

Exercise 3.1.29 Suppose $f(x) = 4x - 1$ and $g(x) = -2x + 5$. (a) solve $f(x) = 0$.
 (b) solve $f(x) > 0$. (c) solve $f(x) = g(x)$.
 (d) solve $f(x) \leq g(x)$. (e) Graph $y = f(x)$ and $y = g(x)$ and label the point where $f(x) = g(x)$.

Solution

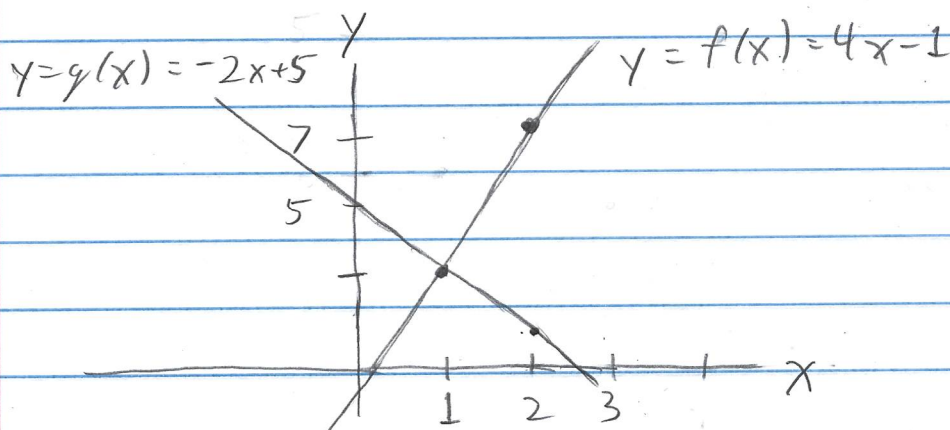
(a) For $f(x) = 0$, we consider $4x - 1 = 0$
 or $4x = 1$ or $x = 1/4$.

(b) For $f(x) > 0$ we consider $4x - 1 > 0$
 or $4x > 1$ or $x > 1/4$.

(c) For $f(x) = g(x)$ we consider $4x - 1 = -2x + 5$
 or $4x + 2x = 5 + 1$ or $6x = 6$ or $x = 1$.

(d) For $f(x) \leq g(x)$ we consider $4x - 1 \leq -2x + 5$
 or $4x + 2x \leq 5 + 1$ or $6x \leq 6$ or $x \leq 1$.

(e) Since $f(x) = g(x)$ for $x = 1$ and $y = 3$, the point $(1, 3)$ lies on both graphs $y = f(x)$ and $y = g(x)$. We use the slope $m = \Delta y / \Delta x = 4$ of f to find a second point $(2, 7)$ on $y = f(x)$. We use the slope $m = \Delta y / \Delta x = -2$ of g to find a second point $(2, 1)$ on $y = g(x)$. This gives:



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