1) Find the mid-point of the following line segment.

2) Find the mid-point of the following two points (8,0) and (-9,3)

3) The line DE is a diameter of a circle, where D and E are (-2,10) and (10,6) respectively. Find the coordinates of the centre of the circle.

4) The line RS is a diameter of a circle, where R and S are (6,-9) and (2,11) respectively. Find the coordinates of the centre of the circle and state whether the line \( y = -5x + 19 \) passes through it.

5) The line RS is a diameter of the circle centre (-8, -6). Given R is (-12,-13), find the coordinates of S.

6) The line XY is a diameter of a circle centre C, where X and Y are (2,-5) and (6,-7) respectively. The line \( l \) passes through C and is perpendicular to XY. Find the equation of \( l \).
7) The line XY is a diameter of the circle centre (2,0). The line \( l \) passes through Y and is perpendicular to XY. Given that X is (11,2), find the equation of \( l \). Write your answer in the form \( ax + by + c = 0 \), where \( a \), \( b \) and \( c \) are integers.

8) The line PQ is a chord of the circle centre C, where P and Q are (7,8) and (3,12) respectively. The line \( l \) is perpendicular to PQ and bisects it. Find the equation of \( l \).

9) The lines DE and FG are chords of the circle. The line \( y = 4x+3 \) is the perpendicular bisector of DE. The line \( y = 6x+17 \) is the perpendicular bisector of FG. Find the coordinates of the centre of the circle.

10) Find the distance between the following points \((-6,12)\) and \((2,13)\).

11) The point \((0,2)\) lies on the circle centre \((-7,1)\). Find the radius of the circle.

12) The line RS is a diameter of a circle, where R and S are (-11,-1) and (11,-13) respectively. Find the coordinates of the centre and the radius of the circle.

13) Write down the equation of the circle

   centre \((-8,14)\) and radius \(2\sqrt{7}\)

14) Find the centre and the radius of the circle

   a) \((x + 7)^2 + (y + 9)^2 = 25\)

   b) \(x^2 + y^2 + 18x - 2y + 57 = 0\)

15) Does the following circle pass through the given point

   \((x + 2)^2 + y^2 = 147, \quad (7, -8)\)
16) The point \((-4, 5)\) lies on the circle centre \((-7, 3)\). Find the equation of the circle. \([1]\)

17) The circle \((x - 2)^2 + (y + 2)^2 = 40\) meets the \(x\)-axis at \((d, 0)\) and the \(y\)-axis at \((0, e)\). Find the possible values of \(d\) and \(e\). \([1]\)

18) The line \(y = x - 10\) meets the circle \((x+8)^2 + (y)^2 = 40\) at \(P\) and \(Q\). Find the coordinates of \(P\) and \(Q\). \([1]\)

19) Find the point of intersection of the tangent \(y = -x - 9\) to the circle \((x - 1)^2 + (y - 2)^2 = 72\). \([1]\)
Solutions for the assessment 4. Coordinate Geometry

1) (1, -2)  
2) (-0.5, 1.5)

3) The centre of the circle is (4, 8)  
4) The centre of the circle is (4, 1) and the line does not pass through the centre.

5) (-4,1)  
6) The equation of \( l \) is \( y = 2x - 14 \)

7) The equation of \( l \) is \( 9x + 2y + 67 = 0 \)  
8) The equation of \( l \) is \( y = x + 5 \)

9) The centre of the circle is (-7, -25)  
10) 8.06 or \( \sqrt{65} \)

11) 7.07 or \( 5\sqrt{2} \)  
12) The centre is (0, -7) and the radius is 12.5 or \( \sqrt{157} \)

13) The equation of the circle is \( (x + 8)^2 + (y - 14)^2 = 28 \)

14) a) The centre is (-7, -9) and the radius is 5  
b) The centre is (-9, 1) and the radius is 5

15) No  
16) \( (x - 7)^2 + (y + 3)^2 = 185 \)

17) \( d = 8 \) or \( d = -4 \) and \( e = 4 \) or \( e = -8 \)  
18) The coordinates of P and Q are (2, -8) and (0, -10)

19) The point of intersection is (-5, -4)