Line Revision Sheet (Higher Level):

Level 1: The formulae

**For questions 1 to 4 below:** $A(2,-1)$, $B(-3,4)$, $C(-4,-2)$, $D(5,2)$

Q1. (i) Find the distance between $A$ and $B$.
(ii) Find the length of the line segment joining $C$ to $D$.
(iii) Find $|AC|$.
(iv) Find |BD|, giving your answer in surd form.

Q2. (i) Find the midpoint of $AB$.
(ii) Find the midpoint of $CD$.

Q3. (i) Find the slope of the line through $A$ and $B$.
(ii) Find the slope of the line $CD$.

Q4. (i) Find the equation of the line with slope 3 that passes through the point $A$.
(ii) Find the equation of the line with slope $\frac{2}{3}$ that passes through the point $C$. Write your answer in the form $ax + by + c = 0$
(iii) Find the equation of the line $AD$.
(iv) Find the equation of the line $CD$. Write your answer in the form $ax + by + c = 0$

Level 2:

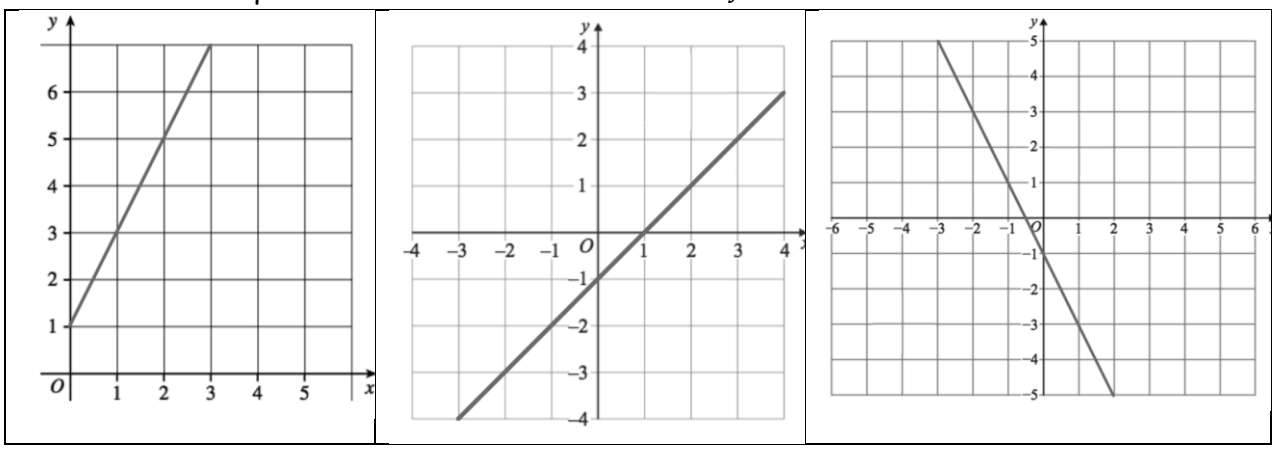
Q5. The equation of the line $k$ is $2x - 3y + 6 = 0$.
(i) Check if the point $(2,1)$ is on the line $k$ or not.
(ii) Write down 3 points that are on the line $k$.
(iii) Find where the line $k$ crosses the $x$ and $y$ axes.
(iv) Using your answers from part (iii), sketch the line $k$.

Q6. The equation of the line $p$ is $x + 2y - 8 = 0$.
(i) Check if the point $(5,-2)$ is on the line $p$ or not.
(ii) Write down 3 points that are on the line $p$.
(iii) Find where the line $p$ crosses the $x$ and $y$ axes.
(iv) Hence, sketch the line $p$.

Q7. Sketch the following lines:
(i) $y = 2x - 1$ (ii) $y = -3x + 2$ (iii) $y = 3x - 2$ (iv) $y = 3$ (iv) $x = -2$

Q8. Write down the slopes of the following lines:
(i) $y = 5x - 3$ (ii) $2x - y - 1 = 0$ (iii) $3x + 2y + 8 = 0$ (iv) $2x + 5y = 3$

Q9. Write down the equations of these lines in the form $y = mx + c$:




Q10. Find where the lines $2x + 3y = 12$ and $7x - 2y = 17$ intersect.

Q11. Find where the lines $3x + 2y = -6$ and $5x + 4y = -8$ intersect.

Level 3:

Q12. Write down the slope of the line that is parallel to the line $2x - y + 3 = 0$.

Q13. Write down the slope of the line that is perpendicular to the line $3x + y - 4 = 0$.

Q14. Write down the slope of the line that is parallel to the line $4x + y - 1 = 0$.

Q15. Write down the slope of the line that is perpendicular to the line $x - 5y + 2 = 0$.

Q16. $A$ is the point $(1, -2)$, $B$ is the point $(7, 4)$ and $C$ is the point $(4,1)$.
(i) Verify that $C$ is the midpoint of $AB$.
(ii) Find the equation of the line $w$ that passes through the point $(6, -2)$ and is parallel to $AB$.
(ii) Find the equation of the line $q$ that passes through the point $C$ and is perpendicular to $AB$. Give your answer in the form $ax + by + c = 0$.

Q17. $D$ is the point $(2, -3)$, $E$ is the point $(-4, 2)$ and $F$ is the point $(-2, -1)$.
(i) Find the equation of the line $k$ that passes through the point $D$ and is parallel to $EF$. Give your answer in the form $ax + by + c = 0$.
(ii) Find the equation of the line $l$ that passes through the point $E$ and is perpendicular to $DF$.

Level 4:

Q18. If $A(-2,4)$ and $B(3, -2)$ are two points, find the equation of the perpendicular bisector of $AB$.

Q19. $l$ is the line $3x - 4y + 7 = 0$ and contains the point $P(-1, h)$. $m$ is the line $4x + 3y - 24 = 0$ and contains the point $Q(k, 0)$.
(i) Find the values of $h$ and $k$.
(ii) $l$ and $m$ intersect at the point $R$. Find the coordinates of $R$.
(iii) Prove that the angle $|\angle PRQ|$ is a right angle.

Q20. $A$ is the point $(2, -3)$ and $B$ is the point $(-2,1)$.
(i) Find $C$, the midpoint of $[AB]$.

$p$ is the line through $C$, perpendicular to $[AB]$.
(ii) Find the equation of $p$ and write your answer in the form $ax + by + c = 0$.
(iii) Show that $D(3,2)$ is on the line $p$.
(iv) Prove that the triangle $ABD$ is isosceles.

Q21. $P$ is the point $(1, -3)$, $Q$ is the point $(-2,1)$ and $R$ is the point $(4, -2)$.
$S(2, -1)$ is a point on the line $QR$.
(i) Show that $PS$ is perpendicular to $QR$.
(ii) Find $|QR|$.
(iii) Given that $|PS| = \sqrt{5}$, find the area of the triangle $PQR$.

Q22. The line $a: 3x - 5y + 15 = 0$ and $b: 3x + 4y - 12 = 0$ cut the x-axis at the points $C$ and $D$, respectively.
(i) Find the coordinates of $C$ and $D$.
(ii) Find $E$, the point of intersection of $a$ and $b$.
(iii) Show the lines $a$ and $b$ on a coordinate diagram.
(iv) Find the area of triangle $CDE$.

**Answers:**

Q1. (i) $\sqrt{50}$ or $5\sqrt{2}$ or $7.1$ (ii) $\sqrt{97}$ or $9.85$ (iii) $\sqrt{37}$ or $6.08$ (iv) $\sqrt{68}$ or $2\sqrt{17}$

Q2. (i) $(-\frac{1}{2},\frac{3}{2})$ or $(-0.5,1.5)$ (ii) $(\frac{1}{2},0)$ or $(0.5,0)$ Q3. (i) $-1$ (ii) $\frac{4}{9}$

Q4. (i) $y+1=3(x-2)$ or $3x-y-7=0$ (ii) $y+2=\frac{2}{3}(x+4)$ or $2x-3y+2=0$

(iii) $y+1=1(x-2)$ or $x-y-3=0$ (iv) $4x-9y-2=0$

Q5. (i) Not (ii) $(3,4),(-3,0),(0,2),(6,6)$ ….. (iii) $(-3,0),(0,2)$

Q6. (i) Not (ii) $(2,3),(4,2),(6,1),(8,0)$ …. (iii) $(8,0),(0,4)$

Q8. (i) $5$ (ii) $2$ (iii) $-\frac{3}{2}$ (iv) $-\frac{2}{5}$

Q9. (i) $y=2x+1$ (ii) $y=x-1$ (iii) $y=-2x-1$

Q10. $(3,2)$ Q11. $(-4,3)$ Q12. $2$ Q13. $\frac{1}{3}$ Q14. $-4$ Q15. $-5$

Q16. (i) $(4,1)$ (ii) $y+2=1(x-6)$ or $x-y-8=0$ (iii) $x+y-5=0$

Q17. (i) $3x+2y=0$ (ii) $y-2=2(x+4)$ or $2x-y+10=0$

Q18. $y-1=\frac{5}{6}(x-\frac{1}{2})$ or $10x-12y+7=0$

Q19. (i) $h=1,k=6$ (ii) $(3,4)$ Q20. (i) $(0,-1)$ (ii) $x-y-1=0$

Q21. (ii) $\sqrt{45}$ or $3\sqrt{5}$ or $6.7$ (iii) $\frac{15}{2}$ or $7.5$

Q22. (i) $C=(-5,0),D=(4,0)$ (ii) $E=(0,3)$ (iv) $\frac{27}{2}$ or $13.5$