Backwards Formulas

1. $P(3,4)$ is the midpoint of $A(1,1)$ and $B(x,y)$. Calculate the point B.

2. Given the points $P(2,-1)$ and $Q(x,3)$, if $|PQ|$ is 5 units, find two possible values for x.

3. Given the points $A(3,2)$ and $B(-2,y)$, if the slope of the line AB is $\frac{3}{2}$, calculate the correct value for y.

4. The equation of the line l is $ax - 2y + 5 = 0$. Calculate the correct value for a, given that the point $(-1,5)$ is on the line l.

5. The line j contains the points $(3,-5)$ and $(x,3)$. If the line $4x + 3y + 9 = 0$ is parallel to the line j, find the correct value for x.

6. The line $a : 3x + 2y - 5 = 0$ and the line $b : 4x - ky + 7 = 0$ are perpendicular. Calculate the correct value for k.

7. The line k contains the points $(5,-4)$ and $(-3,7)$. The equation of the line l is $tx - 22y - 11 = 0$. If k is perpendicular to l, find the correct value for t.

8. $A(1,2)$ and $B(3,-2)$ and $C(x,5)$ are three points such that the area of the triangle ABC is 13 square units. Find two possible values for x.

9. Find in terms of t, the co-ordinates where the line $2x - 5y - t = 0$ cuts the x and y axes. If the area of the triangle formed by the line $2x - 5y - t = 0$ and the x and y axes is 20 square units, find the value of t, given $t > 0$.

10. l is the line $3x + 4y - 6 = 0$. If the perpendicular distance from the line l to the point $(k,-2)$ is 4 units, find two possible values for k.

11. j is the line $5x + 12y + c = 0$. If the perpendicular distance from the line j to the point $(2,-5)$ is 3 units, find two possible values for c.

12. Find the slopes of the two lines which make an angle of $45°$ with the line $2x + 3y - 17 = 0$

13. Find the value of a if the line $ax + 2y - 6 = 0$ makes an anle of $45°$ with the line $3y = x + 21$

14. What is the equation of any line parallel to $4x + 3y + 8 = 0$?
    Hence, find the equations of two lines which are parallel to the line $4x + 3y + 8 = 0$ and 5 units from it?

15. What is the equation of any line perpendicular to $12x - 5y + 7 = 0$?
    Hence, find the equations of the two lines which are perpendicular to $12x - 5y + 7 = 0$, and are a distance of 3 units from the point (-2,3).

16. What is the equation of any line perpendicular to $3x + 4y - 7 = 0$?
    Hence, find the equations of the two lines which are perpendicular to $3x + 4y - 7 = 0$ and are a distance of 4 units from the point (4,-2).

17. Using the formula $y - y_1 = m(x - x_1)$, write down, in terms of m, the equation of any line containing the point (-2,6).
    Hence, find the equations of the two lines which contain the point (-2,6), and are a distance of 6 units from the **origin**.

18. Find the equations of the two lines which contain the point (2,3) and are a distance of 2 units from the point (1,1).

19. Find the equations of the two lines which contain the point (-1,5) and are a distance of 2 units from the point (-4,7).

20. Find the equations of the lines which contain the point (3,-7) and make an angle of $45°$ with the line $2x - 3y + 8 = 0$?

21. Find the equations of the lines which contain the point (-5,3) and make an angle of $45°$ with the line $x + 2y - 7 = 0$?