

8. A circle  $C$  has centre  $M(6, 4)$  and radius 3.

(a) Write down the equation of the circle in the form

$$(x - a)^2 + (y - b)^2 = r^2. \tag{2}$$

Figure 3

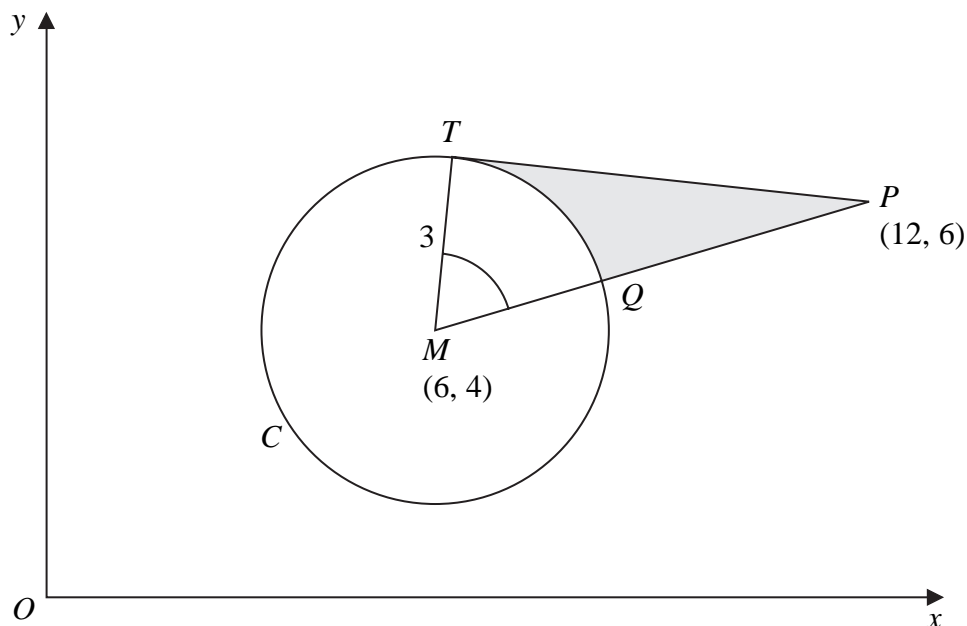


Figure 3 shows the circle  $C$ . The point  $T$  lies on the circle and the tangent at  $T$  passes through the point  $P(12, 6)$ . The line  $MP$  cuts the circle at  $Q$ .

(b) Show that the angle  $TMQ$  is 1.0766 radians to 4 decimal places. (4)

The shaded region  $TPQ$  is bounded by the straight lines  $TP$ ,  $QP$  and the arc  $TQ$ , as shown in Figure 3.

(c) Find the area of the shaded region  $TPQ$ . Give your answer to 3 decimal places. (5)

---

---

---

---

---

---

---

---

---

---





5.

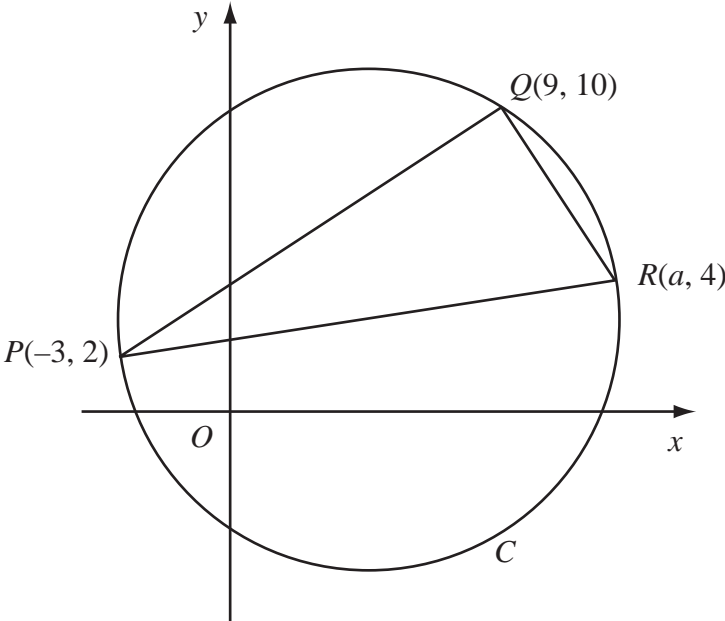


Figure 2

The points  $P(-3, 2)$ ,  $Q(9, 10)$  and  $R(a, 4)$  lie on the circle  $C$ , as shown in Figure 2. Given that  $PR$  is a diameter of  $C$ ,

- (a) show that  $a = 13$ , **(3)**
  
- (b) find an equation for  $C$ . **(5)**

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



8.

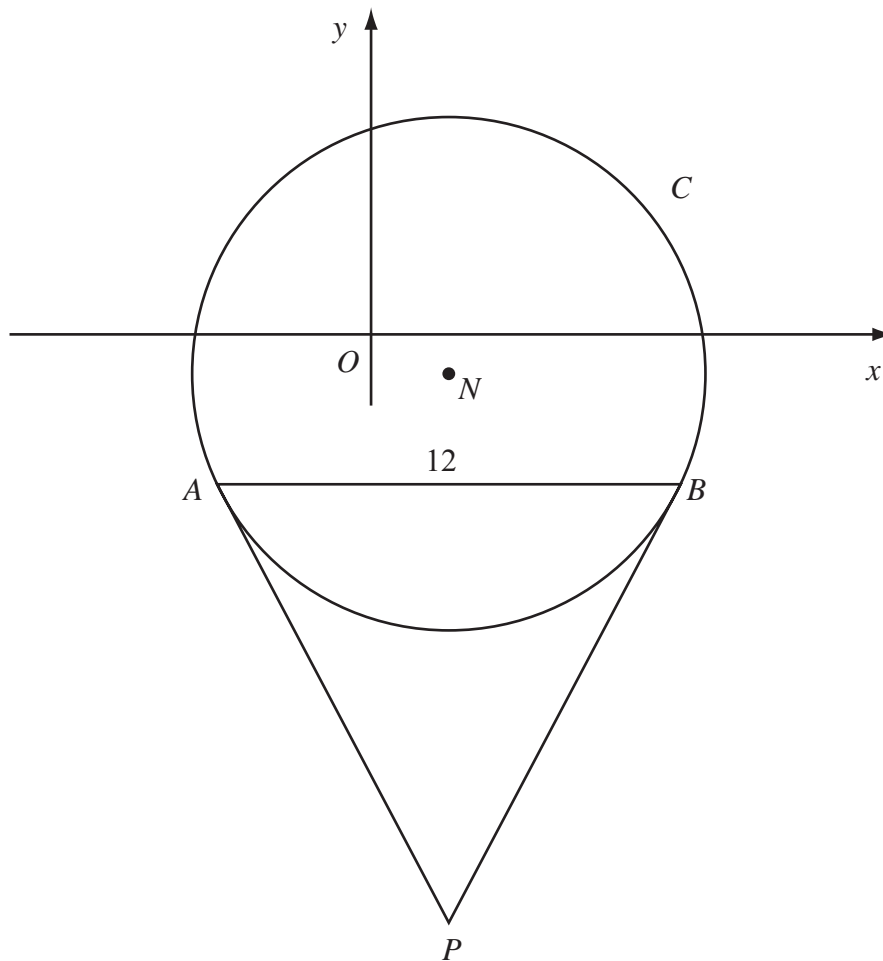
**Figure 3**

Figure 3 shows a sketch of the circle  $C$  with centre  $N$  and equation

$$(x - 2)^2 + (y + 1)^2 = \frac{169}{4}$$

(a) Write down the coordinates of  $N$ . (2)

(b) Find the radius of  $C$ . (1)

The chord  $AB$  of  $C$  is parallel to the  $x$ -axis, lies below the  $x$ -axis and is of length 12 units as shown in Figure 3.

(c) Find the coordinates of  $A$  and the coordinates of  $B$ . (5)

(d) Show that angle  $ANB = 134.8^\circ$ , to the nearest 0.1 of a degree. (2)

The tangents to  $C$  at the points  $A$  and  $B$  meet at the point  $P$ .

(e) Find the length  $AP$ , giving your answer to 3 significant figures. (2)



**10.** The circle  $C$  has centre  $A(2, 1)$  and passes through the point  $B(10, 7)$ .

(a) Find an equation for  $C$ .

**(4)**

The line  $l_1$  is the tangent to  $C$  at the point  $B$ .

(b) Find an equation for  $l_1$ .

**(4)**

The line  $l_2$  is parallel to  $l_1$  and passes through the mid-point of  $AB$ .

Given that  $l_2$  intersects  $C$  at the points  $P$  and  $Q$ ,

(c) find the length of  $PQ$ , giving your answer in its simplest surd form.

**(3)**

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

