

**G.GPE.B.5: Parallel and Perpendicular Lines 5**

- 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  $y - 3x = 4$ ?
  - 1)  $y = -\frac{1}{3}x - 4$
  - 2)  $y = \frac{1}{3}x + 4$
  - 3)  $y = -3x + 4$
  - 4)  $y = 3x - 4$
- 4 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)  $y = \frac{3}{2}x - 3$
- 5 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)  $3y = -2x + 12$
- 6 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)  $y = 2x + 6$
- 7 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)  $y = \frac{3}{5}x + 7$
- 8 What is an equation of a line that is perpendicular to the line whose equation is  $2y + 3x = 1$ ?
  - 1)  $y = \frac{2}{3}x + \frac{5}{2}$
  - 2)  $y = \frac{3}{2}x + 2$
  - 3)  $y = -\frac{2}{3}x + 1$
  - 4)  $y = -\frac{3}{2}x + \frac{1}{2}$
- 9 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.

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### Answer Section

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: 1

$y = 3x + 4$ ,  $m = 3$ ,  $m_{\perp} = -\frac{1}{3}$

REF: 012405geo

4 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

5 ANS: 2

The slope of  $2x + 3y = 12$  is  $-\frac{A}{B} = -\frac{2}{3}$ . 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

6 ANS: 1

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

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

REF: 061509geo

7 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

8 ANS: 1

$$m = \frac{-A}{B} = \frac{-3}{2} \quad m_{\perp} = \frac{2}{3}$$

REF: 081908geo

9 ANS:

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  $\frac{1}{3}$ .  $\frac{1}{3} = -\frac{-2}{b}$ .  
 $b = 6$

REF: fall9925b