

Graphing Linear Equations: practice solutions, Grade 8 – download the PDF

Written solutions to the chapter problems. Check each step, then correct yourself.

1 Read the slope and the y-intercept



Compare each equation with $y = mx + b$.

a. $m = 3$ and $b = 5$.

b. $m = -2$ and $b = 7$.

c. $m = \frac{1}{2}$ and $b = -4$ (the minus sign belongs to the 4).

d. $y = -x$ is $y = -1x + 0$, so $m = -1$ and $b = 0$: the line passes through the origin.

2 Complete a table of values



Substitute each value of x .

$x = -1: 2(-1) - 3 = -5$. $x = 0: -3$. $x = 1: -1$. $x = 2: 1$. $x = 3: 3$.

x	-1	0	1	2	3
y	-5	-3	-1	1	3

Each time x increases by 1, y increases by 2, which is the slope.

3 Is the point on the line?



Replace x and y in the equation and see if it is true.

$(3, 5)$: $3 + 2 = 5$, true, so the point is on the line.

$(-2, 0)$: $-2 + 2 = 0$, true, so the point is on the line.

$(1, 4)$: $1 + 2 = 3 \neq 4$, so the point is not on the line.

4 Slope from two points



a. $m = \frac{8 - 2}{4 - 1} = \frac{6}{3} = 2.$

b. $m = \frac{2 - 5}{3 - 0} = \frac{-3}{3} = -1.$

The first line rises, the second falls.

5 True or false?



a. True: all points have the same y -coordinate 4, so the slope is 0.

b. False: all points have x -coordinate 4, so the line is vertical.

c. True: the slope -3 is negative.

d. False: $|5| > |0.5|$, so $y = 5x + 1$ is steeper.

6 Build an equation



a. $y = -3x + 2.$

b. $y = 4x - 6.$

c. $y = 0x + 7$, which is simply $y = 7$: a horizontal line.

7 Saving money



- a. The starting value is 15 and the rate is 5 per week: $y = 5x + 15$.
- b. $y = 5(6) + 15 = 45$. She has \$45.
- c. The slope 5 is the amount saved per week; the y-intercept 15 is the amount she had at the start (week 0).

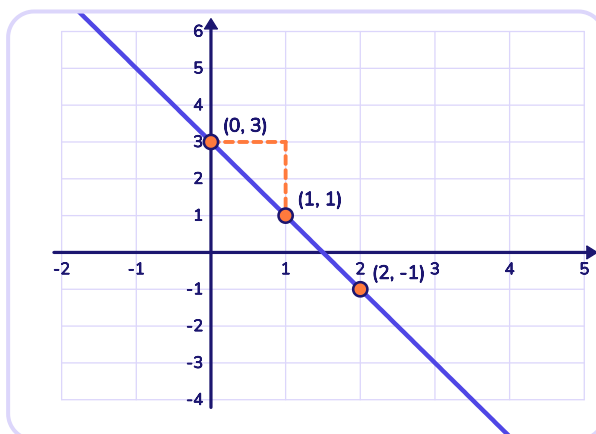
8 Graph a line from its equation



- a. $x = -1: 5$. $x = 0: 3$. $x = 1: 1$. $x = 2: -1$. $x = 3: -3$.

x	-1	0	1	2	3
y	5	3	1	-1	-3

- b. Plot $(0, 3)$. The slope is $-2 = \frac{-2}{1}$: go down 2 and right 1 to reach $(1, 1)$, then again to reach $(2, -1)$. Draw the line through these points.



9 Write the equation from the graph



a. The line crosses the y -axis at $A(0, -2)$, so $b = -2$.

b. $m = \frac{2 - (-2)}{2 - 0} = \frac{4}{2} = 2$.

c. $y = 2x - 2$.

d. For $C(1, 0)$: $2(1) - 2 = 0$. The point satisfies the equation.

10 From a table to an equation



a. y grows by 3 when x grows by 1, so $m = 3$. At $x = 0$, $y = 4$, so $b = 4$.

b. $y = 3x + 4$.

c. $y = 3(10) + 4 = 34$.

11 Linear or not?



Table 1: x increases by 1 each time, but y increases by 3, then 6, then 12. The change is not constant, so the table is **not** linear.

Table 2: x increases by 2 and y decreases by 4 each time, so $m = \frac{-4}{2} = -2$, constant.

The table is linear. At $x = 0$, $y = 10$, so $y = -2x + 10$. Check at $x = 6$: $-12 + 10 = -2$.

12 Horizontal or vertical?



a. Every point of the line has y -coordinate -3 : $y = -3$.

b. Every point has x -coordinate 4: $x = 4$.

c. The horizontal line has slope 0 ; the slope of the vertical line is undefined.

13 Taxi fare



a. $C = 2.25m + 3.5$.

b. $C = 2.25(8) + 3.5 = 18 + 3.5 = 21.5$. The ride costs \$21.50.

c. $2.25m + 3.5 = 30.5$, so $2.25m = 27$ and $m = 12$. The ride covered 12 miles (about 19.3 km).

14 A fractional slope



a. $y = -\frac{1}{2}x + 5$.

b. $y = -\frac{1}{2}(6) + 5 = -3 + 5 = 2$.

c. Plot $(0, 5)$. The slope means down 1 and right 2, giving $(2, 4)$ and then $(4, 3)$.

15 Two points, no intercept



Slope: $m = \frac{16 - 7}{5 - 2} = \frac{9}{3} = 3$.

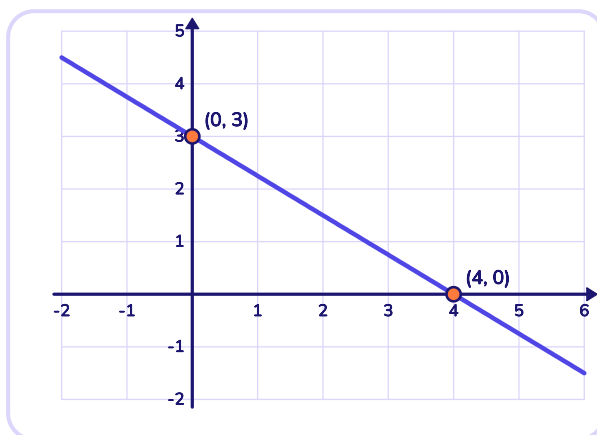
Substitute $(2, 7)$ in $y = 3x + b$: $7 = 6 + b$, so $b = 1$.

The equation is $y = 3x + 1$. Check with $(5, 16)$: $3(5) + 1 = 16$.

16 From standard form to slope-intercept form

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- a. Subtract $2x$ from both sides: $y = -2x + 6$. The slope is -2 , and $b = 6$.
- b. Subtract $3x$: $4y = -3x + 12$. Divide everything by 4: $y = -\frac{3}{4}x + 3$. The slope is $-\frac{3}{4}$, and $b = 3$. The line also crosses the x-axis at $(4, 0)$, since $3(4) = 12$.



17 Parallel lines and common points

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- a. Parallel lines have the same slope and different intercepts: $y = 3x + 2$ and $y = 3x - 5$ both have slope 3.
- b. $y = 3x + 2$ and $y = -3x + 2$ share the y-intercept 2, so they meet at $(0, 2)$.
- c. Same slope 3 and $b = -4$: $y = 3x - 4$.

18 Draining a tank

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- a. $g = -15t + 240$.
- b. $g = -15(10) + 240 = 90$ gallons.
- c. $-15t + 240 = 0$, so $t = 16$. The tank is empty after 16 minutes.
- d. The slope -15 means the tank loses 15 gallons per minute. 240 gallons is about $240 \times 3.785 \approx 908$ liters.

19 Find the mistake



- a. Leo used $+2$ instead of -2 for the y-intercept. The line starts at $(0, -2)$; going up 3 and right 1 gives $(1, 1)$, then $(2, 4)$.
- b. Rewrite the equation as $y = -2x + 5$. The slope is -2 (the coefficient of x), and 5 is the y-intercept.

20 Find the missing number



- a. $13 = 3k + 4$, so $3k = 9$ and $k = 3$.
- b. $-1 = 3(2) + b = 6 + b$, so $b = -7$. The line is $y = 3x - 7$.

21 Choosing a gym



- a. Gym A: $y = 20x + 10$. Gym B: $y = 25x$.
- b. $20x + 10 = 25x$ gives $10 = 5x$, so $x = 2$. After 2 months both cost \$50.
- c. For $x = 6$: Gym A costs $20(6) + 10 = 130$ and Gym B costs $25(6) = 150$. Gym A is cheaper by \$20.



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