Which Line Fits?

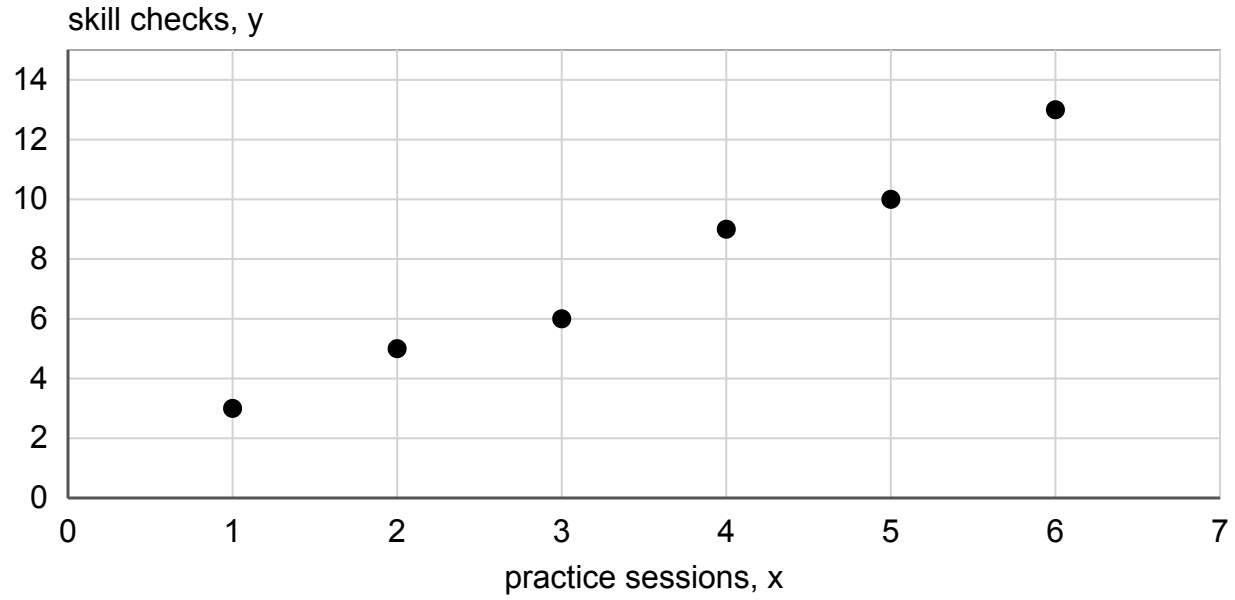
Draw a line of fit and compare how close all points are to two lines.

Name: _____ Date: _____

Part 1 - Draw an informal line of fit

Original classroom simulation data: A club recorded the number of practice sessions (x) and the number of skill checks completed (y) for six members. This is invented instructional data, not a real study.

Draw one straight **line of fit** on the scatter plot. Try to place the line so that the points are generally close to it. Do not connect the dots.



1. Explain why your line is a reasonable fit. Refer to the closeness of the points across the graph, not just one pair of points.

Listen while your teacher reviews how to measure a vertical distance from a point to a line.

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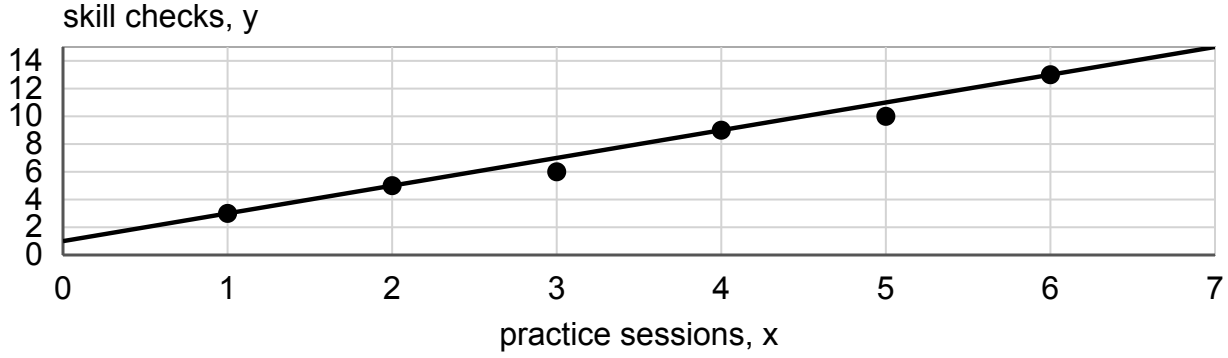
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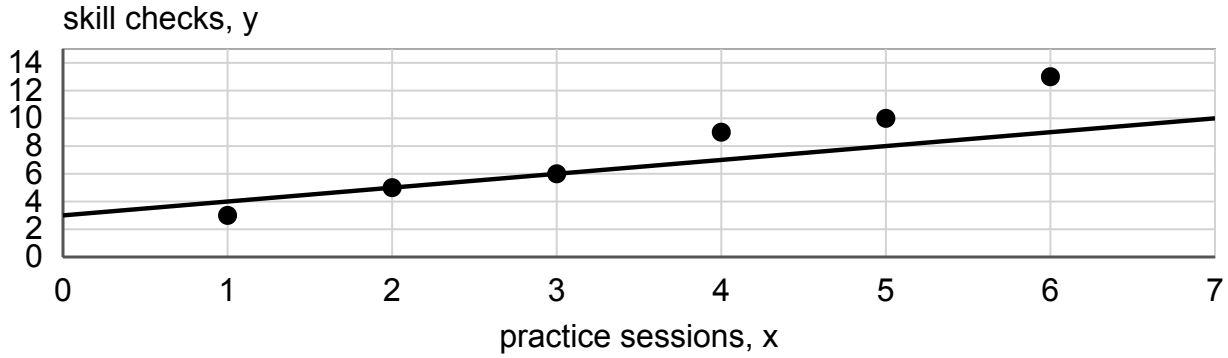
Part 2 - Compare two proposed lines

Use the same data in both panels. At each x-value, find the **vertical distance** from the data point to the proposed line. A point on a line has distance 0. Record each distance in units.

Panel A: Proposed line A, y = 2x + 1



Panel B: Proposed line B, y = x + 3



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Part 2 - Compare two proposed lines (continued)

Data point	Distance to A	Distance to B
(1, 3)		
(2, 5)		
(3, 6)		
(4, 9)		
(5, 10)		
(6, 13)		
Total distance		

2. Which proposed line is the better model? Use distances from several points, including points near the beginning and end of the graph.

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Answer key and teaching notes

Materials and setup: Print and supply all student pages, keeping teacher-key pages separate. Supplied: the two scatter-plot panels and distance table. Additionally needed: pencils, straightedges, and optional transparent rulers or clear grid overlays. Do not give students the equations for proposed lines until Part 2. Students may draw directly on the Part 1 graph.

Teaching script - read aloud before Part 1: “A line of fit is one straight line that shows the overall pattern in a scatter plot. It does not need to pass through every point. In Part 1, draw a line with many points close to it. In Part 2, for each x-value, compare the y-value of the point with the y-value on the line. The vertical gap is the distance we will use. Look across all the points before deciding which line fits better.”

Observation method: As students work, check that each student (1) draws one straight line rather than connecting points, (2) considers points across the full graph, and (3) measures vertical gaps at matching x-values. Prompt without giving an answer: “What is the line's y-value at this same x-value?”

1. Informal line of fit: A strong sample line is $y = 2x + 0.5$. Its points are all within 0.5 vertical unit of the line. Its residuals are 0.5, 0.5, -0.5, 0.5, -0.5, and 0.5, so points occur on both sides of the line. Accept reasonable nearby lines, including $y = 2x + 1$ or $y = 2x$, if the student explains accurately that the points are generally close across the graph. Sample response: “My line follows the upward trend. All of the points are on the line or within about one unit of it, so the line is close to the data across the graph.” Do not require an exact equation or require points to be on both sides for every acceptable line.

2. Distance table and comparison: Vertical distances for line A are 0, 0, 1, 0, 1, 0; total 2. Vertical distances for line B are 1, 0, 0, 2, 2, 4; total 9. Line A is the better model because its points are closer overall. A complete explanation mentions multiple distances or the totals and notes that line B is especially far from later points. Accept equivalent reasoning based on a careful visual comparison.

Feedback note: Do not accept a conclusion based only on whether successive y-differences are equal. This task asks students to judge closeness of data points to a line across the full scatter plot.