Section 3.1a – Practice Problems

EMERGING LEVEL QUESTIONS

Complete each statement

1. The formula for the **Point-Slope form** of a line is $y - y_1 = m(x - x_1)$
2. In the equation $y = mx + b$, $(0, b)$ is called the y-intercept
3. The equation $y = mx + b$ is called the Slope-Intercept form
4. The **Standard form** of the equation of a line is $Ax + By = C$

Find the **slope and the y-intercept**

5. $3x - 2y = 6$

$+2y \quad +2y$

$3x = 2y + 6$

$-6 \quad -6$

$\frac{1}{2}\ 3x - 6 = 2y\ \frac{1}{2}$

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

Slope: $\frac{3}{2}$ y-int: -3

6. $4x + 3y = 12$

$-4x \quad -4x$

$\div 3\ 3y = -4x + 12\ \div 3$

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

Slope: $-\frac{4}{3}$ y-int: 4

7. $2x - 5y = -7$

$-2x \quad -2x$

$\div -5\ -5y = -2x - 7\ \div -5$

$y = \frac{2}{5}x + \frac{7}{5}$

Slope: $\frac{2}{5}$ y-int: $\frac{7}{5}$

8. $5x + 2y = 0$

$-5x \quad -5x$

$\div 2\ 2y = -5x\ \div 2$

$y = \frac{-5x}{2} + 0$

Slope: $-\frac{5}{2}$ y-int: 0

9. $x - 4y = -4$

$-x \quad -x$

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

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

Slope: $\frac{1}{4}$ y-int: 1

10. $6x - y = -3$

$-6x \quad -6x$

$-y = -6x - 3$

$\frac{y}{-1} = \frac{-6x + 3}{-1}$

$y = 6x + 3$

Slope: 6 y-int: 3

Rewrite the **Standard Form Equation** in **Slope-Intercept Form**

11. $2x + y = 6$

$-2x \quad -2x$

$y = -2x + 6$

12. $3x - y = 4$

$-3x \quad -3x$

$-y = -3x + 4$

$\div -1 \quad \div -1$

$y = 3x - 4$

13. $4x + 3y = 12$

$-4x \quad -4x$

$3y = -4x + 12$

$3\div \quad \div 3$

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

14. $2x - 3y = 6$

$-2x \quad -2x$

$-3y = -2x + 6$

$\div -3 \quad \div -3$

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

15. $5x + 4y = 3$

$-5x \quad -5x$

$4y = -5x + 3$

$\div 4 \quad \div 4$

$y = \frac{-5}{4}x + \frac{3}{4}$

16. $6x - 3y = 4$

$-6x \quad -6x$

$-3y = -6x + 4$

$\div -3 \quad \div -3$

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

Rewrite the **Slope-Intercept Equation** in **Standard Form** $Ax + By = C$

17. $y = -2x + 1$

$+2x \quad +2x$

$2x + y = 1$

18. $y = 3x - 1$

$-3x \quad -3x$

$-3x + y = -1$

no negative A value

$\div -1 \quad \div -1$

$3x - y = 1$

19. $y = 3x$

$-y \quad -y$

$\boxed{3x - y = 0}$

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

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

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

↑ cannot have (multiply by 3)

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

21. $y = \frac{3}{4}x + 5$

$-\frac{3}{4}x \quad -\frac{3}{4}x$

$-\frac{3}{4}x + y = 5$

$\cdot -4 \qquad \cdot -4$

$\boxed{3x - 4y = -20}$

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

$+\frac{2}{5}x \qquad +\frac{2}{5}x$

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

$\cdot 5 \qquad \cdot 5$

$2x + 5y = 5/2$

$\cdot 2 \qquad \cdot 2$

$\boxed{4x + 10y = 5}$

PROFICIENT LEVEL QUESTIONS

Rewrite the **Point-Slope Equation** in **Slope-Intercept Form**

23. $y - 2 = 3(x + 1)$

$y - 2 = 3x + 3$

$y = 3x + 3 + 2$

$\boxed{y = 3x + 5}$

24. $y + 4 = -2(x - 1)$

$y + 4 = -2x + 2$

$y = -2x + 2 - 4$

$\boxed{y = -2x - 2}$

25. $y-1=\frac{1}{3}(x+2)$

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

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

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

$y=\frac{1}{3}x+\frac{5}{3}$

26. $y+4=-\frac{2}{5}(x-3)$

$y+4=-\frac{2}{5}x+\frac{6}{5}$

$y=-\frac{2}{5}x+\frac{6}{5}-\frac{20}{5}$

$y=-\frac{2}{5}x-\frac{14}{5}$

27. $y-\frac{2}{3}=\frac{1}{4}(x-8)$

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

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

$y=\frac{1}{4}x-\frac{6}{3}+\frac{2}{3}$

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

28. $y-\frac{1}{4}=\frac{1}{2}\left(x+\frac{2}{3}\right)$

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

$y=\frac{1}{2}x+\frac{1}{3}+\frac{1}{4}$

$y=\frac{1}{2}x+\frac{4}{12}+\frac{3}{12}$

$y=\frac{1}{2}x+\frac{7}{12}$

Rewrite the **Point-Slope Equation** in **Standard Form** $Ax+By=C$

29. $y-2=3(x+1)$

$y-2=3x+3$

$-2=3x-y+3$

$-5=3x-y$

$3x-y=-5$

30. $y+4=-2(x-1)$

$y+4=-2x+2$

$2x+y=-2$

31. $y-1=\frac{1}{3}(x+2)$

$\times 3$

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

$3y-3=x+2$

$-3y \quad -3y$

$x-3y=-5$

$-3=x-3y+2$

$-2 \quad -2$

32. $y+4=-\frac{2}{5}(x-3)$

$\times 5$

$5y+20=-2(x-3)$

$5y+20=-2x+6$

$+2x \quad -20 \quad +2x \quad -20$

$2x+5y=-14$

33. $y-\frac{2}{3}=\frac{1}{4}(x-8)$

$\times 12$

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

$12y-8=3x-24$

$-12y \quad +24 \quad -12y \quad +24$

$16=3x-12y$

$3x-12y=16$

34. $y-\frac{1}{4}=\frac{1}{2}\left(x+\frac{2}{3}\right)$

12

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

$12y-3=6x+4$

$-12x \quad -12y$

$-3=6x-12y+4$

$-4 \quad -4$

$-7=6x-12y$

same as

$6x-12y=-7$

EMERGING LEVEL QUESTIONS

Write the equation of each line in **slope-intercept form**

35. $(0,2); m=2$

y-int ↑ slope ↑

$y=mx+b$

$y=2x+2$

36. $(0,-3); m=\frac{1}{2}$

y-int ↑ slope ↑

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

37. $(0, 3); m = 0$

y-int ↑ ↑ slope! Horizontal Line

$y = 3$

38. $(0, -2); m = -\frac{2}{3}$

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

39. $\left(0, -\frac{1}{2}\right); m = -\frac{3}{4}$

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

40. $(0, 2.3); m = 0.4$

$y = 0.4x + 2.3$

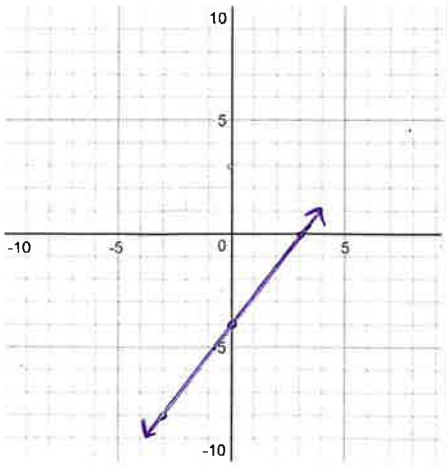
Graph the Linear Equations

41. $4x - 3y = 12$

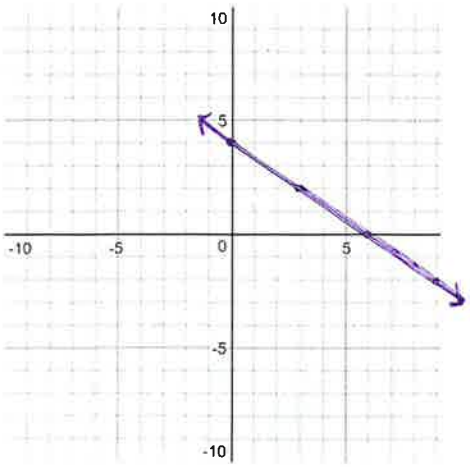
when $x = 0$, $y = -4$

when $y = 0$, $x = 3$

when $x = -3$, $y = -8$



42. $y = -\frac{2}{3}x + 4$ ← slope, y-int



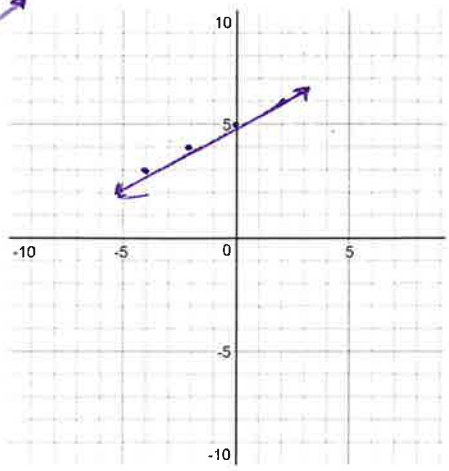
Point-Slope

PROFICIENT LEVEL QUESTIONS

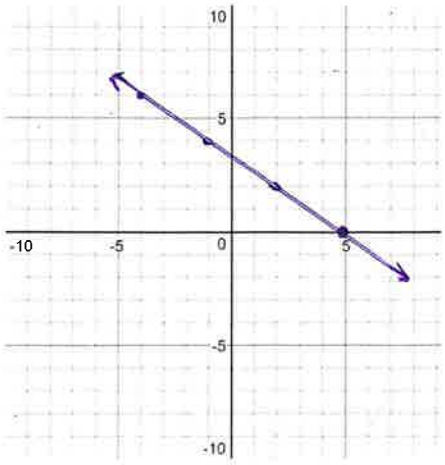
43. $y - 3 = \frac{1}{2}(x + 4)$

slope

point
(-4, 3)



44. $2x + 3y = 10$



when $y = 0$
$x = 5$
↑
perfect point

$3y = -2x + 10$

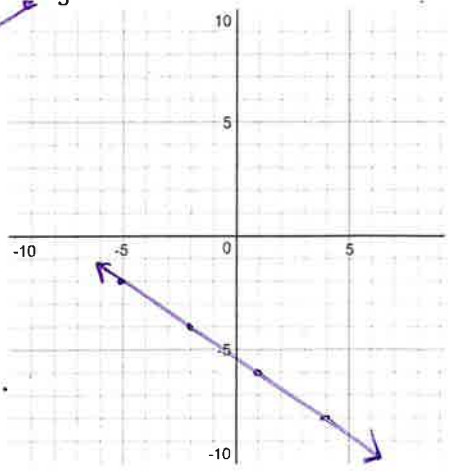
$y = -\frac{2}{3}x + \frac{10}{3}$

slope

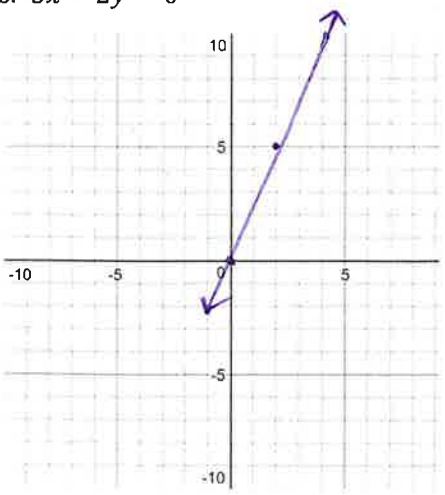
45. $y + 2 = -\frac{2}{3}(x + 5)$

slope

point
(-5, -2)



46. $5x - 2y = 0$



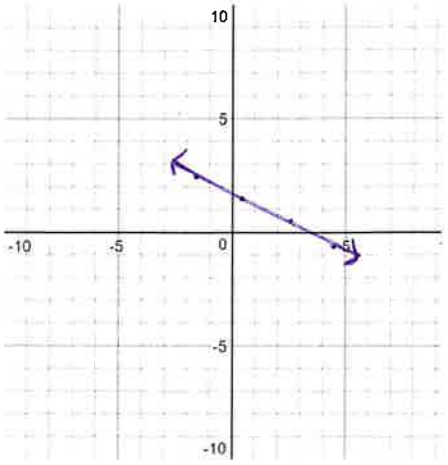
when
$x = 0$
$y = 0$

$-2y = -5x$

$y = \frac{5}{2}x$ ← slope

EXTENDING LEVEL QUESTIONS

47. $y-\frac{5}{2}=-\frac{1}{2}\left(x+\frac{3}{2}\right)$ ← slope



can we get a perfect point?

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

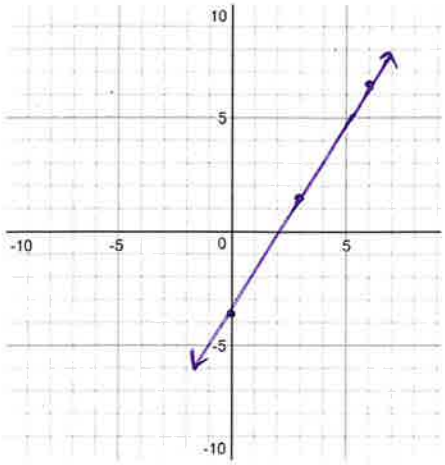
$4y-10=-2x-3$

$2x+4y=7$

not easy so we estimate points

point $\left(-\frac{3}{2},\frac{5}{2}\right)$

48. $y=\frac{5}{3}x-\frac{7}{2}$ ← slope, y-int $\frac{7}{2}=3.5$



$y=\frac{5}{3}x-\frac{7}{2}$

$6y=10x-21$

$10x-6y=21$

not easy so we estimate