My labs Plus

Solve: $(x-1)(x+3)=0$

$x=1$, $x=-3$

Ans: $\{x=1,-3\}$ ✗

$\{1,-3,\}$ ✗

$\{1,-3\}$ ✓

Solve: $x^2+1=0$, give answer in the form $a+bi$.

$x^2=-1$

$x=i,-i$

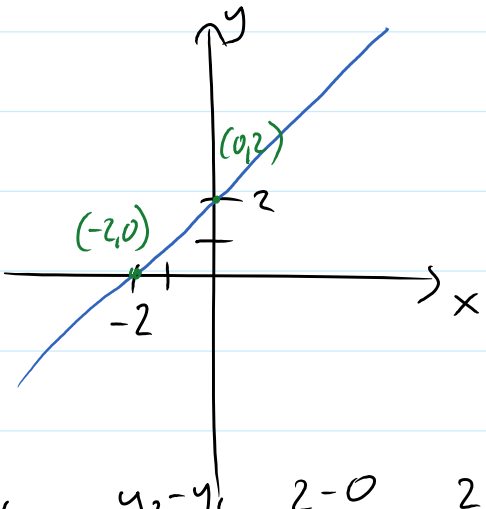
$x=0+i$

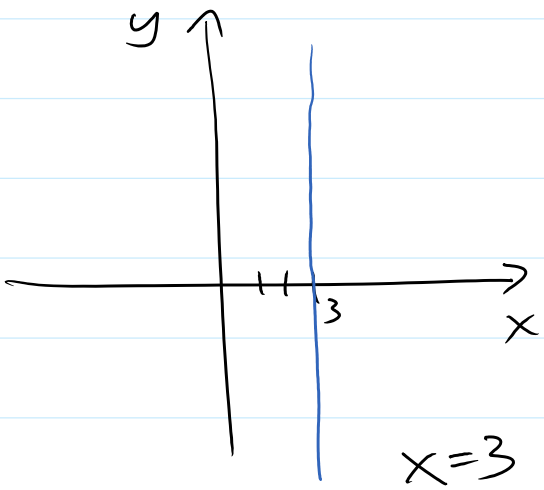
$x=0-i$

$(x+1-i)(x+1+i)=0$

$x=-1+i$, $x=-1-i$

$x=\frac{-2+2i}{2}$, $x=\frac{-2-2i}{2}$ ✗





slope: $\frac{y_2-y_1}{x_2-x_1} = \frac{2-0}{0-(-2)} = \frac{2}{2} = 1$

$x=3$

slope is undefined

slope-intercept form

$y=mx+b$

$y=x+2$

point-slope form

$y-y_0=m(x-x_0)$

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slope-int

Find the eq. of the line that goes through:

a) $(-3,-1)$, $(-2,4)$

$\text{slope} = \frac{y_2-y_1}{x_2-x_1} = \frac{4-(-1)}{-2-(-3)} = \frac{5}{1}$

$= 5$

$y-4=5(x-(-2))$

b) $(-3,4)$, $(2,-2)$

$\text{slope} = \frac{4-(-2)}{-3-2} = \frac{6}{-5}$

$y-4=\frac{-6}{5}(x-(-3))$

$y-4=5(x-(-2))$

$y-4=5x+10$

$\boxed{y=5x+14}$

$y-4=\frac{-6}{5}(x-(-3))$

$y-4=-\frac{6}{5}x-\frac{18}{5}$

$y=-\frac{6}{5}x-\frac{18}{5}+4\cdot\frac{5}{5}$

$y=-\frac{6}{5}x-\frac{18}{5}+\frac{20}{5}$

$\boxed{y=-\frac{6}{5}x+\frac{2}{5}}$

$y-(-1)=5(x-(-3))$

$y+1=5x+15$

$y=5x+14$

Ex: Find an equation in point-slope form for the line with slope 4 that passes through the point $(-1,3)$.

Find the x-, y- intercepts

set $y=0$ ↙ x-, y- ↑ set $x=0$

$\boxed{y-3=4(x+1)}$

x-int

$0-3=4(x+1)$

$-3=4x+4$

$-7=4x$

$x=-\frac{7}{4}$ $\boxed{\left(-\frac{7}{4},0\right)}$

$(-1.75,0)$

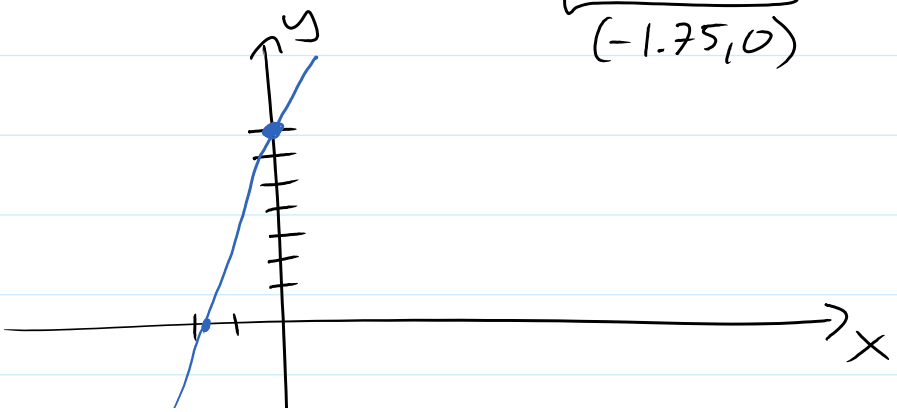
y-int

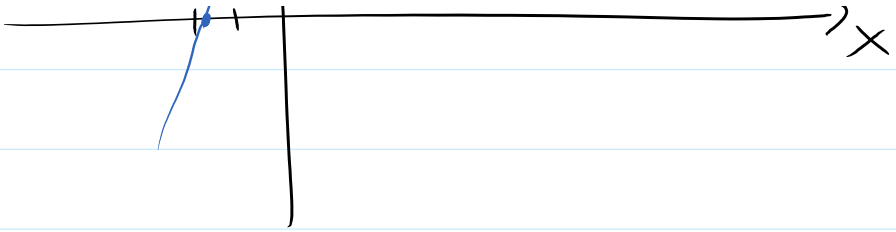
$y-3=4(0+1)$

$y-3=4$

$y=7$

$\boxed{(0,7)}$





The general form of the eq. of a line:

$$Ax + By + C = 0.$$

Ex:

Find the slope, y-, x-int. of the line

$$3x + 2y - 4 = 0$$

$$2y = -3x + 4$$

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

Slope $= m = \boxed{-1.5}$

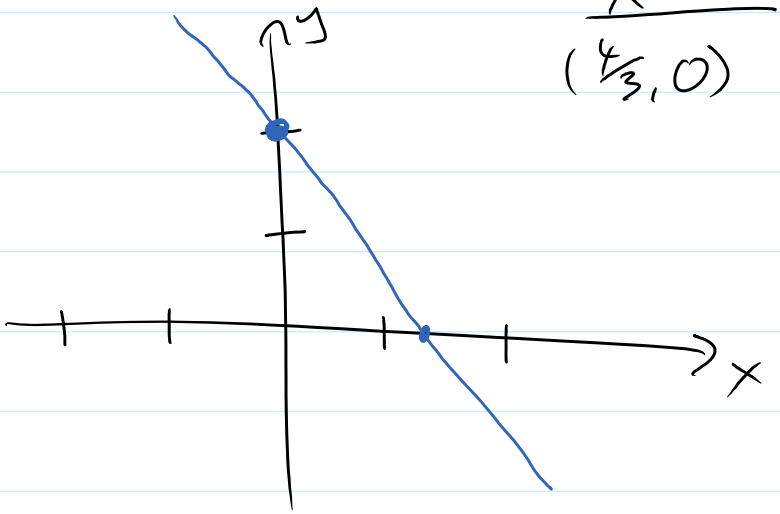
y-int $\quad y = -1.5 \cdot 0 + 2 = 2$

$(0, 2)$

x-int $\quad 0 = -\frac{3}{2}x + 2$

$(\frac{4}{3}, 0)$ $\quad \frac{3}{2}x = 2$

$3x = 4 \rightarrow x = \frac{4}{3}$



Parallel lines have the same slope:

Parallel lines have the same slope:

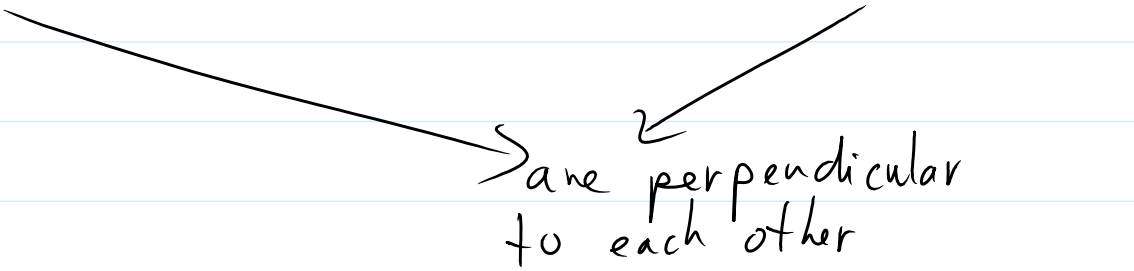
$y = 2x + 3$

$y = 2x - 2$

Two lines $y = m_1 x + b_1$ are perpendicular, $y = m_2 x + b_2$

if $m_1 \cdot m_2 = -1$, i.e., $m_2 = \frac{-1}{m_1}$

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



Find a perpendicular line: (that goes through (1,1))

a) $y = 3x - 3$

$m_1 = 3$

$m_2 = \frac{-1}{3}$

$y - y_0 = m(x - x_0)$

$y - 1 = \frac{-1}{3}(x - 1)$

$y = -\frac{1}{3}x + \frac{1}{3} + 1$

b) $2x + 3y + 1 = 0$

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

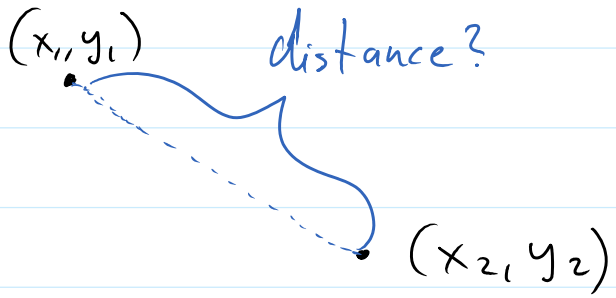
c) $y - 1 = 2(x + 5)$

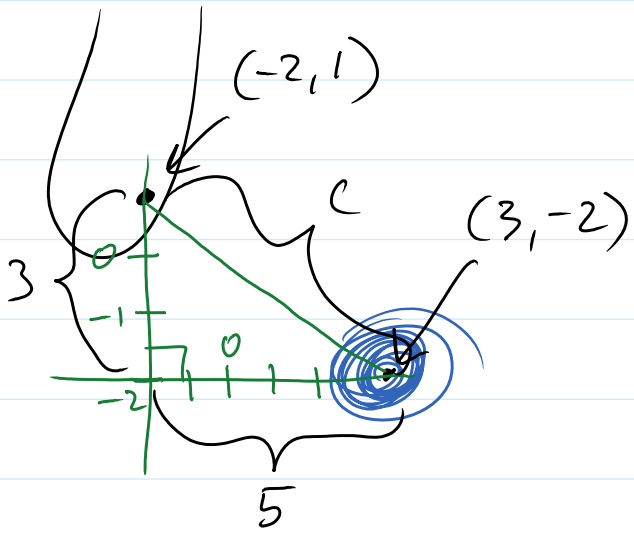
$y = \frac{-1}{2}x + \frac{3}{2}$

$y = -\frac{1}{3}x + \frac{1}{3} + 1$

$\boxed{y = -\frac{1}{3}x + \frac{4}{3}}$

Section 2.8





Pythag. thm

$a^2 + b^2 = c^2$

$c^2 = 3^2 + 5^2 = 9 + 25$

$c^2 = 34$

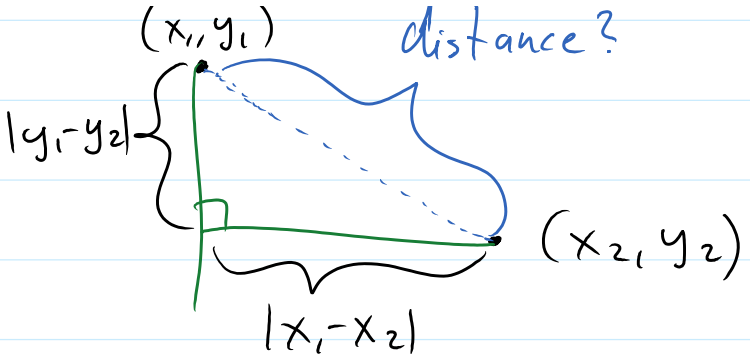
$c = \sqrt{34} \approx 5.8$

34

2 17

$c = \sqrt{3^2 + 5^2}$

$d = \sqrt{|y_1 - y_2|^2 + |x_1 - x_2|^2}$



$$d = \sqrt{|y_1 - y_2|^2 + |x_1 - x_2|^2}$$

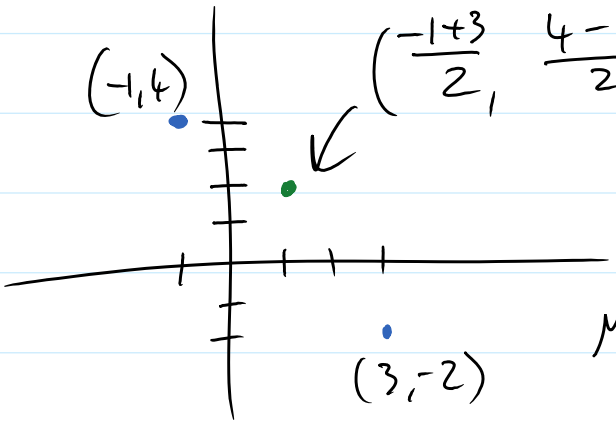
distance formula: $d = \sqrt{(y_1 - y_2)^2 + (x_1 - x_2)^2}$

Find the distance: $(-1, 4)$, $(3, -2)$

$$d = \sqrt{(4 - (-2))^2 + (-1 - 3)^2} = \sqrt{(6)^2 + (-4)^2}$$
$$= \sqrt{36 + 16} = \sqrt{52} = \sqrt{4} \cdot \sqrt{13} = \boxed{2\sqrt{13}}$$

2 | 26

2 · 13



$$\left(\frac{-1+3}{2}, \frac{4-2}{2}\right) = \left(\frac{2}{2}, \frac{2}{2}\right) = \boxed{(1, 1)}$$

Midpoint between (x_1, y_1) and (x_2, y_2) is

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$