LESSON MAKER PRO

Start at Zero

Use tables, graphs and equations to justify each choice.

GRADE 8 · TEKS 8.5.F

8.5.F "distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form y = kx or y = mx + b, where b ≠ 0;"

NAME _____ DATE _____

Connect the representations

Among linear situations, proportional means y = kx: zero intercept and a constant ratio for nonzero x. Linear non-proportional means y = mx + b with b ≠ 0. A constant rate by itself, or one shared point, cannot distinguish them.

Worked example

Both columns have a constant rate. Decide whether P and Q are proportional to x, and write each equation.

Both outputs rise 2 when x rises 1. P starts at zero; Q starts at 3. Constant rate alone does not prove proportionality.

P = 2x is proportional. Q = 2x + 3 is linear non-proportional.

x	P	Q
0	0	3
1	2	5
2	4	7

Use the stated variables, units and graph intervals. Plot only when asked. Label points clearly and use the response lines for equations, tables and explanations.

1. Practice

Classify y = 5x, y = -2x + 4, and y = 3(x + 2) - 6 as proportional or linear non-proportional. Simplify when needed and justify each choice.

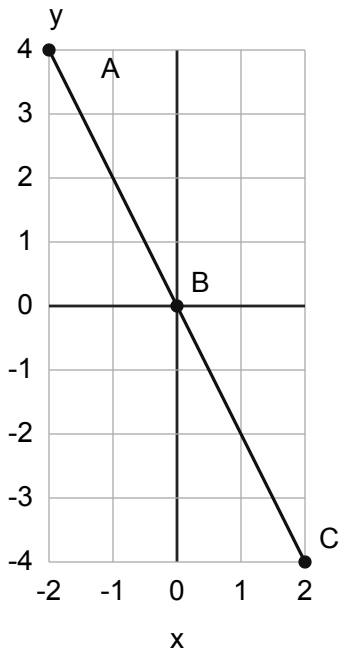
2. Practice

Use the table to determine a linear equation and classify the situation. The row x = 0 is not shown; explain how you can still decide.

x	y
1	-1
2	1
4	5

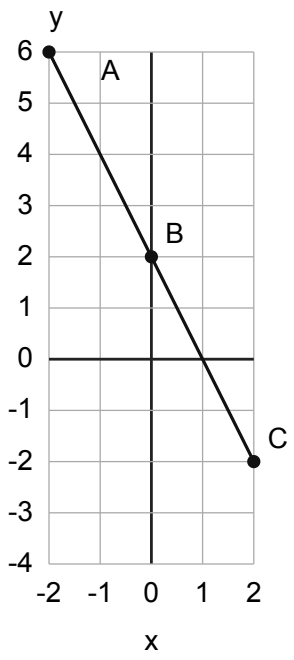
3. Practice

Use the actual plotted line to classify this relationship. Read two points, find the equation and explain whether a negative slope changes the proportionality test.



4. Practice

Classify this line and compare it with Task 3. Write its equation and identify the feature that changes its classification.

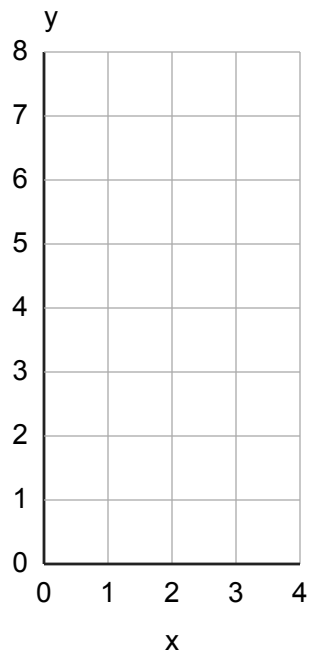


5. Apply

Plan A charges $3 per hour with no fee. Plan B charges $3 per hour plus $4 to start. Write both equations and give their values at 0 and 2 hours. Classify each using your table.

6. Apply

On one grid, graph P: y = x and Q: y = x + 2 for 0 ≤ x ≤ 4. Mark endpoints and one interior point on each. Label the lines P and Q and classify them.



7. Challenge

Two tables share the row (2,6). One has equation y = 3x; the other has y = x + 4. Can the shared row determine proportionality? Add x = 0 and x = 4 rows to each and explain.

ANSWER KEY # Start at Zero

Accept equivalent correct reasoning. Check plotted points and constructed representations as well as written answers. Numbered solutions match the student tasks.

Task 1

y = 5x: proportional. y = -2x + 4: non-proportional because b = 4. y = 3(x + 2) - 6 = 3x: proportional.

Task 2

The rate is 2; y = 2x - 3. It is linear non-proportional: extrapolating to x = 0 gives y = -3, not 0.

Task 3

The line passes through (0,0) and (2,-4), so y = -2x. It is proportional; a negative constant ratio still has the form y = kx.

Task 4

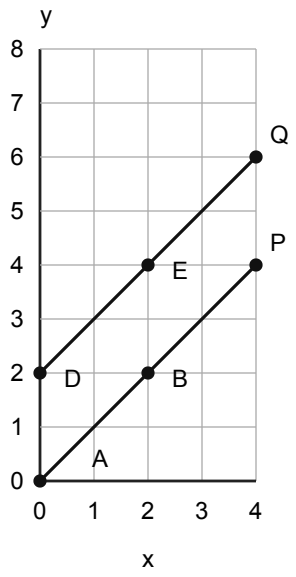
y = -2x + 2. It is linear non-proportional: its y-intercept is 2. Both lines have slope -2, but only Task 3 passes through the origin.

Task 5

A: y = 3x, proportional; table (0,0), (2,6). B: y = 3x + 4, non-proportional; table (0,4), (2,10). Only A starts at zero.

Task 6

P uses (0,0), (2,2), (4,4) and is proportional. Q uses (0,2), (2,4), (4,6) and is non-proportional. Their slopes match but intercepts differ.



Task 7

No: one pair is insufficient. For y = 3x, add (0,0), (4,12); it is proportional. For y = x + 4, add (0,4), (4,8); it is non-proportional.