

Writing and Graphing Linear Functions in Three Forms

Grade 9 – Algebra 1 math · Worksheet · Standards: F-IF.C.7a, F-LE.A.1a, F-LE.A.2, A-CED.A.2

Name: _____ Date: _____ Class: _____

These problems train finding slope from two points, writing lines in slope-intercept, point-slope and standard forms, and graphing from each form (F-IF.C.7a). Parallel and perpendicular lines appear in the middle problems. The last six problems build linear models from stories (F-LE.A.1a, F-LE.A.2 and A-CED.A.2): memberships, hikes, candles, budgets and draining pools.

Standards: F-IF.C.7a, F-LE.A.1a, F-LE.A.2, A-CED.A.2 · **Level:** Grade 9 Algebra 1

Problem 1 Slope from two points (easy)

Find the slope of the line through $(7, -5)$ and $(13, 19)$.

Problem 2 Negative slope (easy)

Find the slope of the line through $(-1, 4)$ and $(5, -2)$.

Problem 3 Read slope and intercept (easy)

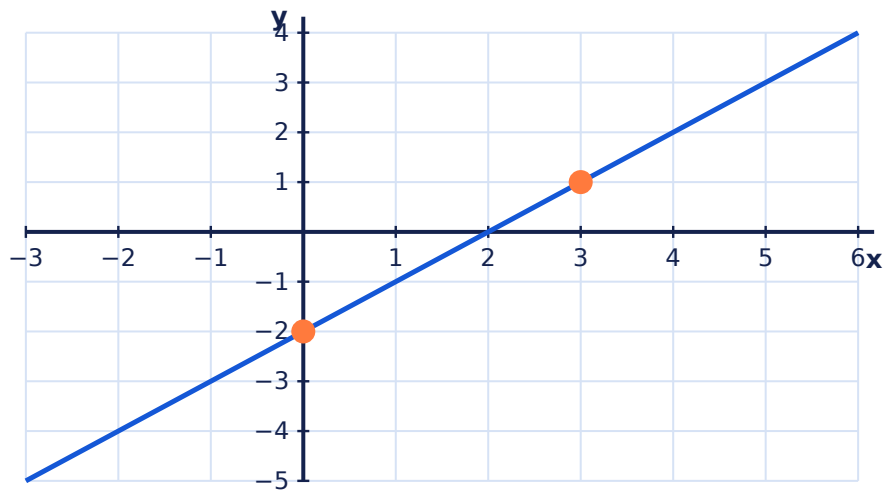
Name the slope and the y-intercept in $y = -8x + 15$.

Problem 4 Write from slope and intercept (easy)

Write the equation of the line with slope 6 and y-intercept -11 .

Problem 5 Equation from a graph (easy)

The graph of a line is shown with two points plotted. Describe its slope and write its equation in the form $y = mx + b$.



A line with two marked points.

Problem 6 Point-slope form (medium)

Write an equation of the line with slope 3 through $(2, -1)$ in point-slope form, then in slope-intercept form.

Problem 7 Line through two points (medium)

A line passes through $(-4, 9)$ and $(6, -11)$. Write its equation in slope-intercept form.

Problem 8 Standard to slope-intercept (medium)

Rewrite $4x + 2y = 10$ in slope-intercept form and give both intercepts.

Problem 9 Slope-intercept to standard (medium)

Write $y = \frac{2}{3}x - 4$ in standard form with integer coefficients.

Problem 10 Graph from intercepts (medium)

Graph $3x - 4y = 12$ by finding its intercepts.

Problem 11 Parallel line (medium)

Write the equation of the line through $(3, 9)$ that is parallel to $y = 2x - 1$.

Problem 12 Perpendicular line (medium)

Write the equation of the line through $(6, 1)$ that is perpendicular to $y = 3x + 8$.

Problem 13 Parallel, perpendicular or neither (medium)

Classify each pair of lines. (a) $y = 3x - 2$ and $6x - 2y = 5$ (b) $y = \frac{3}{4}x + 1$ and $4x + 3y = 7$.

Problem 14 Is the table linear? (medium)

Decide whether the table is linear and, if so, write a rule.

x	0	2	4	6
y	5	11	17	23

Problem 15 Fitness membership (hard)

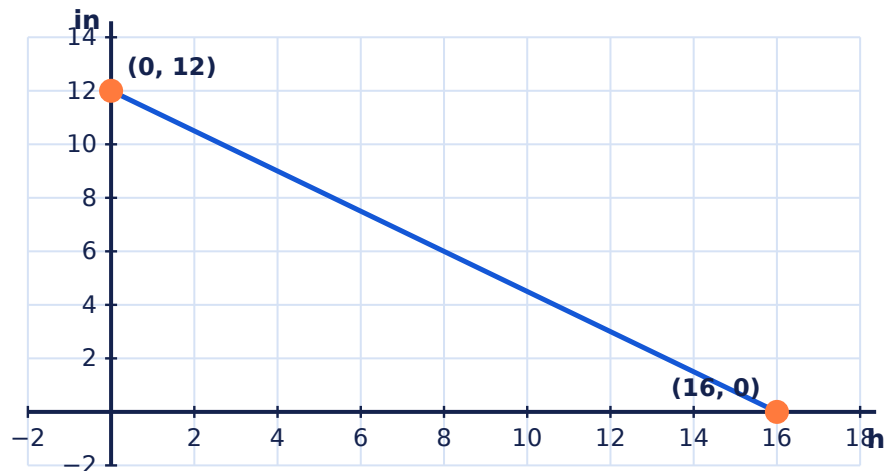
A studio charges \$40 to join plus \$22 each month. Write a function $C(m)$ for the total cost after m months, find the cost after 7 months, and interpret the slope and the intercept.

Problem 16 Hiker's elevation (hard)

A hiker's elevation is 1,900 feet after 2 hours and 2,950 feet after 5 hours, climbing at a steady rate. Write an equation for the elevation E after t hours and find when the hiker reaches 4,000 feet.

Problem 17 Burning candle (hard)

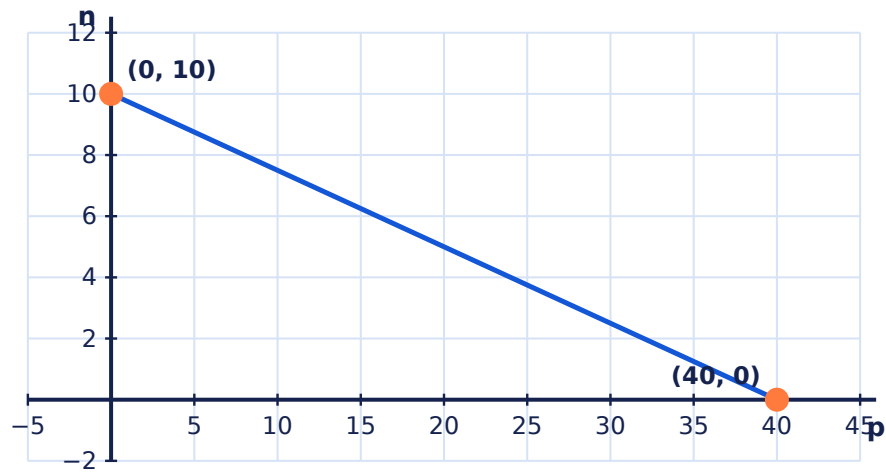
A candle is 12 inches tall and burns down 0.75 inch each hour. Write $H(t)$ for its height, state the domain and range, and find when it burns out. Use the graph.



Candle height (inches) after t hours.

Problem 18 School store budget (hard)

A school store spends exactly \$20 on pencils at \$0.50 each and notebooks at \$2 each. Write an equation in standard form with integer coefficients, find the intercepts, and find how many notebooks go with 12 pencils. Use the graph.



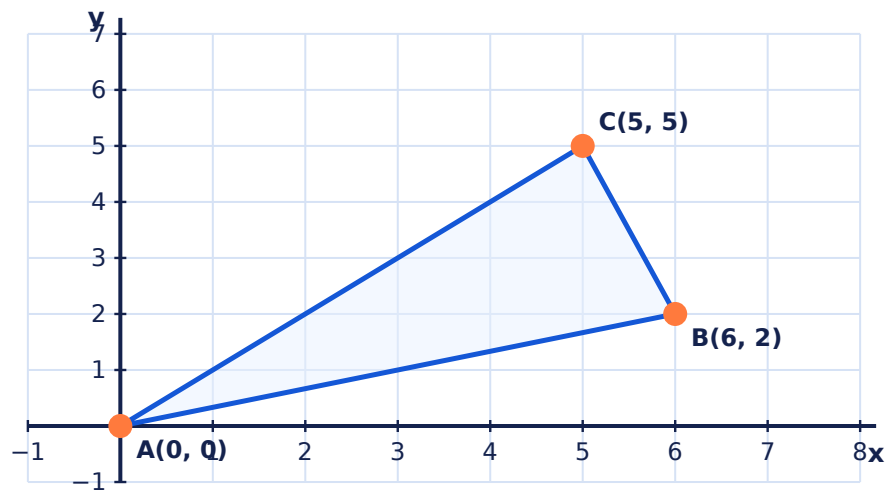
Budget line: p pencils and n notebooks.

Problem 19 Draining a pool (hard)

A pool holds 450 gallons after 3 minutes of draining and 200 gallons after 8 minutes. Write an equation for the gallons G left after t minutes, find how much water the pool began with and when it is empty.

Problem 20 Right angle test (hard)

Triangle ABC has vertices $A(0, 0)$, $B(6, 2)$ and $C(5, 5)$. Use slopes to decide whether the angle at B is a right angle.



Triangle ABC.