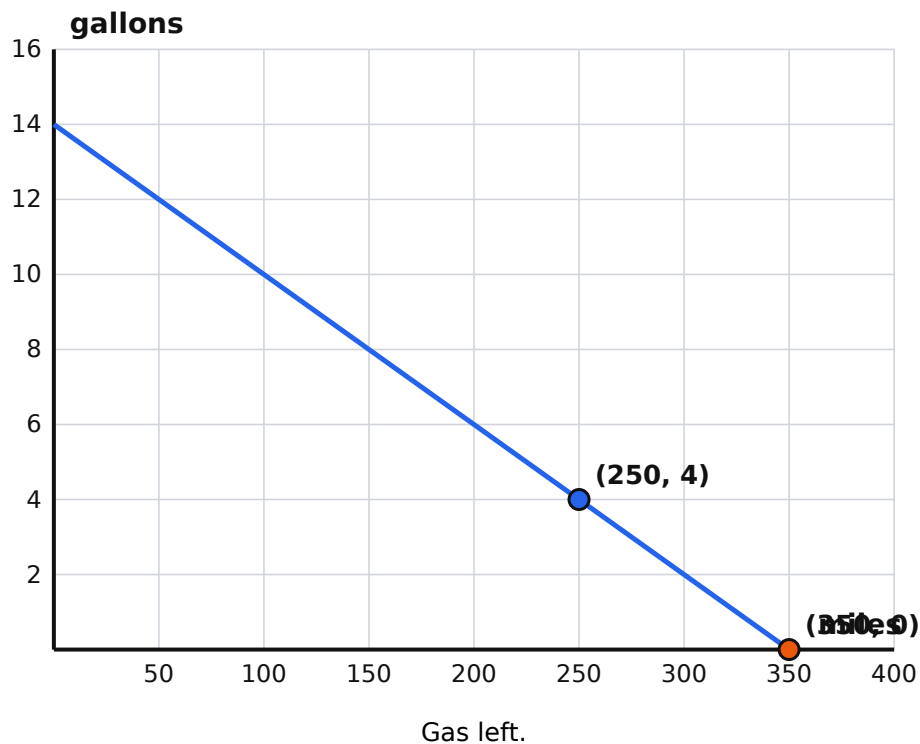
Exercise 13 - Temperature conversion

$$F = 1.8 \cdot 20 + 32 = 68.$$

1.8 is the rate: each 1°C increase raises the temperature 1.8°F .

68°F ; 1.8°F per 1°C

Exercise 14 - Gas tank



$$g = 14 - 0.04m.$$

$$g = 14 - 0.04 \cdot 250 = 4.$$

$$0 = 14 - 0.04m, \text{ so } m = 350.$$

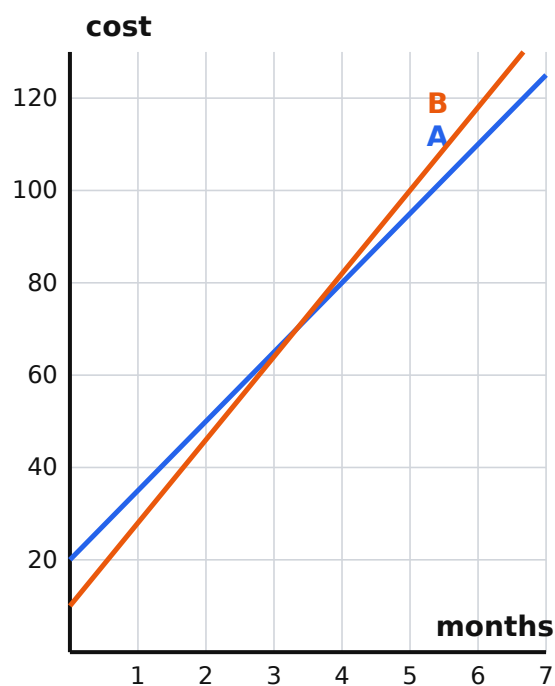
4 gallons; empty after 350 miles

Exercise 15 - Qualitative curve

It is nonlinear (a curve). The height increases, reaches a maximum near 2 seconds, then decreases.

Nonlinear; increasing then decreasing

Exercise 16 - Compare two plans



Plans A and B.

Rate A: 15. Rate B: 18.

After 6 months: $A = 15 \cdot 6 + 20 = 110$; $B = 18 \cdot 6 + 10 = 118$.

B has the greater rate; A costs less after 6 months

Exercise 17 - Proportional special case

When $x=0$, $y=0$, so the equation is $y=mx$ and the relationship is proportional.

It is proportional

Exercise 18 - Streaming

Rate: $\frac{45-27}{5-3}=9$ dollars per month.

$27=9\cdot 3+b$, so $b=0$.

\\$9 per month; no sign-up fee

Exercise 19 - Meaning of an intercept

Set $L=0$: $30=2d$, so $d=15$.

(15, 0): the pond is empty after 15 days

Exercise 20 - Piecewise story

0 to 1 hour: walked away at 4 mph. 1 to 3 hours: stayed 4 miles from home. 3 to 4 hours: walked home at 4 mph.

Walk out, stay, walk back