1 The slope of line $\ell$ is $-\frac{1}{3}$. What is an equation of a line that is perpendicular to line $\ell$?  
1) $y + 2 = \frac{1}{3}x$  
2) $-2x + 6 = 6y$  
3) $9x - 3y = 27$  
4) $3x + y = 0$  

2 Which equation represents a line that is perpendicular to the line represented by $y = \frac{2}{3}x + 1$?  
1) $3x + 2y = 12$  
2) $3x - 2y = 12$  
3) $y = \frac{3}{2}x + 2$  
4) $y = -\frac{2}{3}x + 4$  

3 Which equation represents a line that is perpendicular to the line whose equation is $-2y = 3x + 7$?  
1) $y = x + 7$  
2) $2y = 3x - 3$  
3) $y = \frac{2}{3}x - 3$  
4) $y = \frac{3}{2}x - 3$  

4 Which equation represents a line perpendicular to the line whose equation is $2x + 3y = 12$?  
1) $6y = -4x + 12$  
2) $2y = 3x + 6$  
3) $2y = -3x + 6$  
4) $3y = -2x + 12$  

5 Which equation represents a line that is perpendicular to the line represented by $2x - y = 7$?  
1) $y = -\frac{1}{2}x + 6$  
2) $y = \frac{1}{2}x + 6$  
3) $y = -2x + 6$  
4) $y = 2x + 6$  

6 Which line is perpendicular to the line whose equation is $5y + 6 = -3x$?  
1) $y = -\frac{5}{3}x + 7$  
2) $y = \frac{5}{3}x + 7$  
3) $y = -\frac{3}{5}x + 7$  
4) $y = \frac{3}{5}x + 7$  

7 Given two lines whose equations are $3x + y - 8 = 0$ and $-2x + by + 9 = 0$, determine the value of $b$ such that the two lines will be perpendicular.
1 ANS: 3
The slope of $9x - 3y = 27$ is $m = \frac{-A}{B} = \frac{-9}{-3} = 3$, which is the opposite reciprocal of $-\frac{1}{3}$.

REF: 081225ge

2 ANS: 1
The slope of $3x + 2y = 12$ is $-\frac{3}{2}$, which is the opposite reciprocal of $\frac{2}{3}$.

REF: 081811geo

3 ANS: 3
Divide the equation $-2y = 3x + 7$ by -2 to transform to the slope intercept form, and note that $m = -\frac{3}{2}$.
Perpendicular lines have slope that are the opposite and reciprocal of each other. The slope of $y = \frac{2}{3}x - 3$ is $\frac{2}{3}$.

REF: 060528a

4 ANS: 2
The slope of $2x + 3y = 12$ is $m = \frac{-A}{B} = \frac{-2}{3}$. The slope of a perpendicular line is $\frac{3}{2}$. Rewritten in slope intercept form, (2) becomes $y = \frac{3}{2}x + 3$.

REF: 060926ge

5 ANS: 1
$m = \frac{-A}{B} = \frac{-2}{-1} = 2$

$m_{\perp} = -\frac{1}{2}$

REF: 061509geo

6 ANS: 2
Transform the equation $5y + 6 = -3x$ to $3x + 5y = -6$. $m = \frac{-A}{B} = -\frac{3}{5}$. The slope of $y = \frac{5}{3}x + 7$ is $\frac{5}{3}$.

REF: 080630a
6. The slope of the line $3x + y - 8 = 0$ is $m = -\frac{A}{B} = -\frac{3}{1} = -3$. The slope of a line perpendicular to $3x + y - 8 = 0$ would have a slope the opposite and reciprocal of -3, or $\frac{1}{3} = -\frac{-2}{b}$. 

REF: fall9925b