MAC1105 College Algebra
2.4 Practice Problems

For each of the following pairs of lines in 1-3, determine whether the lines are parallel, perpendicular, or neither.

1. $y=\frac{1}{2}x-3$; $2x-4y=15$

parallel

$m=\frac{1}{2}$

$-2x \quad -2x$

$\frac{-4y}{-4}=\frac{-2x+15}{-4}\ \frac{}{-4}$

$y=\frac{1}{2}x-\frac{15}{4}$ ← $m=\frac{1}{2}$

parallel lines have the same slope

2. $y=-\frac{2}{3}x+10$; $2x-3y=18$

$m=\frac{-2}{3}$

$-2x \quad -2x$

$\frac{-3y}{-3}=\frac{-2x+18}{-3}\ \frac{}{-3}$

$y=\frac{2}{3}x-6$ ← $m=\frac{2}{3}$

neither

3. $y=\frac{7}{8}x-7$; $8x+7y=14$

perpendicular

$m=\frac{7}{8}$

$-8x \quad -8x$

$\frac{7y}{7}=\frac{-8x+14}{7}\ \frac{}{7}$

$y=-\frac{8}{7}x+2$ ← $m=\frac{-8}{7}$

perpendicular lines have negative recip. slopes

Use the given conditions to write an equations for each line in point-slope form and slope-intercept form. Use these directions for 4-9.

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

$m=-4$ use this slope since we are looking for a parallel line

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

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

$y-5=-4x-8$

$+5 \quad +5$

$y=-4x-3$

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

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

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

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

$-3 \quad -3$

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

$-4x \quad -4x$

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

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

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

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

$m=-2$

use $\frac{1}{2}$ since we want a perp line

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

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

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

$-1 \quad -1$

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

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

$-3x \quad -3x$

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

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

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

use $\frac{5}{3}$ since we want a perp line

$y-1=\frac{5}{3}(x-7)$

$y-1=\frac{5}{3}x-\frac{35}{3}$

$+1 \quad +1$

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

8. Passing through $(-3,5)$ and parallel the x-axis.

lines parallel to the x-axis are horizontal

horizontal lines have an equation $y=\#$

equation: $y=5$

9. Passing through $(7,4)$ and perpendicular to the x-axis.

lines perpendicular to the x-axis are vertical

vertical lines have an equation $x=\#$

equation: $x=7$