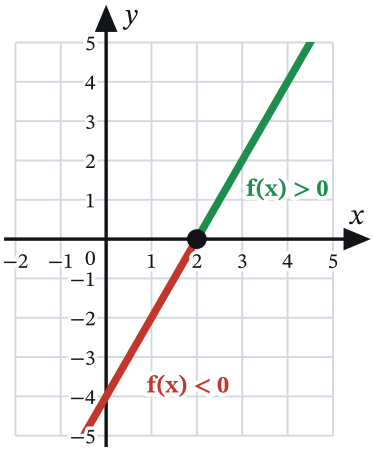
Names (pair) _____ Date _____

Sign of a Function and Inequalities

Example: $f(x) = 2x - 4$



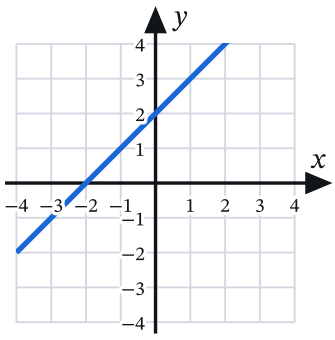
x-intercept: $2x - 4 = 0, x = 2$.
To the right of it the graph is **above** the x-axis:
$f(x) > 0$ for $x > 2$.
To the left it is **below**: $f(x) < 0$ for $x < 2$.
So the inequality $2x - 4 > 0$ has the solution
$x \in (2, +\infty)$.

Remember

$f(x) > 0$ where the graph is **above** the x-axis, and $f(x) < 0$ where it is **below**. The boundary is the x-intercept. We can solve $mx + b > 0$ from the graph. $f(x) < g(x)$ where the graph of f is below the graph of g, and the intersection solves $f(x) = g(x)$.

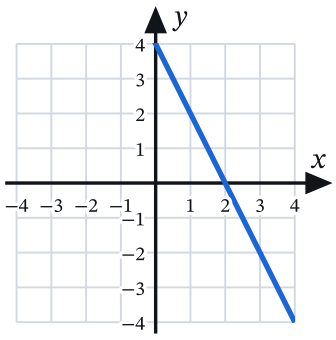
1 IN PAIRS For each graph, find the x-intercept and where the function is positive and where negative.

$f(x) = x + 2$



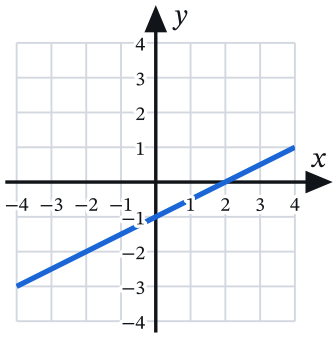
x -int. ☐
$f(x) > 0$: ☐
$f(x) < 0$: ☐

$f(x) = -2x + 4$



x -int. ☐
$f(x) > 0$: ☐
$f(x) < 0$: ☐

$f(x) = \frac{1}{2}x - 1$



x -int. ☐
$f(x) > 0$: ☐
$f(x) < 0$: ☐

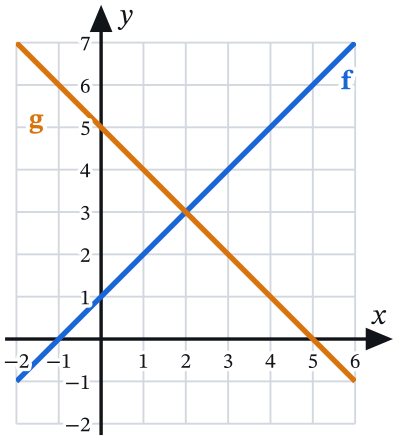
Names (pair) _____ Date _____

2 ON YOUR OWN Solve the inequalities algebraically and check on a sketch of the graph.

$3x - 6 \geq 0$ → ☐

$-x + 3 > 0$ → ☐

3 ON YOUR OWN The picture shows the graphs of $f(x) = x + 1$ and $g(x) = -x + 5$. Read them.



intersection: ☐

$f(x) = g(x)$ for $x =$ ☐

$f(x) < g(x)$ for ☐

$f(x) > g(x)$ for ☐

4 ON YOUR OWN On a winter morning the temperature is $T(t) = 2t - 6$ (in °C, t hours after 6 a.m.). When is it above freezing?

$2t - 6 > 0$ → ☐ i.e. after ☐ h

The Grapher app · otooly.com/grapher

Type $f(x) = 2x - 4$ and turn on **Inequalities** and **Sign table**.

The Number Line app · otooly.com/number-line

Intervals mode: type the solution of task 2 and compare it with the graph.

★ ON YOUR OWN **Exit card.** $f(x) = -3x + 6 > 0$ for ☐