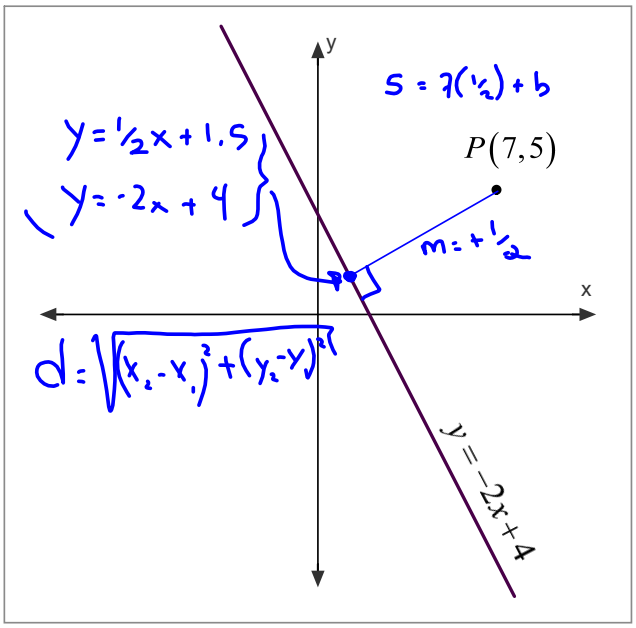
(shortest) Distance from a Point to a Line



The shortest distance from a point to a line is the distance that runs perpendicular to that line.

Shortcut: There is a formula for calculating the distance.

The line needs to be in general form

$$d(P,l)=\frac{|Ax+By+C|}{\sqrt{A^2+B^2}}$$

where x and y are the coordinates of the point.

Example: Determine the distance from the point $Z(3,11)$ to the line $\overset{A}{3}x-\overset{B}{4}y+\overset{C}{10}=0$.

$$d(Z,\ell)=\frac{|3x-4y+10|}{\sqrt{3^2+(-4)^2}}$$

$$=\frac{|3(3)-4(11)+10|}{\sqrt{9+16}}$$

$$=\frac{|9-44+10|}{\sqrt{25}}$$

$$=\frac{|-25|}{\sqrt{25}}$$

$$=\frac{25}{5}=5 \text{ units}$$