What are the intercepts of the line whose equation is

$\frac{2x}{3} - \frac{5y}{4} = 1$?

standard? no
general? no
symmetric?

$\frac{x}{a} + \frac{y}{b} = 1$

$\frac{x}{\frac{3}{2}} + \frac{y}{-\frac{4}{5}} = 1$ division of fraction

x-int: $\frac{3}{2}$

y-int: $-\frac{4}{5}$

Example: A line's x-intercept is -10 and its y-intercept is 8. Determine the equation of the line three ways.

1) Symmetric

$$\frac{x}{-10} + \frac{y}{8} = 1$$

$$\frac{x}{-10} + \frac{y}{8} = 1$$

2) Standard

$y = mx + b$

① $\frac{y}{8} = \frac{x}{10} + 1$

$y = \frac{8x}{10} + 8$

$y = \frac{4}{5}x + 8$

② $y = mx + 8$

$m = \frac{-b}{a}$

$= \frac{-8}{-10} = 0.8 = \frac{4}{5}$

$y = \frac{4}{5}x + 8$

3) General

$Ax + By + C = 0$

$40 \cdot \left(\frac{x}{-10} + \frac{y}{8} - 1 = 0\right)$

LCM 10, 8 → 40

$-4x + 5y - 40 = 0$

Example: Write the equation $2x-4y-5=0$ in symmetric form. $\frac{x}{a}+\frac{y}{b}=1$

Intercepts

$2x-4y-5=0$

y-int: $x=0$

$-4y-5=0$

$-4y=5$

$y=-\frac{5}{4}$ or -1.25

x-int $y=0$

$2x-5=0$

$2x=5$

$x=\frac{5}{2}=2.5$

Intercepts

y-int: $-\frac{C}{B}=\frac{5}{-4}$

x-int: $-\frac{C}{A}=\frac{5}{2}$

$\frac{x}{\frac{5}{2}}+\frac{y}{-\frac{5}{4}}=1$

$\frac{2x}{5}+\frac{-4y}{5}=1$

Example: Find the equation of a line that passes through the point $(4, 9)$ and is

a) parallel to the line $\frac{x}{2}+\frac{y}{3}=1$

same slope

$m = -\frac{b}{a} = \frac{-3}{2}$

$y = mx + b$

$y = -\frac{3}{2}x + b$

$9 = -\frac{3}{2}(4) + b$

$9 = -6 + b$

$15 = b$

$y = -\frac{3}{2}x + 15$

Example: Find the equation of a line that passes through the point $(4, 9)$ and is

b) perpendicular to the line $\frac{x}{5}-\frac{y}{4}=1$.

negative reciprocal

$a=5$ $b=-4$

$m=-\frac{b}{a}=\frac{4}{5}$

$y=mx+b$

① $m=-\frac{5}{4}$

② $9=-\frac{5}{4}(4)+b$

$9=-5+b$

$14=b$

$y=-\frac{5}{4}x+14$

Example: Determine the equation of the perpendicular bisector of the line segment that joins points (5, 8) & (15, 13).

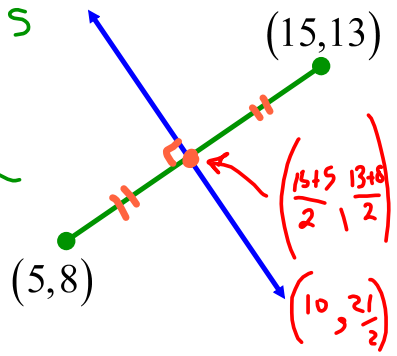
$y = mx + b$

② $m = -2$

$y = -2x + b$

b:
using (10, 10.5)
$10.5 = -2(10) + b$
$10.5 = -20 + b$
$30.5 = b$

① $m = \frac{13-8}{15-5} = \frac{5}{10} = \frac{1}{2}$



$y = -2x + 30.5$