Linear Equations

Finding the Equation of a Line – Given two points

Write the Linear Equation containing the following in Slope-Intercept Form:

1. $(-3,1)$ & $(0,-8)$

$m = \frac{-8-1}{0+3} = \frac{-9}{3} = -3$

$y = -3x + b$

$-8 = -3(0) + b$

$-8 = 0 + b$

$-8 = b$

$y = -3x - 8$

2. $(2,-7)$ & $(0,-5)$

$m = \frac{-5+7}{0-2} = \frac{2}{-2} = -1$

$y = -1x + b$

$-5 = -1(0) + b$

$-5 = 0 + b$

$-5 = b$

$y = -1x - 5$

3. $(2,-4)$ & $(0,-4)$

$m = \frac{-4+4}{0-2} = \frac{0}{-2} = 0$

$y = 0x + b$

$-4 = 0(0) + b$

$-4 = 0 + b$

$-4 = b$

$y = 0x - 4$ OR $y = -4$

4. $(0,4)$ & $(8,3.5)$

$m = \frac{3.5-4}{8-0} = \frac{-0.5}{8} = -\frac{1}{16}$

$y = -\frac{1}{16}x + b$

$4 = -\frac{1}{16}(0) + b$

$4 = 0 + b$

$4 = b$

$y = -\frac{1}{16}x + 4$

5. $(0,5)$ & $(1.5,1)$

$m = \frac{1-5}{1.5-0} = \frac{-4}{1.5} = -\frac{8}{3}$

$y = -\frac{8}{3}x + b$

$1 = -\frac{8}{3}(1.5) + b$

$1 = -\frac{8}{3}\left(\frac{3}{2}\right) + b$

$1 = -4 + b$

$+4 \quad +4$

$5 = b$

$y = -\frac{8}{3}x + 5$

6. $(-6,0)$ & $(0,-24)$

$m = \frac{-24-0}{0+6} = \frac{-24}{6} = -4$

$y = -4x + b$

$-24 = -4(0) + b$

$-24 = 0 + b$

$-24 = b$

$y = -4x - 24$

7. $(0,2)$ & $(2,4)$

$m = \frac{4-2}{2-0} = \frac{2}{2} = 1$

$y = 1x + b$

$4 = 1(2) + b$

$4 = 2 + b$

$-2 \quad -2$

$2 = b$

$y = 1x + 2$

8. $(0,7)$ & $(3,1)$

$m = \frac{1-7}{3-0} = \frac{-6}{3} = -2$

$y = -2x + b$

$1 = -2(3) + b$

$1 = -6 + b$

$+6 \quad +6$

$7 = b$

$y = -2x + 7$

9. $(0,-2)$ & $(4,-3)$

$m = \frac{-3+2}{4-0} = \frac{-1}{4}$

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

$-3 = -\frac{1}{4}(4) + b$

$-3 = -1 + b$

$+1 \quad +1$

$-2 = b$

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

10. $(0,-1)$ & $(5,-5)$

$m = \frac{-5+1}{5-0} = \frac{-4}{5}$

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

$-5 = -\frac{4}{5}(5) + b$

$-5 = -4 + b$

$+4 \quad +4$

$-1 = b$

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

11. $(-2,6)$ & $(0,-4)$

$m = \frac{-4-6}{0+2} = \frac{-10}{2} = -5$

$y = -5x + b$

$-4 = -5(0) + b$

$-4 = 0 + b$

$-4 = b$

$y = -5x - 4$

12. $(-6,-1)$ & $(0,3)$

$m = \frac{3+1}{0+6} = \frac{4}{6} = \frac{2}{3}$

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

$3 = \frac{2}{3}(0) + b$

$3 = 0 + b$

$3 = b$

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

13. $(4,13)$ & $(0,21)$

$m = \frac{21-13}{0-4} = \frac{8}{-4} = -2$

$y = -2x + b$

$21 = -2(0) + b$

$21 = 0 + b$

$21 = b$

$y = -2x + 21$

14. $(0,9)$ & $(3,0)$

$m = \frac{0-9}{3-0} = \frac{-9}{3} = -3$

$y = -3x + b$

$0 = -3(3) + b$

$0 = -9 + b$

$+9 \quad +9$

$9 = b$

$y = -3x + 9$

15. $(0.2,1)$ & $(0,0.6)$

$m = \frac{0.6-1}{0-0.2} = \frac{-0.4}{-0.2} = 2$

$y = 2x + b$

$0.6 = 2(0) + b$

$0.6 = 0 + b$

$0.6 = b$

$y = 2x + 0.6$

OR

$y = 2x + \frac{3}{5}$

16. $(3,3)$ & $(6,4)$

$m = \frac{4-3}{6-3} = \frac{1}{3}$

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

$4 = \frac{1}{3}(6) + b$

$4 = 2 + b$

$-2 \quad -2$

$2 = b$

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

17. $(2,2)$ & $(6,4)$

$m = \frac{4-2}{6-2} = \frac{2}{4} = \frac{1}{2}$

$y = \frac{1}{2}x + b$

$4 = \frac{1}{2}(6) + b$

$4 = 3 + b$

$-3 \quad -3$

$1 = b$

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

18. $(0,3)$ & $(4,2)$

$m = \frac{2-3}{4-0} = \frac{-1}{4}$

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

$2 = -\frac{1}{4}(4) + b$

$2 = -1 + b$

$+1 \quad +1$

$3 = b$

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

19. $(-4,-2)$ & $(-2,-1)$

$m = \frac{-1+2}{-2+4} = \frac{1}{2}$

$y = \frac{1}{2}x + b$

$-1 = \frac{1}{2}(-2) + b$

$-1 = -1 + b$

$+1 \quad +1$

$0 = b$

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

20. $(1,-1)$ & $(-1,3)$

$m = \frac{3+1}{-1-1} = \frac{4}{-2} = -2$

$y = -2x + b$

$3 = -2(-1) + b$

$3 = 2 + b$

$-2 \quad -2$

$1 = b$

$y = -2x + 1$