KNOW and MEMORIZE slope formula: $\frac{y_2-y_1}{x_2-x_1}$ and slope-intercept form: y = mx + b

Topic 5: Parallel, Perpendicular, or neither?!

For questions 19-21, determine if $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are parallel, perpendicular or neither.

19. $A(-11, 5)$, $B(-8, 4)$, $C(8, -7)$, $D(-1, -4)$

AB: $m = \frac{4-5}{-8--11} = \frac{-1}{3}$

CD: $m = \frac{-4--7}{-1-8} = \frac{3}{-9}$

Slope of $\overleftrightarrow{AB}$	Slope of $\overleftrightarrow{CD}$	Types of Lines
$-\frac{1}{3}$	$-\frac{1}{3}$	∥ (parallel)

20. $A(-3, 8)$, $B(1, 15)$, $C(10, -9)$, $D(3, -5)$

$m = \frac{15-8}{1--3} = \frac{7}{4}$ $m = \frac{-5--9}{3-10} = \frac{4}{-7}$

Slope of $\overleftrightarrow{AB}$	Slope of $\overleftrightarrow{CD}$	Types of Lines
$\frac{7}{4}$	$-\frac{4}{7}$	⊥ (perpendicular)

21. $A(9, -3)$, $B(9, 4)$, $C(-2, 10)$, $D(-2, 6)$

$m = \frac{4--3}{9-9}$ = undef $m = \frac{6-10}{-2--2}$ = undef

Slope of $\overleftrightarrow{AB}$	Slope of $\overleftrightarrow{CD}$	Types of Lines
undef.	undef.	∥ (parallel)

For questions 22-25, determine if the lines are parallel, perpendicular or neither.

22. $6x + 10y = 20$ and $5x - 3y = 21$

$10y = -6x + 20$ $-3y = -5x + 21$

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

perpendicular ⊥

23. $x - y = 4$ and $x + y = 9$

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

$y = x - 4$

perpendicular ⊥

24. $x - 5y = 30$ and $10y = 2x + 90$

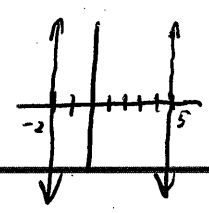
$-5y = -x + 30$ $y = \frac{5}{5}x + 9$

$y = \frac{1}{5}x - 6$

parallel ∥

25. $x = 5$ and $x = -2$

vertical line vertical line



∥

** ∥ means parallel and ⊥ means perpendicular

$y = mx + b$ | $1 = -3 + b$

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

Topic 6: Writing Linear Equations

26. Write a linear equation that passes through the point (-6, 1) with a slope of ½. x y m $\boxed{y = \frac{1}{2}x + 4}$	**27.** Write a linear equation that passes through the points (3, 1) and (-2, 6). $x_1\ y_1$ $x_2\ y_2$ $m = \frac{6-1}{-2-3} = \frac{5}{-5} = -1$ $y = mx + b$ $1 = -1(3) + b$ $1 = -3 + b$ $4 = b$ $y = mx + b$ $y = -1x + 4$ $\boxed{y = -x + 4}$

Write equation of circle equation:

Given Circumference/ Area $C = \pi d$ $C = 2\pi r$ $A = \pi r^2$	**12.** Center: (-1, 4) (h,k) Circumference: 6π $d = 6$, $r = 3$ $C = 2\pi r$ $6\pi = 2\pi r$ $r = 3$ $\boxed{(x+1)^2 + (y-4)^2 = 9}$	**13.** Center: (9, 12) (h, k) Circumference: 17π $d = 17$, $r = 8.5$ $C = 2\pi r$ $17\pi = 2\pi r$ $8.5 = r$ $(x-9)^2 + (y-12)^2 = 72.25$
	14. Center: (-8, -11) Area: 16π $r = 4$ $(x+8)^2 + (y+11)^2 = 16$	**15.** Center: (2, -2) Area: 361π $r^2 = 361$ $(x-2)^2 + (y+2)^2 = 361$

Write equation of circle equation:

Given center and point on circle h k x y

① Find radius r

② write equation

$(x-h)^2 + (y-k)^2 = r^2$

10. Center: (2, -6); Point on Circle: (1, 10) $(x-h)^2 + (y-k)^2 = r^2$ $(1-2)^2 + (10--6)^2 = r^2$ $1 + 16^2 = r^2$ $257 = r^2$ $\boxed{(x-2)^2 + (y+6)^2 = 257}$	
11. Center: (-2, 0); Point on Circle: (-9, -4) h k x y $(x-h)^2 + (y-k)^2 = r^2$ $(-9+2)^2 + (-4-0)^2 = r^2$ $7^2 + 4^2 = r^2$ $65 = r^2$ $\boxed{(x+2)^2 + (y-0)^2 = 65}$	

Given the Center and a Point on the Circle

8. Center: (9, 10), Point on Circle: (7, 4) h k x y $(x-h)^2 + (y-k)^2 = r^2$ $(7-9)^2 + (4-10)^2 = r^2$ $2^2 + 6^2 = r^2$ $40 = r^2$ $\boxed{(x-9)^2 + (y-10)^2 = 40}$	
9. Center: (1, -5), Point on Circle: (-7, -13) $(x-h)^2 + (y-k)^2 = r^2$ $(-7-1)^2 + (-13+5)^2 = r^2$ $8^2 + 8^2 = r^2$ $128 = r^2$ $\boxed{(x-1)^2 + (y+5)^2 = 128}$	