[12-02-15-T]

Linear function.

■ **All answers must be in standard form: $a\,x + b\,y = c$, where a, b, c are integers.**

[1] Graph the lines $\ell_1 : 3\,x + y = -2$ and $\ell_2 : 3\,x - 2\,y = 1$. Then find, algebraically, the point at which the two lines intersect. If the lines do not intersect, say so.

[2] Graph the lines $\ell_1 : y = 2\,x - 3$ and $\ell_2 : y = 3\,x + 1$. Then find, algebraically, the point at which the two lines intersect. If the lines do not intersect, say so.

[3] Graph the lines $\ell_1 : y = 5$ and $\ell_2 : x = 10$. Then state the point at which the two lines intersect.

[4] Graph the lines $\ell_1 : 3x + y = 3$ and $\ell_2 : -6x - 2y = -1$. Then find, algebraically, the point at which the two lines intersect. If the lines do not intersect, say so.

[5] Find the y-intercept of the line ℓ through $P(2, -5)$ that is *perpendicular* to the line $\ell_1 : x - 5y = 2$.

[6] Find the equation of the line ℓ that is *perpendicular* to the line $\ell_1 : 3x - 5y = 7$ at the point $P(2, \frac{-1}{5})$.

Answers

■ **All answers must be in standard form: $a x + b y = c$, where a, b, c are integers.**

[1] $(x,\ y) = (\frac{-1}{3},\ -1)$

[2] $(x,\ y) = (-4,\ -11)$

[3] $(x,\ y) = (10,\ 5)$

[4] These lines do not intersect. How could you have known that almost *by inspection*?

[5] $y + 5 = 5(x - 2) \Longleftrightarrow y + 5 = 5x - 10 \Longleftrightarrow y = 5x - 15$, $\therefore$ The y-intercept is -15.

[6] $y + \frac{1}{5} = \frac{5}{3}(x - 2) \Longleftrightarrow 15y + 3 = 25(x - 2) \Longleftrightarrow 15y + 3 = 25x - 50 \Longleftrightarrow 25x - 15y = 53$.