(1) Find the gradient of the line passing through each set of points given below:
(a) $(2,1)$ and $(6,9)$
(b) $(4,7)$ and $(2,5)$
(c) $(-3,2)$ and $(2,-1)$
(d) $\left(\dfrac{1}{2},3\right)$ and $\left(\dfrac{3}{2},-\dfrac{3}{4}\right)$

(2) The gradient of the line passing through the points $(p,5)$ and $(1,-7)$ is 4. Find the value of p.

(3) State the gradient and y intercept of the following lines:
(a) $y = 3x-1$
(b) $y = -2x+5$
(c) $y = \dfrac{1}{2}-x$
(d) $y = 3(2x+1)$
(e) $y = -\dfrac{1}{3}x$

(4) The line $y = 3x+c$ passes through the point $(1,5)$. Find the coordinates where the line crosses the x axis.

(5) State the gradient and y intercept of the following lines:
(a) $8x+4y-3 = 0$
(b) $3x-2y+5 = 0$
(c) $5x-6y = 4$
(d) $ax+by+c = 0$

(6) Find the equation of the straight line with the given gradient and point in the form $y = mx+c$:
(a) Gradient $= 3$, point $(2,1)$
(b) Gradient $= -1$, point $(3,-2)$
(c) Gradient $= \dfrac{1}{4}$, point $(-8,2)$
(d) Gradient $= 0.2$, point $\left(5,\dfrac{1}{4}\right)$
(e) Gradient $= m$, point $(0,m)$

(7) Find the equation of the straight line passing through the given points in the form $y = mx+c$:
(a) $(2,1)$ and $(4,5)$
(b) $(-1,5)$ and $(2,-3)$
(c) $(5,-7)$ and the origin.
(d) $\left(2,\dfrac{1}{3}\right)$ and $\left(4,\dfrac{2}{3}\right)$

(8) Find the equation of the straight line passing through the given points in the form $ax+by+c = 0$:
(a) $(6,10)$ and $(4,6)$
(b) $(3,0)$ and $(0.5,4)$
(c) $(-3,0)$ and $(0,-3)$
(d) $(-1,-3)$ and $\left(2,\dfrac{1}{4}\right)$

(9) The line l has gradient 4 and crosses the x axis at the point $(3,0)$. Find where it crosses the y axis.

(10) The line l with gradient 3 passing through the point $(2,4)$ intersects the line $2x-y = 5$ at the point P. Find the coordinates of P.

(11) Find the distance between the two given points leaving your answer in exact form where appropriate:
(a) $(5,6)$ and $(1,3)$
(b) $(4,1)$ and $(10,9)$
(c) $(-1,-4)$ and the origin.
(d) $(-1,-1)$ and $(1,1)$
(e) $(5,3)$ and $(5,7)$

(12) Given the distance between the points $(p,3)$ and $(4,1)$ is $2\sqrt{5}$ find the possible values of p.

(13) The distance between the points $(10,q)$ and $(q,12)$ is 10. Find the possible values of q.

(14) Find the midpoint of the following pairs of coordinates:
(a) $(2,1)$ and $(6,9)$
(b) $(4,7)$ and $(2,5)$
(c) $(-1,5)$ and $(2,-3)$
(d) $(0.5,3)$ and $\left(\dfrac{1}{4},-\dfrac{1}{3}\right)$

(15) The midpoint of the points $(12,7)$ and $(p,3)$ is $(5,q)$. Find the values of p and q.

(16) Write down the gradient of a line *(i)* parallel to and *(ii)* perpendicular to the following lines:
(a) $y = 3x-1$
(b) $y = 4-2x$
(c) $x+y = 0$
(d) $2x+3y = 7$
(e) $px-qy-4 = 0$

(17) Find an equation of the line *(i)* parallel to and *(ii)* perpendicular to the line $y = 5x+1$ that passes through the point $(2,4)$.

(18) The perpendicular bisector of the line segment AB crosses the x axis at the point P. Given the coordinates of A are $(2,1)$ and the coordinates of B are $(6,4)$ find the coordinates of the point P.

(19) The lines $x+3y-4 = 0$ and $y = mx+2$ are perpendicular. Find the value of m.

(20) Given the lines $px+y = 0$ and $2y = 3+5qx$ are parallel express p in terms of q.

(21) The line l passes through the point $(-1,5)$ and is perpendicular to the line $2x+4y+7 = 0$. Line l meets the line $y = 3x+8$ at the point P. Find the coordinates of P.