2.2 Practice Problems

1. Find the slope of the line passing through each pair of points.

   a. $(5,8)$ and $(7,-12)$

   $m = \frac{-12-8}{7-5} = \frac{-20}{2} = -10$

   b. $(8,-3)$ and $(7,-3)$

   $m = \frac{-3-(-3)}{7-8} = \frac{-3+3}{-1} = \frac{0}{-1} = 0$

2. Find an equation of the line that has a y-intercept of $(0,8)$ and has a slope of $m=-\frac{3}{5}$.

   $y = mx + b$

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

3. Write the point-slope form of the equation of a line with slope 3 that passes through the point $(5,-1)$. Then solve the equation for y.

   $y - y_1 = m(x - x_1)$

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

   $y + 1 = 3x - 15$

   $-1 \quad -1$

   $y = 3x - 16$

4. Write the point-slope from of the question of the line passing through the points $(2,3)$ and $(7,4)$. Then solve the equation for y.

   $m = \frac{4-3}{7-2} = \frac{1}{5}$

   $y - y_1 = m(x - x_1)$

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

   $5(y-3) = 1(x-2)$

   $5y - 15 = x - 2$

   $+15 \quad +15$

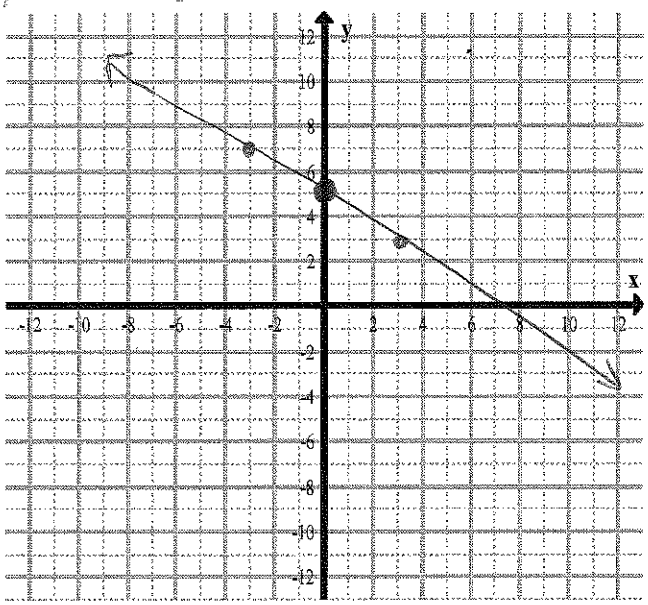
   $\frac{5y}{5} = \frac{x+13}{5}$

   $y = \frac{1}{5}x + \frac{13}{5}$

5. Graph the linear equation. $y=-\frac{2}{3}x+5$

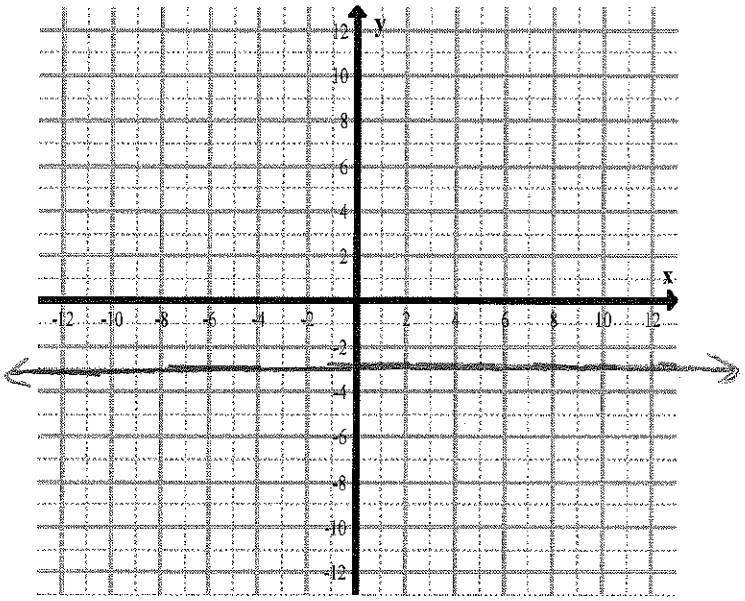
   y-int $(0,5)$

   $m = \frac{-2}{3} = \frac{\text{Rise}}{\text{Run}}$



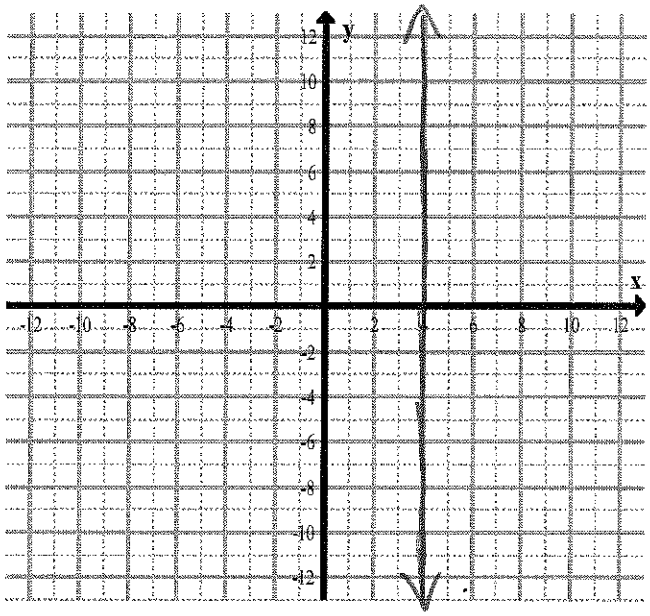
6. Graph the linear equation. $y=-3$.

↑ horizontal line



7. Graph the linear equation. $x=4$.

↑ vertical line



8. Find the slope and y-intercept of a line whose equation is $3x+5y-10=0$.

$3x+5y-10=0$

$-3x \quad +10 \quad -3x+10$

$\frac{5y}{5} = \frac{-3x+10}{5} \quad \frac{10}{5}$

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

y-int $(0,2)$

$m = -\frac{3}{5}$

Use the given conditions to write an equations for each line in point-slope form and slope-intercept form. Use these directions for 9-12.

9. Passing through $(-2,5)$ and parallel to the line whose equation is $y=-4x+9$.

$y-5=-4(x+2)$ ← point slope

$y-5=-4x-8$

$+5 \quad +5$

$y=-4x-3$ ← slope intercept

$m=-4$ ← parallel lines have same slope

10. Passing through $(-1,-3)$ and parallel to the line whose equation is $4x+3y=12$.

$y+3=-\frac{4}{3}(x+1)$ ← point slope

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

$3y+9=-4x-4$

$-9 \quad -9$

$\frac{3y}{3}=-\frac{4x}{3}-\frac{13}{3}$

$y=-\frac{4}{3}x-\frac{13}{3}$ ← slope intercept

$-4x \quad -4x$

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

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

$m=-\frac{4}{3}$ ← parallel lines have the same slope

11. Passing through $(5,-1)$ and perpendicular to the line whose equation is $y=-2x+3$.

$y+1=\frac{1}{2}(x-5)$ ← point slope

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

$2y+2=x-5$

$-2 \quad -2$

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

$y=\frac{1}{2}x-\frac{7}{2}$ ← slope intercept

$m=-2$

$m_{\perp}=\frac{1}{2}$ ← perpendicular lines have negative reciprocal slopes

12. Passing through $(7,1)$ and perpendicular to the line whose equation is $3x+5y=15$.

$y-1=\frac{5}{3}(x-7)$ ← point slope

$3(y-1)=5(x-7)$

$3y-3=5x-35$

$+3 \quad +3$

$\frac{3y}{3}=\frac{5x}{3}-\frac{32}{3}$

$y=\frac{5}{3}x-\frac{32}{3}$ ← slope intercept

$-3x \quad -3x$

$\frac{5y}{5}=\frac{-3x}{5}+\frac{15}{5}$

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

$m=-\frac{3}{5}$

$m_{\perp}=\frac{5}{3}$ ← perpendicular lines have negative reciprocal slopes