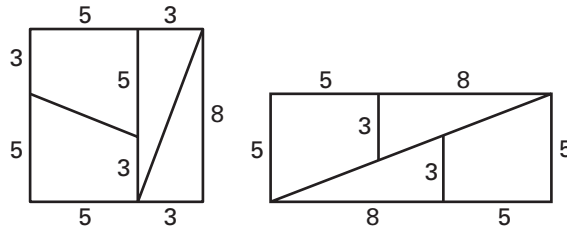


Challenge: Skills and Applications

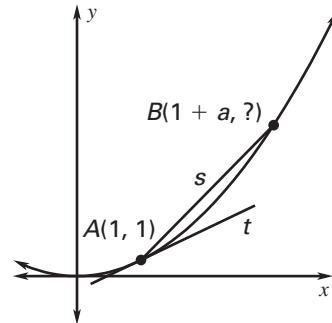
For use with pages 75–81

In Exercises 1 and 2, use slopes to check whether each set of 3 points lies on one line.

1. $(-1, -3), (2, 1), (8, 9)$
2. $(-4, 7), (0, 2), (5, -2)$
3. Find k so that the line through $(7, 2k)$ and $(4, -3)$ is parallel to the line through $(1, k + 1)$ and $(3, 5)$.
4. Find k so that the line through $(k - 1, k + 2)$ and $(4, -1)$ is perpendicular to the line through $(-3, 2)$ and $(2, 5)$.
5. a. Find the areas of the square and the rectangle shown below.



- b. Explain why the two areas you found in part (a) should be the same.
- c. Resolve the apparent contradiction between your results in parts (a) and (b) by using slopes. Draw a diagram to illustrate the actual situation.
6. The curve shown at the right is the graph of $y = x^2$. Line t is a *tangent line* to the graph at A (that is, a line that intersects the graph only at this point and remains on the “same side” of the graph), while line s intersects the graph at points A and B .



- a. Explain in words what would happen to the relationship between the slopes of lines s and t as the number a approached 0, but point B remained on the graph.
- b. Express the second coordinate of point B in terms of a .
- c. Using your answer to part (b), express the slope of line s in terms of a .
- d. By simplifying your answer to part (c) under the assumption that $a \neq 0$, but imagining a approaching 0, estimate the slope of the line t .