lead4ward®

Proportional and Non-Proportional Reasoning

Interesting Items ▶

Which subclusters will we choose for review?	What are common errors and misconceptions we can help students avoid?	Which items will we use?
Slope Readiness: 8.4(B) Supporting: 8.4(A)	• difficulty establishing the correct proportion to relate to the slope of the line* • interpreting the unit rate and slope as $k = x/y$ instead of $k = y/x$* • incorrectly determining the difference in x- or y-values when the ordered pair includes a negative value* • graphing a non-proportional relationship and interpreting the slope as the unit rate • not understanding a linear proportional relationship goes through the origin	8.4(B) 2019 item 20 8.4(B) 2016 item 5 8.4(A) 2023 item 5 8.4(A) 2021 item 15 8.4(A) 2019 item 18 8.4(A) 2017 item 30
Proportional Reasoning Supporting: 8.5(A), 8.5(E)	• determining the slope as x/y instead of y/x • calculating the slope from a table using only the change in y and not taking the change in x into consideration* • not relating the constant of proportionality $k = y/x$ to problems involving direct variation* • determining the equation of a function from a proportional situation without a table or graph*	8.5(A) 2023 item 39 8.5(A) 2018 item 14 8.5(A) 2017 item 8 8.5(E) 2022 item 40 8.5(E) 2016 item 9
Non-Proportional Reasoning Readiness: 8.4(C), 8.5(I) Supporting: 8.5(B), 8.9(A)	• thinking the slope is the unit rate (y/x) for a non-proportional linear relationship • having difficulty identifying the constant and/or rate of change/slope for a non-proportional table of values* • confusing the x-intercept with the y-intercept [e.g., x-intercept = (0, y) and y-intercept = (x, 0)]* • dividing the change in x by the change in y when determining the slope from coordinates • not relating the data from the table (e.g., $\frac{change\ in\ y}{change\ in\ x}$) to the rate of change or slope* • using $\frac{run}{rise}$ as the slope when using data from the graph* • calculating the slope from a table using only the change in y and not taking the change in x into consideration • having difficulty identifying the y-intercept from a table of values that does not begin the pattern with a zero value as the input* • relying on the visual of the graph to determine the y-intercept instead of applying knowledge of (0, y)* • confusing the real-world context of slope/rate of change and the y-intercept/constant* • not considering the constant (b) in the problem and interpreting the situation as proportional • not recognizing $y = 6 + 3x$ as equivalent to $y = 3x + 6$ • transposing the ordered pairs of the point of intersection as (y, x) instead of (x, y) • incorrectly describing the meaning of the point that simultaneously satisfies both linear equations*	8.4(C) 2023 item 24 8.4(C) 2023 item 32 8.4(C) 2022 item 11 8.4(C) 2018 item 38 8.4(C) 2017 item 6 8.5(I) 2023 item 20 8.5(I) 2021 item 10 8.5(I) 2021 item 21 8.5(I) 2018 item 28 8.5(I) 2017 item 19 8.5(B) 2023 item 22 8.5(B) 2016 item 16 8.9(A) 2016 item 50
Proportional and Non-Proportional Recognition Supporting: 8.5(F), 8.5(H)	• assuming all straight lines on a graph represent a proportional relationship • assuming that if a table starts at a value, other than zero, then it is non-proportional	8.5(F) 2023 item 7 8.5(F) 2021 item 37 8.5(F) 2016 item 2 8.5(H) 2022 item 18 8.5(H) 2016 item 20
Function Identification Readiness: 8.5(G)	• thinking two x-values mapped to the same y-value is not a function* • thinking only linear data can represent a function • confusing the concept of functions with "repeating values" or "repeating arrows" in a given stimulus* • using a horizontal line test instead of a vertical line test to determine functions* • not identifying piecewise graphs as a function*	8.5(G) 2022 item 36 8.5(G) 2019 item 5 8.5(G) 2017 item 11 8.5(G) 2016 item 28

Which stimuli will we emphasize?

Word Problem*	Verbal Description*	Chart/ Table*	Graph*	Equation/ Expression*	Ordered Pairs*	Diagram/ Image*	Number Line	Base Ten Blocks	Measurement Tool	Formula	Geometric Figures*

Which words will we prioritize?

constant rate of change	intersecting lines	ratio*	$y = mx + b$
direct variation/varies directly*	non-proportional*	similar right triangle*	y as a function of x*
equation ($y = kx$)*	point of intersection	slope*, m	y-intercept*
function*	proportion*	unit rate*	
hypotenuse*	rate of change*	x-intercept	

Have we prepared students to respond to different item types?

Match Table Grid (2 pts)	Multiselect (2 pts)	Equation Editor (1-2 pts)	Text Entry (1-2 pts)	Graphing (1-2 pts)	Number Line (1-2 pts)	Inline Choice (1-2 pts)	Hot Spot (1-2 pts)	Drag and Drop (1-2 pts)	Multiple Choice (1 pt)