2ⁿᵈ Year Singles Assignment test 16 version O

1. The circle with equation $x^2 - 4x + y^2 - 6y = 7$.
The line *l* with equation $x - 3y + 17 = 0$ intersects the circle at P and Q
a) Find the coordinates of the point P and the point Q

b) Find the equation of the tangent at the point P

c) Find the equation of the tangent at the point Q

d) Find the equation of the perpendicular bisector of the chord PQ.

e) Show that the two tangents and the perpendicular bisector intersect at a single point and find the coordinates of the point of intersection.

2. A block of mass 20 kg is released from the rest at the top of a rough slope. The slope is inclined to the horizontal at an angle of 30°. After 6 s the speed of the block is $21\ m\ s^{-1}$. Find the coefficient of friction between the block and the slope.

3. Integrate the following expression

a) $\int \left(3\sin(2x + 1) + \frac{4}{2x+1} \right) dx$

2ⁿᵈ Year Singles Assignment test 16 version P

1. The circle with equation $x^2 - 3x + y^2 - 5y = -8$.
The line *l* with equation $x - 3y + 5 = 0$ intersects the circle at P and Q
a) Find the coordinates of the point P and the point Q

b) Find the equation of the tangent at the point P

c) Find the equation of the tangent at the point Q

d) Find the equation of the perpendicular bisector of the chord PQ.

e) Show that the two tangents and the perpendicular bisector intersect at a single point and find the coordinates of the point of intersection.

2. A block of mass 20 kg is released from the rest at the top of a rough slope. The slope is inclined to the horizontal at an angle of 30°. After 21 s the speed of the block is $3\ m\ s^{-1}$. Find the coefficient of friction between the block and the slope.

3. Integrate the following expression

a) $\int \left(3\sin(5x + 1) + \frac{10}{5x+1} \right) dx$

2nd Year Singles Assignment test 16 version Q

1. The circle with equation $x^2 - 3x + y^2 - 5y = 4$.
The line *l* with equation $x - 3y - 4 = 0$ intersects the circle at P and Q
a) Find the coordinates of the point P and the point Q

b) Find the equation of the tangent at the point P

c) Find the equation of the tangent at the point Q

d) Find the equation of the perpendicular bisector of the chord PQ.

e) Show that the two tangents and the perpendicular bisector intersect at a single point and find the coordinates of the point of intersection.

2. A block of mass 20 kg is released from the rest at the top of a rough slope. The slope is inclined to the horizontal at an angle of 30°. After 70 s the speed of the block is $11\ m\ s^{-1}$. Find the coefficient of friction between the block and the slope.

3. Integrate the following expression

a) $\int \left(10\sin(9x+1) + \frac{3}{2x+1}\right) dx$

2nd Year Singles Assignment test 16 version R

1. The circle with equation $x^2 - 2x + y^2 - 5y = 20$.
The line *l* with equation $3x - y - 17 = 0$ intersects the circle at P and Q
a) Find the coordinates of the point P and the point Q

b) Find the equation of the tangent at the point P

c) Find the equation of the tangent at the point Q

d) Find the equation of the perpendicular bisector of the chord PQ.

e) Show that the two tangents and the perpendicular bisector intersect at a single point and find the coordinates of the point of intersection.

2. A block is released from the rest at the top of a rough slope. The slope is inclined to the horizontal at an angle of 30°. After 19 s the speed of the block is $2\ m\ s^{-1}$. Find the coefficient of friction between the block and the slope.

3. Integrate the following expression

a) $\int \left(a\sin(bx+1) + \frac{c}{2x+1}\right) dx$

Answers Version O

1. a) P(-2, 5) and Q(4, 7)
b) $y = 2x + 9$
c) $y = -\frac{1}{2}x + 9$
d) $y = -3x + 9$
e) (0, 9)

2. 0.165

3. a) $-\frac{3}{2}\cos(2x + 1) + 2\ln|2x + 1| + c$

Answers Version P

1. a) P(1,2) and Q($\frac{11}{5}, \frac{12}{5}$)
b) $y = -x + 3$
c) $y = 7x - 13$
d) $y = -3x + 7$
e) (2,1)

2. 0.561
3. a) $-\frac{3}{5}\cos(5x + 1) + 2\ln|5x + 1| + c$

Answers Version Q

1. a) P(4,0) and Q(1,-1)
b) $y = x - 4$
c) $y = -\frac{1}{7}x - \frac{6}{7}$
d) $y = -3x + 7$
e) ($\frac{11}{4}, -\frac{5}{4}$)

2. 0.559
3. a) $-\frac{10}{9}\cos(9x + 1) + \frac{3}{2}\ln|2x + 1| + c$

Answers Version R

1. a) P(6,1) and Q($\frac{59}{10}, \frac{7}{10}$)
b) $y = \frac{10}{3}x - 19$
c) $y = \frac{49}{18}x - \frac{553}{36}$
d) $y = -\frac{1}{3}x + \frac{17}{6}$
e) (5.955,0.848)

2. 0.565
3. a) $-\frac{a}{b}\cos(bx + 1) + \frac{c}{2}\ln|2x + 1| + c$