

Exercise 30

Use algebra to find the point at which the line $f(x) = -\frac{4}{5}x + \frac{274}{25}$ intersects the line $h(x) = \frac{9}{4}x + \frac{73}{10}$.

Solution

At the point of intersection, the two functions are equal.

$$\begin{aligned}f(x) &= h(x) \\ -\frac{4}{5}x + \frac{274}{25} &= \frac{9}{4}x + \frac{73}{10}\end{aligned}$$

Solve for x .

$$\begin{aligned}\frac{274}{25} - \frac{73}{10} &= \frac{9}{4}x + \frac{4}{5}x \\ \frac{61}{20} &= \frac{183}{50} \\ x &= \frac{183}{50} \times \frac{20}{61} = \frac{6}{5}\end{aligned}$$

Now plug this value of x into either of the functions to get the corresponding y -value.

$$f\left(\frac{6}{5}\right) = -\frac{4}{5}\left(\frac{6}{5}\right) + \frac{274}{25} = 10$$

Therefore, the point of intersection is $\left(\frac{6}{5}, 10\right)$.

