

Quick revision

- 12** 38 students were asked what life skills they had. 15 could swim, 12 could drive, and 23 could cook. 9 could cook and swim, 5 could swim and drive, and 6 could drive and cook. There was 1 student who could do all three. Find the number of students who:
- a** could only cook
  - b** could not do any of these things
  - c** had exactly two of these life skills.

**Q53.** A fountain jet is in the shape of a parabola. The water is spouted from the point placed 20 cm above the ground level and it reaches its maximum height of 1 metre. Then it goes back to the ground level after travelling 180 centimetres horizontally. Find the horizontal distance that the water covers till it reaches the maximum height.

Q3

Let  $y = (m - 1)x^2 + 3mx + 4m + 1$  ;

- a) Find the value of m for which the function has 2 different zeroes.
- b) For what values of m zeroes of the function are both positive?

Q3

Let  $f(x) = x^2 - 1$  Find the coordinates of the point on the curve f which is closest to the point (0,2).

Q4

For the given sector, find to 3 significant figures:

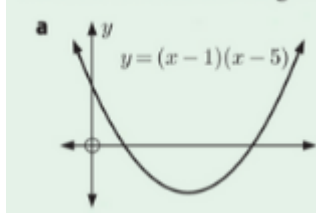
- a** the angle  $\theta^\circ$
- b** the area of the sector.



- c) Find the area of the segment of the circle which is inside of the given sector.

Q5

State the domain and range of the function



- a** find (k,m) the coordinates of the vertex
- b** express the function in the vertex form
- c** find the inverse function for  $x < k$  and find the domain and the range of the inverse.

Q6

Solve

- a)  $\log_5^2 x = 4 \log_{x^2} \sqrt{x}$
- b)  $0.2^{3-5x} = 25^{3x-5}$
- c)  $2^{2x+1} + 2^2 = 2^x + 8^{\frac{3+x}{3}}$
- d)  $\log_{\frac{1}{2}}^2 x^3 = \frac{9}{2} \log_2 \sqrt{2} \left(\frac{1}{x}\right) + 2$

e)  $\cos^2 x + 3 \sin x - 3 = 0$  for  $x \in [0, 2\pi]$ .

f)  $\tan^2 x + \frac{1}{\cos x} = 1$

g)  $4 \cos^2\left(\frac{x}{2} + \frac{\pi}{3}\right) = 3$  for  $x \in [0, 2\pi]$ .

h)  $\sin x > 0.5$  for  $x \in [0, 2\pi]$ .

i)  $|\cos x - 0.5| < 0.5$  for  $x \in [0, 2\pi]$ .

j)  $|\sin 2x + 0.5| \geq 0.5$  for  $x \in [0, 2\pi]$ .

k)  $\tan x \leq 1$  for  $x \in [0, 2\pi]$ .

Q7

Let 1)  $y = \frac{2x-4}{x+3}$  2)  $f(x) = -\log_2(2x-1)$  , 3)  $g(x) = 3^{-x+2} + 3$

a) Find the domain and range ,y-intercept and zero

b) Find equation of asymptotes

c) Write the sequence of transformation that transformed 1)  $y = \frac{1}{x}$  , 2)  $y = \log_2 x$  , 3)  $y = 3^x$

d) Find the equation of inverse function

e) Sketch the graph of the functions

Q8

Let  $f(x) = x^2 - 9$ ,  $g(x) = \sqrt{2x+2}$

a) Find  $f \circ g$  and its domain and range

b) Find  $g \circ f$  and its domain and range

Q9

Let  $S_n = 2n^2 + 6n$  be the formula on a sum of first n terms of a sequence.

a) Find the formula on n-th term of the sequence

b) Prove that it is an arithmetic sequence.

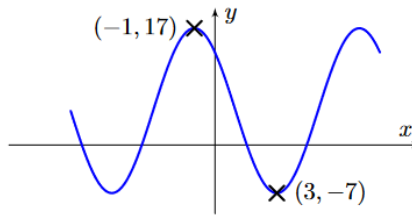
Q10

Let  $S_n = 3 - 3^{n+1}$  be the formula on a sum of first n terms of a sequence.

a) Find the first 3 terms of the sequence and the formula on n-th term

b) Prove that it is a geometric sequence.

- Q11.** The diagram below shows a graph of a function that has a maximum point at  $(-1, 17)$  and a minimum point at  $(3, -7)$ .



- (i) Find the equation of the graph in the form  $y = A \sin(Bx + C) + D$ .  
 (ii) Find the equation of the graph in the form  $y = p \cos(qx + r) + s$ .

**Q12**

Sketch the graphs of the following functions.

- (2)  $f(x) = x^2 + 2|x| - 3$       (6)  $f(x) = |2 - \sqrt{x+1}|$       (10)  $f(x) = \log_2(|x| + 2)$   
 (4)  $f(x) = -|4 - \sqrt{4-x}|$       (8)  $f(x) = 2^{|x|+2}$   
 (4)  $f(x) = -\sin(0.5x)$       (8)  $f(x) = \sin(2x) - \frac{1}{2}$       (12)  $f(x) = \cos(2x + \pi)$

**Q12.** Determine the first 3 terms in the expansion of  $(2 - \frac{1}{2}x)^4(2x + 1)^7$  in ascending powers of  $x$ .

**Q13.** The coefficient of  $\frac{1}{x^2}$  in the expansion of  $(2x + \frac{1}{ax^2})^7$  is  $-70$ . Find the possible values of  $a$ .

**Q38.** 800 PLN was deposited in an account at the rate of 3% per annum compounded monthly.

- (i) What are the savings after 5 years?  
 (ii) When the savings exceed 5000 PLN?

**Q39.** Adili considers two savings plans.

In plan A he saves 200 PLN in the first month and each next month he saves 10 PLN more than in the previous month.

In plan B he saves 50 PLN in the first month and each next month he saves 10% more than in the previous month.

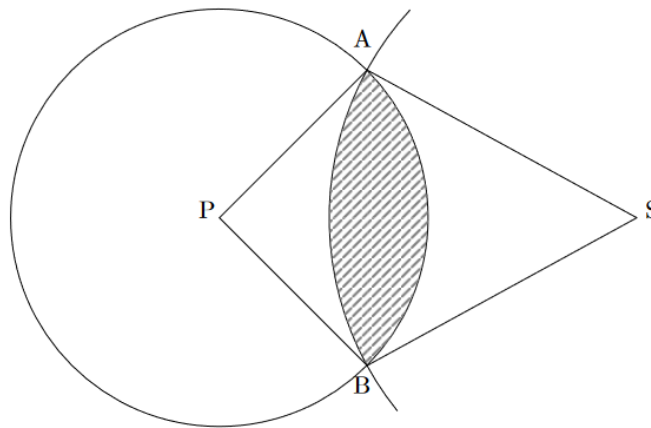
- (i) What are the monthly savings in the  $10^{th}$  month in both plans?  
 (ii) When monthly savings in plan B exceed monthly savings in plan A?  
 (iii) When total savings in plan B exceed monthly savings in plan A?

**Q12.** Town  $A$  is 4.3km on a bearing of  $243^\circ$  from town  $B$ . Town  $B$  is 3.9km on a bearing of  $340^\circ$  from town  $C$ .

- (i) Find the distance from  $A$  to  $C$ .
- (ii) Find a bearing of  $A$  from  $C$ .
- (iii) Find a bearing of  $C$  from  $A$ .

**Q13.** The diagram shows two circles: one with the centre at  $P$  and the radius  $PA = PB = 4\text{cm}$  and the other with the centre at  $S$  and the radius  $SA = SB = 6.1\text{cm}$ . The angle  $\hat{APB}$  is a right angle.

- a) Find the length  $AB$ .
- b) Find the angle  $\hat{ASB}$ .
- c) Find the area of the shaded region.



Q14

In triangle  $ABC$  the sides  $BC$  and  $AC$  are 4.2 and 5.6 respectively. The angle  $\hat{BAC} = 46^\circ$ . Find the length  $AB$ .

Q15

a)

In triangle  $ABC$  the sides  $AC$  and  $BC$  are 12 and 9 respectively. The angle  $\hat{BAC} = 44^\circ$ . Find angle  $B$ .

b) Find the area of the triangle