Which Side to Shade

Solve for y (flip when multiplying or dividing by a negative), graph the boundary from m and b, dashed or solid, shade above for y greater and below for y less, confirm with a test point.

1 THE VOCABULARY
Words we use

Shade color the half-plane of solutions.

Above, below y greater than the line is the higher points; y less is the lower points.

Test point an easy point not on the line, usually (0, 0), put into the original inequality to confirm the side.

Flip the sign multiply or divide both sides by a negative: turn the sign around (Unit 1).

Vertical, horizontal x = a: right for greater, left for less. y = a: above or below.

- Watch out for these.
- Reading the side before y is alone. y > ... means above only once y is by itself.
- Forgetting the flip when multiplying or dividing by a negative. The test point catches it.
- Testing the point in the solved version instead of the original. Use the original; it has no flip mistakes in it.
- Picking a test point on the line. It gives no information.
- Dashing an or-equal sign.

2 THE METHOD
The five steps

1. **SOLVE FOR** y add opposites, multiply by the reciprocal. Negative multiplier: flip the sign.
2. **GRAPH THE BOUNDARY** the line with an equals sign, from m and b.
3. **DASHED OR SOLID** strict: dashed. Or-equal: solid.
4. **SHADE** y greater: above. y less: below. (Vertical: x greater is right.)
5. **TEST POINT** (0, 0) into the original. True: its side. False: the other side.

WHY ABOVE MEANS GREATER

At one x the line has one y. A solution of y > line has a bigger y at that x, and a bigger y is higher on the page. So every solution is above the line, and the shaded half-plane is exactly the points above.

3 WITH A FLIP
−2y < 4x − 6

−2y < 4x − 6	the original. y is not alone
y > −2x + 3	multiply both sides by −1/2, a negative: the sign flips
boundary y = −2x + 3	b = 3, m = −2: plot (0, 3), step down 2 and right 1
dashed	strict sign
shade above	y greater than the line
test (0, 0): 0 < −6? false	so shade away from (0, 0), which is above. Agrees

IF THE TEST POINT DISAGREES

You probably missed a flip. Redo step 1.

SAY IT OUT LOUD

Solve for y, flip if negative. Boundary from m and b. Dashed or solid. Above for greater, below for less. Test a point.