Coordinate Geometry Worksheet 3

1. Find the distance between the points $(1, 2)$ and $(5, -2)$, giving your answer as a square root. $\boxed{\sqrt{32}}$
2. Find the mid point of the points $(2, 6)$ and $(4, -3)$. $\boxed{(3, \frac{3}{2})}$
3. Show that the triangle whose vertices are $(1, 1)$, $(3, 2)$ and $(2, -1)$ is isosceles. $\boxed{\text{Two of the sides have length } \sqrt{5}}$
4. P, Q and R are the points $(5, -3)$, $(-6, 1)$ and $(1, 8)$ respectively. Show that PQR is isosceles and and find the coordinates of the mid point of the base. $\boxed{PQ = PR = \sqrt{137}, \text{ base mid-point} = (-\frac{5}{2}, \frac{9}{2})}$
5. The triangle ABC has its vertices at the points $A(1, 5)$, $B(4, -1)$ and $C(-2, -4)$
   (a) Show that the triangle ABC is right-angled. $\square$
   (b) Find the area of ABC. $\square$
6. Find the equation of the perpendicular bisector of the points $(2, 4)$ and $(8, 0)$ in the form $ax + by = c$. $\square$
7. Find the equation of the line perpendicular to $y = -2x + 3$ through the point $(-1, 2)$, giving your answer in the form $ax + by = c$. $\square$
8. Find the equation of the line parallel to $3x + 4y = -1$ through the point $(0, 0)$, giving your answer in the form $ax + by = c$. $\square$
9. Find the equation of the line perpendicular to $7x - 2y = 3$ through the point $(1, 2)$, giving your answer in the form $ax + by = c$. $\square$
10. Find where the lines $y = 2x - 3$ and $y = \frac{2}{3}x - 1$ intersect. $\boxed{(x, y) = (\frac{3}{2}, 0)}$
11. Find where the lines $2x + y = 5$ and $5x - 2y = -1$ intersect. $\boxed{(x, y) = (1, 3)}$
12. Find the shortest distance from the point $(5, -1)$ to the line $y = 2x - 1$. $\square$
13. $ABCD$ is a quadrilateral where A, B, C and D are the points $(3, -1)$, $(6, 0)$, $(7, 3)$ and $(4, 2)$ respectively. Prove that the diagonals bisect each other (cut each other perfectly in half) and hence find the area of $ABCD$. $\boxed{\text{Bisect at } (5, 1), \text{ Area} = 8}$