Average Rates of Change
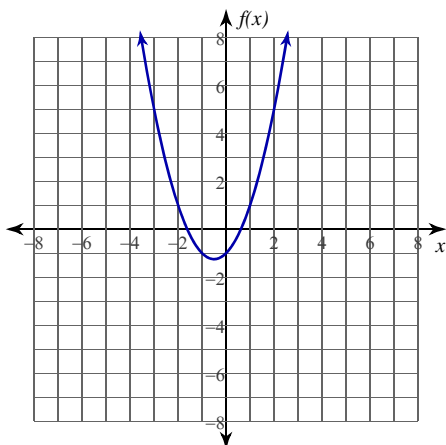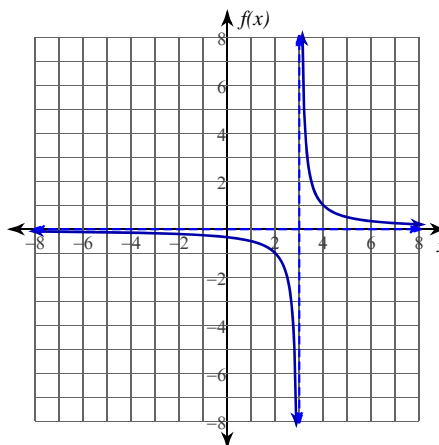
For each problem, find the average rate of change of the function over the given interval.

1) $f(x) = x^2 + x - 1;\ \ [-2, -\frac{7}{4}]$

2) $f(x) = \frac{1}{x-3};\ \ [-2, -\frac{3}{2}]$

3) $f(x) = x^2 - x - 1;\ \ [3, \frac{13}{4}]$

4) $f(x) = -x^2 - x + 1;\ \ [2, \frac{7}{3}]$

5) $f(x) = 2x^2 - 2x - 1;\ \ [1, \frac{3}{2}]$

6) $f(x) = \frac{1}{x-1};\ \ [-4, -\frac{11}{3}]$

7) $f(x) = \frac{1}{x+3};\ \ [-1, -\frac{2}{3}]$
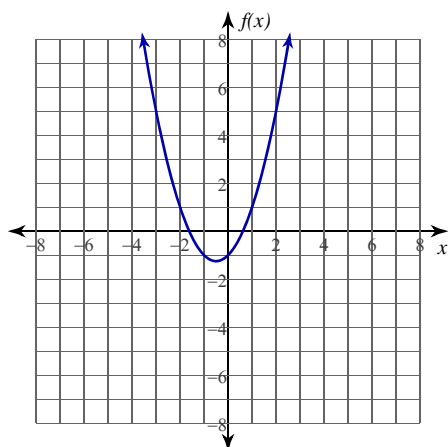
8) $f(x) = -\frac{1}{x-1};\ \ [-4, -\frac{7}{2}]$

9) The police have accused a driver of breaking the speed limit of 60 miles per hour. As proof, they provide two photographs. One photo shows the driver's car passing a toll booth at exactly 6 PM. The second photo shows the driver's car passing another toll both 31 miles down the highway at exactly 6:30 PM. Does the photo evidence prove that the driver broke the speed limit during this time?
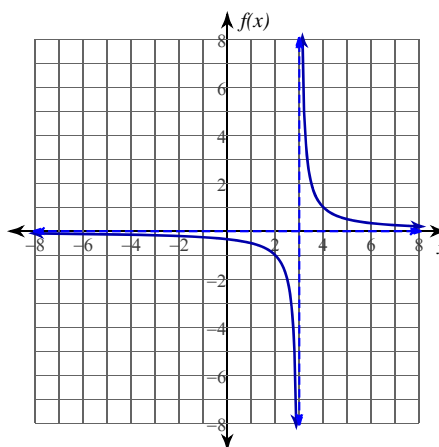
Average Rates of Change

For each problem, find the average rate of change of the function over the given interval.

1) $f(x) = x^2 + x - 1;\ \ [-2, -\frac{7}{4}]$

$-\dfrac{11}{4}$

2) $f(x) = \dfrac{1}{x - 3};\ \ [-2, -\frac{3}{2}]$

$-\dfrac{2}{45}$

3) $f(x) = x^2 - x - 1;\ \ [3, \frac{13}{4}]$

$\dfrac{21}{4}$

4) $f(x) = -x^2 - x + 1;\ \ [2, \frac{7}{3}]$

$-\dfrac{16}{3}$

5) $f(x) = 2x^2 - 2x - 1;\ \ [1, \frac{3}{2}]$

3

6) $f(x) = \dfrac{1}{x - 1};\ \ [-4, -\frac{11}{3}]$

$-\dfrac{3}{70}$

7) $f(x) = \dfrac{1}{x + 3};\ \ [-1, -\frac{2}{3}]$

$-\dfrac{3}{14}$

8) $f(x) = -\dfrac{1}{x - 1};\ \ [-4, -\frac{7}{2}]$

$\dfrac{2}{45}$

9) The police have accused a driver of breaking the speed limit of 60 miles per hour. As proof, they provide two photographs. One photo shows the driver's car passing a toll booth at exactly 6 PM. The second photo shows the driver's car passing another toll both 31 miles down the highway at exactly 6:30 PM. Does the photo evidence prove that the driver broke the speed limit during this time?

Yes. The average rate of change is 62 mph, so the driver must have been breaking the speed limit some of the time.