

IG-0606,  
Additional Maths.

Simultaneous Equations  
Exercise.

Suresh Goel  
(Director)  
Alliance World School,  
Noida, Delhi, NCR, India.

Q1 Solve:  $xy = 3$  SP-20/02/Q1  
 $x^4 y^5 = 486$  --- [3]

Q2 Solve the following simultaneous equations for  $x$  and  $y$ , giving each answer in its simplest surd form,  
 $\sqrt{3}x + y = 4$  --- [5]  
 $x - 2y = 5\sqrt{3}$  W-17/21/Q4

Q3 Solve the simultaneous equations:  
 $\log_2(x+4) = 2 \log_2 y$  --- [5]  
 and  $\log_2(7y-x) = 4$  W-17/22/Q4

Q4 Solve the simultaneous equations:  
 $\log_3(x+1) = 1 + \log_3 y$  --- [5]  
 $\log_3(x-y) = 2$  W-17/23/Q4

Q5 Find the coordinates of the points of intersection of the curve  $4 + \frac{5}{y} + \frac{3}{x} = 0$  and the line  $y = 15x + 10$  --- [6]  
S-16/22/Q8

Q6 Solve the simultaneous equations  
 $3x^2 - xy + 2y^2 = 16$  -- [5]  
 $2y - x = 4$  M-15/22/Q3

Q7 Solve the simultaneous equations:  
 $2x^2 + 3y^2 = 7xy$  --- [5]  
 $x + y = 4$  S-15/22/Q5

Q8 Solve the following simultaneous equations, giving your answers for both  $x$  and  $y$  in the form  $a + b\sqrt{3}$ , where  $a$  and  $b$  are integers.  
 $2x + y = 9$  --- [5]  
 $\sqrt{3}x + 2y = 5$  W-15/23/Q4

my companion

Q9 Find the coordinates of the points of intersection of the curve  $\frac{8}{x} - \frac{10}{y} = 1$  and line  $x+y=9$  [S-14/23/Q6] --[6]

Q10 Solve the following simultaneous equations:  
 $\log_2(x+3) = 2 + \log_2 y$  and  $\log_2(x+y) = 3$  --[5]  
[W-14/21/Q3]

Q11 Solve the simultaneous equations  
 $\frac{4^x}{256^y} = 1024$  and  $3^{2x} \times 9^y = 243$  ---[5]  
[W-13/21/Q5]

Answers

Q1  $(xy)^4 \cdot y = 486$  from eqn (2)  
 $81y = 486 \Rightarrow y = 6, x = \frac{1}{2}$  ✓

Q6 Eliminate y;  $3x^2 + 2x - 8 = 0$   
 $\rightarrow x = \frac{4}{3}$  and  $-2$   
 $y = \frac{8}{3}$  and  $1$

Q2  $x - 2(4 - \sqrt{3}x) = 5\sqrt{3}$   
 $x = \frac{5\sqrt{3} + 8}{2\sqrt{3} + 1}, \frac{2\sqrt{3} - 1}{2\sqrt{3} - 1}$   
or  $x = 2 + \sqrt{3}; y = 1 - 2\sqrt{3}$

Q7 Eliminate y;  $12x^2 - 52x + 48 = 0$   
 $x = \frac{4}{3}$  and  $3$   
 $y = \frac{8}{3}$  and  $1$

Q3  $x + 4 = y^2$   
and  $7y - x = 16$   
 $\rightarrow 7y + 4 - 16 = y^2$   
 $y^2 - 7y + 12 \rightarrow (y-3)(y-4) = 0$   
 $y = 3, 4$   
 $y = 3, x = 5$  or  $y = 4, x = 12$

Q8  $x(4 - \sqrt{3}) = 13$   
 $\Rightarrow x = \frac{13}{4 - \sqrt{3}} \times \frac{4 + \sqrt{3}}{4 + \sqrt{3}} = (4 + \sqrt{3})$  ✓  
 $x = (4 + \sqrt{3})$  and  $y = (1 - 2\sqrt{3})$  ✓

Q4  $\log_3 3 = 1$  and  $\log_3 9 = 2$   
 $\therefore x + 1 = 3y$  and  $x - y = 9$   
solving;  $x = 14; y = 5$

Q9 Eliminate y;  $x^2 - 27x + 72 = 0$   
 $x = 3$  ;  $x = 24$   
 $y = 6$  ;  $y = -15$

Q5, Eliminate y;  $4 + \frac{5}{15x+10} + \frac{3}{x} = 0$   
 $\rightarrow 60x^2 + 90x + 30 = 0$   
 $x = -\frac{1}{2}, x = -1$   
 $y = 2\frac{1}{2}$  ;  $y = -5$

Q10  $\log_2(x+3) = 2 + \log_2 y \Rightarrow x+3 = 4y$   
and  $\log_2(x+y) = 3 \Rightarrow x+y = 8$   
 $\Rightarrow x+3 = 4(8-x) \Rightarrow x = 5.8, y = 2.2$  ✓

Q11  $x - 4y = 5$  and  $2y + 2x = 5$   
 $\therefore x = 3$  ;  $y = -0.5$  ✓

