GLOBAL INDIAN SCHOOL , AJMAN

GRADE X	WORKSHEET [ANSWER KEY]	MATHEMATICS

CHAPTER 3 : PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

LEVEL 1	
1	(c) y = 6
2	(a) unique solution
3	(b) 5, 1
4	$149x - 330y = -511$ -------(1) $-330x + 149y = -32$. --------(2) (1) + (2) $\Rightarrow -181x - 181y = -543$ $(\div -181)$ $\Rightarrow x + y = 3$ ------(3) (1) – (2) $\Rightarrow 479x - 479y = -479$ $(\div 479)$ $\Rightarrow x - y = -1$ ------(4) Solve (3) and (4) $\Rightarrow x = 1,\ y = 2$
5	Let Ritu's speed of rowing in still water and the speed of the stream be x km/h and y km/h respectively. Ritu's speed of rowing; Upstream = (x - y) km/h & Downstream = (x + y) km/h According to question, Ritu can row downstream 20 km in 2 hours, $\Rightarrow$ 2(x + y) = 20 [Since, Distance = Speed × Time] $\Rightarrow$ x + y = 10 ....(1) Ritu can row upstream 4 km in 2 hours, $\Rightarrow$ 2(x - y) = 4 $\Rightarrow$ x - y = 2 ....(2)

	Solving (1) and (2), we obtain x = 6 & y = 4 Hence, Ritu's speed of rowing in still water is 6 km/h and the speed of the stream is 4 km/h.
6	According to the question, equations are x + 3y = 13.....(1) & x + y = 7.....(2) From (1), x = 13 -3y put the value of x in (2) ⇒3(13−3y) + y =7 ⇒39−9y+y=7 ⇒ −8y=−32 ⇒ y=4 put the value of y in x=13−3y ⇒x =13−(3×4) ⇒x=1 ⇒x = 1, y = 4
LEVEL 2	
7	(d) no solution
8	(d) 36
9	(c) (0, 0) [Solve : $ax + by = 0$ & $ax – by = 0$]
10	**(i)** px + qy = p - q ....(1) qx - py = p + q ....(2) Multiplying (1) by p and (2) by q, we obtain $p^2 x + pqy = p^2 - pq$ ....(3) $q^2 x - pqy = pq + q^2$ ....(4) Adding equations (3) and (4), we obtain $p^2x + q^2x = p^2 + q^2$ $(p^2 + q^2) x = p^2 + q^2$ $x = (p^2 + q^2)/p^2+ q^2 = 1$

Substituting x =1 in equation (1), we obtain y = - 1

Therefore, x = 1 and y = - 1

(ii)

$(a - b)x + (a + b)\, y = a^2 - 2ab - b^2$ ....(1)

$(a + b)(x + y) = a^2 + b^2$ ....(2)

By solving equation (2), we obtain

$(a + b)(x + y) = a^2 + b^2$

$(a + b)x + (a + b)\, y = a^2 + b^2$ ....(3)

Subtracting equation (3) from (1), we obtain

$(a - b)x - (a + b)x = (a^2 - 2ab - b^2) - (a^2 + b^2)$

$[(a - b) - (a + b)]\, x = a^2 - 2ab - b^2 - a^2 - b^2$

$[a - b - a - b]\, x = -2ab - 2b^2$

$-2bx = -2b\,(a + b)$

$x = (a + b)$

Substituting x = (a + b) in equation (1), we obtain

$(a - b)(a + b) + (a + b)\, y = a^2 - 2ab - b^2$

$(a^2 - b^2) + (a + b)\, y = a^2 - 2ab - b^2$

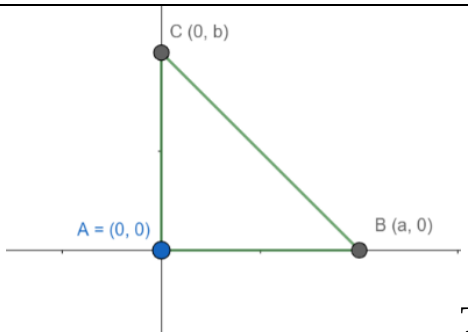
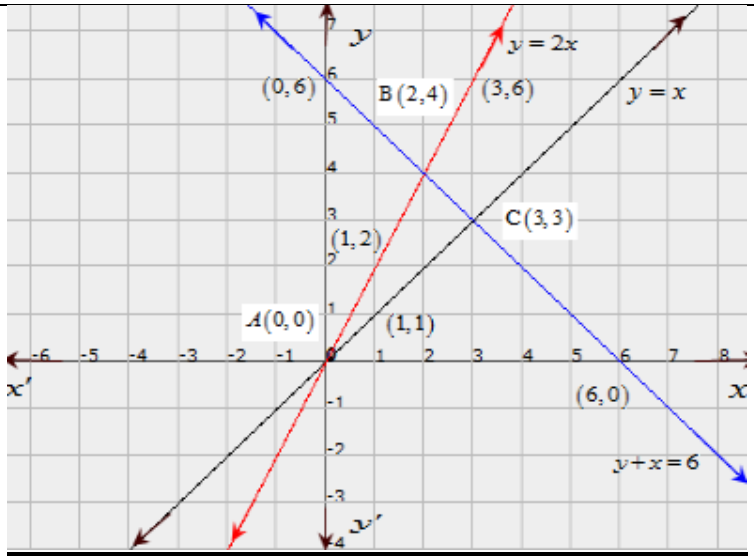
$(a + b)\, y = a^2 - 2ab - b^2 - (a^2 - b^2)$

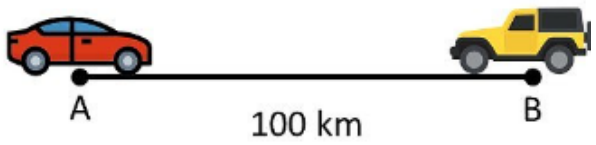
$(a + b)\, y = a^2 - 2ab - b^2 - a^2 + b^2$

$y = -2ab/(a + b)$

Hence, $x = a + b$, $y = \frac{-2ab}{a+b}$

11	Let x be the number of right answers and y be the number of wrong answers. ∴ According to the question , $3x-y=40 \longrightarrow (i)$ and , $2x-y=25 \longrightarrow (ii)$ On subtraction : $x=15$ putting the value of x in $\longrightarrow (i)$ $3(15)-y=40y=5$ ∴ Number of right answers=15 answers Number of wrong answers=5 answers. Total Number of questions 5+15=20
12	Let the number of rows be x and number of students in a row be y. Total students of the class= Number of rows × Number of students in a row = xy **Case 1** Total number of students $=(x-1)(y+3)$ $\Rightarrow xy = (x-1)(y+3) = xy-y+3x-3$ $\Rightarrow 3x-y-3 = 0$ $\Rightarrow 3x-y = 3$..... (i) **Case 2** Total number of students $=(x+2)(y-3)$ $\Rightarrow xy = xy+2y-3x-6$ $\Rightarrow 3x-2y = -6$..... (ii) Subtracting equation (ii) from (i), $\Rightarrow (3x-y)-(3x-2y) = 3-(-6)$ $\Rightarrow -y+2y=3+6$ $\Rightarrow y=9$ By substituting value of y in (i), we get

	⇒3x−9=3 ⇒3x=9+3=12 ⇒x=4 Number of rows , x = 4 Number of students in a row, y = 9 Number of total students in a class , xy = 4×9 = 36
LEVEL 3	
13	(c) $k \neq \sqrt{3}$
14	 The area of the triangle = $\frac{1}{2}$ ab [opt (c)]
15	(a) $\alpha = -6$
16	 It is seen that the coordinates of the vertices of the obtained triangle are A(0,0), B(2,4), C(3,3)
17	Case 1 

	when the car travel in same direction, Relative Speed is x − y Dist = 100km, t = 5 hours 100 = (x−y)5 (∴ Dist =S×T) x – y = 20⟶ (1) Case 2:  when car travel in opposite direction, Relative Speed is x + y Dist = 100km, t = 1 hours 100 = (x+y)1 x + y = 100⟶(2) Solving (1) & (2) Speed of the car at A = 60 km/h, Speed of the car at B = 40 km/h & The difference of speeds is 20 km/h
18.	Let the speed of the train be xkm/h and the time taken by train to travel the given distance be t hours and the distance to travel be d km. We know that, Distance (d) = Speed x Time **Case 1** ⇒(x+10)×(t−2)=d ⇒xt+10t−2x−20=d ⇒d+10t−2x−20=d ⇒−2x+10t=20..... (1) **Case 2** ⇒(x−10)×(t+3)=d ⇒xt−10t+3x−30=d

	$\Rightarrow d-10t+3x-30=d$ $\Rightarrow 3x-10t=30$..... (2) Solving (1) and (2), we gets $\Rightarrow x = 50$ & $t = 12$ hours Distance covered, $d = xt = 12\times50 = 600$Km Hence, the distance covered by the train is 600km.