Writing Linear Equations given 2 Points
Unit 3: Introduction to Functions

Write the slope-intercept form of the equation of the line through the given points:

1. *through*: $(-1, 2)$ *and* $(0, -1)$ $x_1 \; y_1 \qquad x_2 \; y_2$ $m = \frac{-1-(2)}{0-(-1)} = \frac{-1-2}{0+1} = \frac{-3}{1} = \boxed{-3}$ $2 = -3(-1) + b$ $2 = 3 + b$ $\underline{-3 \quad -3}$ $-1 = b$ $\boxed{y = -3x - 1}$	2. *through*: $(0, 2)$ *and* $(-3, -2)$ $x_1 \; y_1 \qquad x_2 \; y_2$ $m = \frac{-2-(2)}{-3-(0)} = \frac{-2-2}{-3-0} = \frac{-4}{-3} = \boxed{\frac{4}{3}}$ $-2 = \frac{4}{3}(-3) + b$ $-2 = -4 + b$ $\underline{+4 \qquad +4}$ $2 = b$ $\boxed{y = \frac{4}{3}x + 2}$
3. *through*: $(0, 0)$ *and* $(-3, 3)$ $x_1 \; y_1 \qquad x_2 \; y_2$ $m = \frac{3-(0)}{-3-(0)} = \frac{3-0}{-3-0} = \frac{3}{-3} = \boxed{-1}$ $0 = -1(0) + b$ $0 = 0 + b$ $0 = b$ $\boxed{y = -1x}$	4. *through*: $(2, -2)$ *and* $(-4, 1)$ $x_1 \; y_1 \qquad x_2 \; y_2$ $m = \frac{1-(-2)}{-4-(2)} = \frac{1+2}{-4-2} = \frac{3}{-6} = \boxed{-\frac{1}{2}}$ $1 = -\frac{1}{2}(-4) + b$ $1 = 2 + b$ $\underline{-2 \quad -2}$ $-1 = b$ $\boxed{y = -\frac{1}{2}x - 1}$
5. *through*: $(0, 1)$ *and* $(1, -4)$ $x_1 \; y_1 \qquad x_2 \; y_2$ $m = \frac{-4-(1)}{1-(0)} = \frac{-4-1}{1-0} = \frac{-5}{1} = \boxed{-5}$ $1 = -5(0) + b$ $1 = 0 + b$ $1 = b$ $\boxed{y = -5x + 1}$	6. *through*: $(-1, 4)$ *and* $(2, 1)$ $x_1 \; y_1 \qquad x_2 \; y_2$ $m = \frac{1-(4)}{2-(-1)} = \frac{1-4}{2+1} = \frac{-3}{3} = \boxed{-1}$ $1 = -1(2) + b$ $1 = -2 + b$ $\underline{+2 \quad +2}$ $3 = b$ $\boxed{y = -1x + 3}$
7. *through*: $(1, -3)$ *and* $(0, -1)$ $x_1 \; y_1 \qquad x_2 \; y_2$ $m = \frac{-1-(-3)}{0-(1)} = \frac{-1+3}{0-1} = \frac{2}{-1} = \boxed{-2}$ $-3 = -2(1) + b$ $-3 = -2 + b$ $\underline{+2 \qquad +2}$ $-1 = b$ $\boxed{y = -2x - 1}$	8. *through*: $(4, 1)$ *and* $(2, 3)$ $x_1 \; y_1 \qquad x_2 \; y_2$ $m = \frac{3-(1)}{2-(4)} = \frac{3-1}{2-4} = \frac{2}{-2} = \boxed{-1}$ $3 = -1(2) + b$ $3 = -2 + b$ $\underline{+2 \qquad +2}$ $5 = b$ $\boxed{y = -1x + 5}$
9. *through*: $(0, 3)$ *and* $(4, 3)$ $x_1 \; y_1 \qquad x_2 \; y_2$ $m = \frac{3-(3)}{4-(0)} = \frac{3-3}{4-0} = \frac{0}{4} = \boxed{0}$ $3 = 0(0) + b$ $3 = 0 + b$ $3 = b$ $\boxed{y = 0x + 3}$ or $\boxed{y = 3}$	10. *through*: $(3, -4)$ *and* $(-1, -1)$ $x_1 \; y_1 \qquad x_2 \; y_2$ $m = \frac{-1-(-4)}{-1-(3)} = \frac{-1+4}{-1-3} = \boxed{\frac{3}{-4}}$ $-1 = \frac{-3}{4}(-1) + b$ $-1 = \frac{3}{4} + b$ $\underline{-3/4 \quad -3/4}$ $-7/4 = b$ $\boxed{y = -\frac{3}{4}x - \frac{7}{4}}$

↑
Used 1st pt for all in this column

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Used 2nd pt for all in this column

Write the point-slope form of the equation of the line through the given points:

11. through: $(-4,-2)$ and $(-4,-4)$	12. through: $(1,1)$ and $(1,-2)$
$x_1\ y_1 \quad\quad x_2\ y_2$ $m = \dfrac{-4-(-2)}{-4-(-4)} = \dfrac{-4+2}{-4+4} = \dfrac{-2}{0} = undefined$ Since slope is undefined, $x =$ the x-value, of the pts. $\boxed{x = -4}$	$x_1\ y_1 \quad\quad x_2\ y_2$ $m = \dfrac{-2-(1)}{1-(1)} = \dfrac{-2-1}{1-1} = \dfrac{-3}{0} = undefined.$ Since slope is undefined, $x =$ the x-value of the pts. $\boxed{x = 1}$
13. through: $(5,0)$ and $(0,1)$	14. through: $(-5,2)$ and $(-4,0)$
$x_1\ y_1 \quad\quad x_2\ y_2$ $m = \dfrac{1-(0)}{0-(5)} = \dfrac{1-0}{0-5} = \boxed{\dfrac{1}{-5}}$ $\boxed{y-0 = \dfrac{-1}{5}(x-5)}$ $\boxed{y-1 = \dfrac{-1}{5}(x-0)}$	$x_1\ y_1 \quad\quad x_2\ y_2$ $m = \dfrac{0-(2)}{-4-(-5)} = \dfrac{0-2}{-4+5} = \dfrac{-2}{1} = \boxed{-2}$ $y-2 = -2(x-(-5))$ $\boxed{y-2 = -2(x+5)}$ $y-0 = -2(x-(-4))$ $\boxed{y-0 = -2(x+4)}$
15. through: $(0,-4)$ and $(4,4)$	16. through: $(-2,-1)$ and $(5,3)$
$x_1\ y_1 \quad\quad x_2\ y_2$ $m = \dfrac{4-(-4)}{4-(0)} = \dfrac{4+4}{4-0} = \dfrac{8}{4} = \boxed{2}$ $y-(-4) = 2(x-0)$ $\boxed{y+4 = 2(x-0)}$ $\boxed{y-4 = 2(x-4)}$	$x_1\ y_1 \quad\quad x_2\ y_2$ $m = \dfrac{3-(-1)}{5-(-2)} = \dfrac{3+1}{5+2} = \boxed{\dfrac{4}{7}}$ $y-(-1) = \dfrac{4}{7}(x-(-2))$ $\boxed{y+1 = \dfrac{4}{7}(x+2)}$ $\boxed{y-3 = \dfrac{4}{7}(x-5)}$
17. through: $(3,5)$ and $(5,2)$	18. through: $(0,4)$ and $(-1,-3)$
$x_1\ y_1 \quad\quad x_2\ y_2$ $m = \dfrac{2-(5)}{5-(3)} = \dfrac{2-5}{5-3} = \boxed{\dfrac{-3}{2}}$ $\boxed{y-5 = \dfrac{-3}{2}(x-3)}$ $\boxed{y-2 = \dfrac{-3}{2}(x-5)}$	$x_1\ y_1 \quad\quad x_2\ y_2$ $m = \dfrac{-3-(4)}{-1-(0)} = \dfrac{-3-4}{-1-0} = \dfrac{-7}{-1} = \boxed{7}$ $\boxed{y-4 = 7(x-0)}$ $y-(-3) = 7(x-(-1))$ $\boxed{y+3 = 7(x+1)}$
19. through: $(1,4)$ and $(0,0)$	20. through: $(-3,-5)$ and $(2,-4)$
$x_1\ y_1 \quad\quad x_2\ y_2$ $m = \dfrac{0-(4)}{0-(1)} = \dfrac{0-4}{0-1} = \dfrac{-4}{-1} = \boxed{4}$ $\boxed{y-4 = 4(x-1)}$ $\boxed{y-0 = 4(x-0)}$	$x_1\ y_1 \quad\quad x_2\ y_2$ $m = \dfrac{-4-(-5)}{2-(-3)} = \dfrac{-4+5}{2+3} = \boxed{\dfrac{1}{5}}$ $y-(-5) = \dfrac{1}{5}(x-(-3))$ $\boxed{y+5 = \dfrac{1}{5}(x+3)}$ $y-(-4) = \dfrac{1}{5}(x-2)$ $\boxed{y+4 = \dfrac{1}{5}(x-2)}$