Show that the given proportions are equivalent.

31. $\frac{a-b}{a+b} = \frac{c-d}{c+d}$ and $\frac{a}{b} = \frac{c}{d}$

32. $\frac{a+c}{b+d} = \frac{a-c}{b-d}$ and $\frac{a}{b} = \frac{c}{d}$

Find the value of x.

33. $\frac{x}{x+5} = \frac{x-4}{x}$

34. $\frac{x-2}{x} = \frac{x}{x+3}$

35. $\frac{x+1}{x-2} = \frac{x+5}{x-6}$

C **36.** $\frac{x-1}{x-2} = \frac{x+4}{x+2}$

37. $\frac{x(x+5)}{4x+4} = \frac{9}{5}$

38. $\frac{x-1}{x+2} = \frac{10}{3x-2}$

Find the values of x and y.

39. $\frac{y}{x-9} = \frac{4}{7}$

$\frac{x+y}{x-y} = \frac{5}{3}$

40. $\frac{x-3}{4} = \frac{y+2}{2}$

$\frac{x+y-1}{6} = \frac{x-y+1}{5}$

41. Prove: If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$, then $\frac{a+c+e}{b+d+f} = \frac{a}{b}$. (*Hint*: Let $\frac{a}{b} = r$. Then $a = br$, $c = dr$, and $e = \underline{?}$.)

42. Explain how to extend the proof of Exercise 41 to justify Property 2 on page 245.

43. If $\frac{4a-9b}{4a} = \frac{a-2b}{b}$, find the numerical value of the ratio $a:b$.

7-3 *Similar Polygons*

When you draw a diagram of a soccer field, you don't need an enormous piece of paper. You use a convenient sheet and draw *to scale*. That is, you show the right shape, but in a convenient size. Two figures, such as those below, that have the same shape are called *similar*.