

**Answer on Question #56021 – Math – Algebra**

14. Which of the following is the equation of the line perpendicular to the line  $y = -10x + 1$ , passing through the point (5,7)?

A:  $x - y = -10$

$x - y = -10$

B:  $x + y = 12$

$x + y = 12$

Yes B and C are the same for some reason.

C:  $x + y = 12$

$x + y = 12$

D:  $x - y = 12$

$x - y = 12$

**Solution**

$y = -10x + 1$   
 $10x + y - 1 = 0$

the normal vector to this line has coordinate (10, 1)

the vector orthogonal to this normal is (1, -10) because their dot product

$\langle (10, 1), (1, -10) \rangle = 10 - 10 = 0$ .

so the orthogonal line has the following equation:

$x - 10y + d = 0$ .

To find d, recall that the line passing through the point (5,7), so  $5 - 10 \cdot 7 + d = 0$ ,  $d = 65$ .

the equation of orthogonal line is  $x - 10y + 65 = 0$ .

**Answer:** the line perpendicular to the line  $y = -10x + 1$ , passing through the point (5,7), is  $x - 10y + 65 = 0$ .

16. How many solutions does the following system of equations have?

$Y = \frac{5}{2}x + 2$

$2y = 5x + 8$

A: one

B: two

C: Zero

D: Infinitely many.

**Solution**

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

Multiply by 2

$$2y = 5x + 4;$$

Equivalent system of equations is

$$2y = 5x + 4$$

$$2y = 5x + 8;$$

Subtract the first equation from the second one

$$2y - 2y = 5x - 5x + 8 - 4$$

$$0 = 4$$

it is impossible.

**Answer:** zero

17. Assume  $f(x) = -2x + 8$  and  $g(x) = 5x$ , what is the value of  $(f - g)(2)$ ?

**Solution**

$$(f - g)(2) = f(2) - g(2) = -2 \cdot 2 + 8 - 5 \cdot 2 = -4 + 8 - 10 = -6,$$

**Answer:** -6.