Summative Assessment
(*Ujian Akhir Sesi Akademik*)

Marks
100

Section A [20 *marks*]

Instruction: Answer **all** questions.

Time **2 hours**

1 Given that $\frac{r^x w^{-3}}{r^9 w^y} = \frac{1}{r^5 w^4}$, find the value of $(x+y)^2$.

A 4 **C** 16
B 9 **D** 25

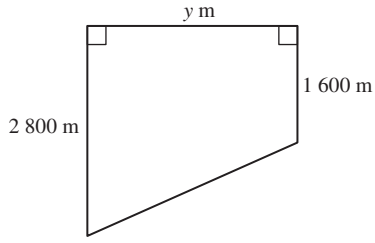
2 $\frac{\sqrt{m^6 \times n^{-8}}}{m \times m \times n \times n \times n} =$

A $m^4 n^{-11}$ **C** mn^{-7}
B $m^2 n^{-5}$ **D** $m^5 n^7$

3 Round off 0.04077 correct to three significant figures.

A 0.04 **C** 0.047
B 0.040 **D** 0.0408

4 The following diagram shows a plan of paddy field in the shape of a trapezium.



If the area of the paddy field is 71.5 km^2, calculate the value of y.

A 1.625×10^2
B 1.625×10^4
C 3.25×10^3
D 3.25×10^4

5 A financial institution offered investors with an interest rate of 4.8% per annum compounded four times every year. Ming Yuan deposited a sum of RM25 000 in the financial institution. What is his total savings at the end of the fifth year?

A RM30 264.04
B RM31 735.86
C RM31 964.25
D RM32 083.17

6 A sum of money, RMP is invested for 8 years in two types of investment as follows.

Investment 1 The money is deposited in a fixed deposit account that pays a simple interest at a rate of 5% per annum.
Investment 2 The money is invested in an agriculture scheme that pays an interest compounded once every year.

If the interest paid on each of the investment is the same, what is the annual interest rate calculated for Investment 2?

A 3.9% **C** 4.3%
B 4.1% **D** 4.5%

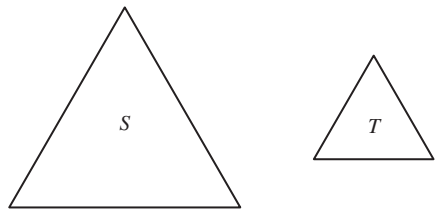
7 The following table shows the information about the CCM shares that were bought by William in several months.

Number of units	Buying price per unit (RM)
2 000	2.45
5 000	1.72
3 000	2.24
10 000	x

If the average cost per share bought is RM1.776, calculate the value of x.

A 1.42 **C** 1.57
B 1.53 **D** 1.63

8 The following diagram shows two equilateral triangles S and T.



The areas of triangles S and T are 450 cm^2 and 50 cm^2 respectively. If triangle T is the scale drawing of triangle S, find its scale factor in the form $1 : k$.

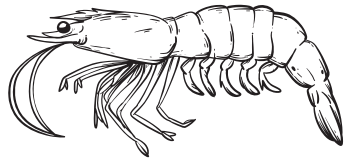
A $1 : \frac{1}{9}$

B $1 : \frac{1}{3}$

C $1 : 3$

D $1 : 9$

9 The following diagram shows a prawn caught by Badrul. The actual length of the prawn is 8.45 cm.



Badrul wants to draw the prawn according to a scale of $1 : \frac{1}{9}$. What is the length of the prawn, in cm, on the scale drawing?

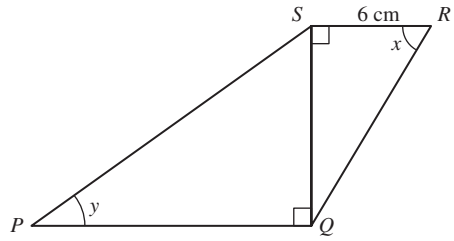
A 23.45

B 42.25

C 76.05

D 152.1

10 The following diagram shows two right-angled triangles PQS and QRS such that $PQ = 2SR$.



Find the value of tan y.

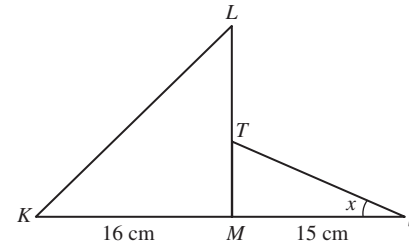
A $\frac{2}{5}$

B $\frac{2}{3}$

C $\frac{4}{3}$

D $\frac{3}{2}$

11 In the following diagram, KMS and LTM are straight lines. T is the midpoint of LM.

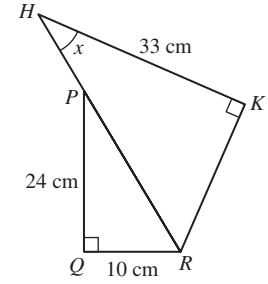


Given that $\tan x = \frac{2}{5}$, calculate the length, in cm, of KL.

A 18 **C** 24

B 20 **D** 30

12 In the following diagram, HPR is a straight line and $HP = 13$ cm.

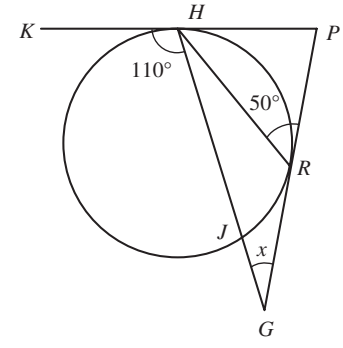


Find the value of cos x.

A $\frac{8}{11}$ **C** $\frac{11}{13}$

B $\frac{8}{13}$ **D** $\frac{10}{11}$

13 In the following diagram, GP and KP are tangents to the circle RJH at R and H respectively. GJH is a straight line.

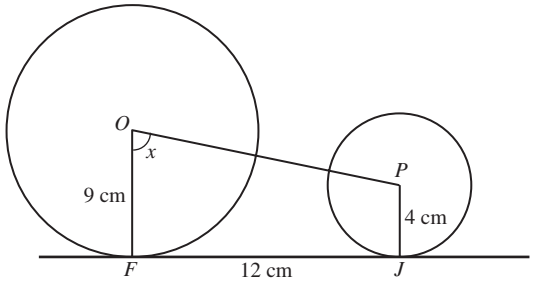


Find the value of x.

A 25° **C** 55°

B 30° **D** 60°

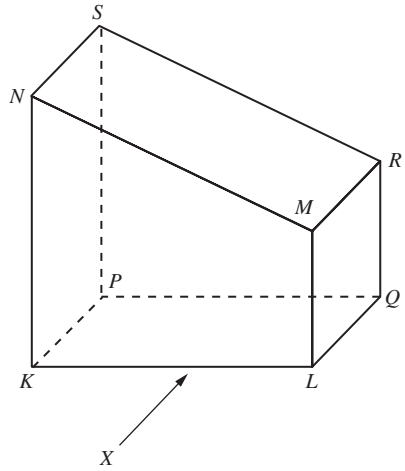
14 The following diagram shows two circles with centres *O* and *P*. *FJ* is the common tangent to the circles.



Calculate the value of *x*.

A 22° 37′
B 40° 23′
C 67° 23′
D 70° 45′

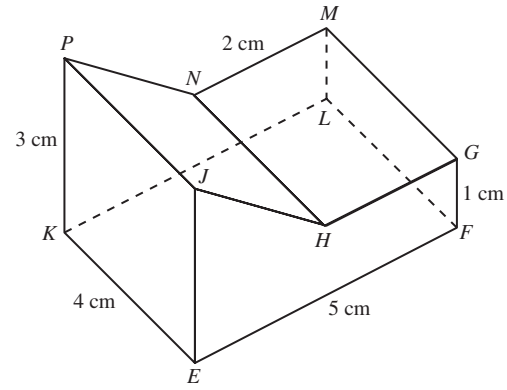
15 The following diagram shows a solid right prism with the rectangular base *KLQP* on a horizontal plane.



Which of the following is **not** correct about the orthogonal projection of the solid on a vertical plane parallel to *KL* as viewed from *X*?

A The length of the edge *KL* on the solid is the same as its orthogonal projection.
B The length of the edge *MN* on the solid is the same as its orthogonal projection.
C The size of angle *LMN* on the solid is the same as its orthogonal projection.
D The size of angle *MNS* on the solid is the same as its orthogonal projection.

16 The following diagram shows a solid right prism with the rectangular base *EFLK* on a horizontal plane. The face *EFGHJ* is the uniform cross section of the prism.

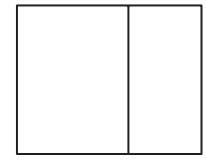


Which of the following is the plan of the solid?

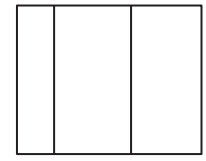
A

B

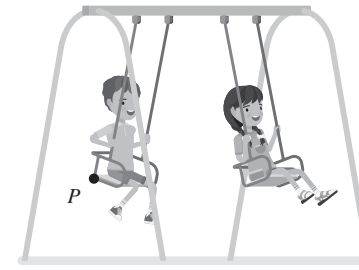
C



D



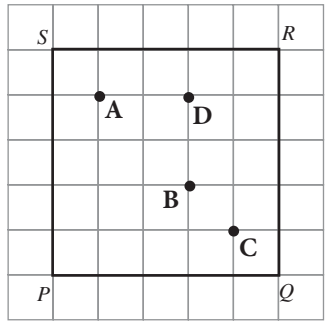
17 The following diagram shows two children playing swings at their residential garden.



P is a point on the wood seated by the boy. State the most likely locus of point *P*.

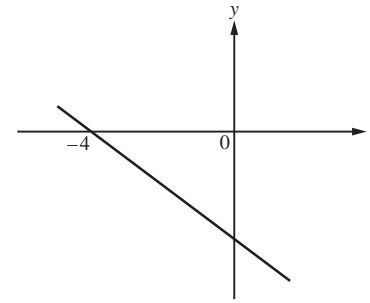
A A horizontal straight line.
B An arc of a circle.
C A horizontal circle.
D A vertical circle.

18 The following diagram shows a square *PQRS* that is drawn on square grids with sides of length 1 unit.



X and *Y* are two points that move inside the square *PQRS* such that *X* is equidistant from *PS* and *RS* whereas *Y* is always 2 units from *QR*. Which of the point **A**, **B**, **C** or **D** is the point of intersection of locus *X* and locus *Y*?

19 The following diagram shows a straight line with gradient $-\frac{2}{3}$ that is drawn on a Cartesian plane.



Find the equation of the straight line.

A $y = -\frac{2}{3}x - 6$ **C** $y = -\frac{2}{3}x - \frac{1}{3}$

B $y = -\frac{2}{3}x - 3$ **D** $y = -\frac{2}{3}x - \frac{8}{3}$

20 Which of the following is correct?

	Equation of straight line	Gradient	*y*-intercept
A	$x - \frac{y}{4} = \frac{7}{4}$	4	−7
B	$\frac{1}{3}y = -2x + 1$	6	3
C	$3x - y = 8$	−3	8
D	$\frac{1}{2}x + y = \frac{1}{2}$	−2	1

Section B [20 *marks*]

Instruction: *Answer* **all** *questions*.

1 (a) Mark '✓' for the correct answer. [1 *mark*]

Answer:
0.0000001648 correct to three significant figures =

1.64×10^{-7} ☐ 1.64×10^{-6} ☐

1.65×10^{-7} ☐ 1.65×10^{-6} ☐

(b) Complete the following. [3 *marks*]

Answer:
$8.7 \times 10^{9} \times 15 \times 10^{-6}$
$= \square \times 10^{3}$
$= \square \times 10^{\square}$

2 The following diagram shows a photograph of the Kenyir Lake with a measurement of 11 cm × 8 cm.

Given the photograph represents the actual rectangular area with a perimeter of 1 140 m. Complete the following.

[4 *marks*]

Answer:

Perimeter of the photograph

$= 2\left(11 + \square\right)$

$= \square$ cm

Perimeter of the actual area

= 1 140 m

$= \square$ cm

Scale for the photograph

$= \square$ cm : $\square$ cm

$= 1 : \square$

3 Circle the correct answers.

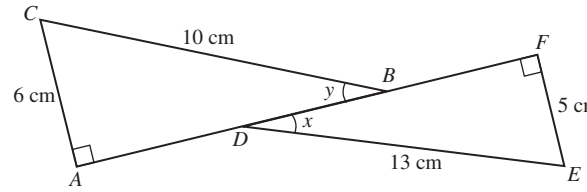
[4 *marks*]

Answer:

(a) $2^7 \times 8^4 =$ 2^{11} 2^{19}

(b) $81^3 \div \frac{1}{9} =$ 3^{11} 3^{14}

4 In the following diagram, *ADBF* is a straight line. *B* is the midpoint of *DF*.



Circle the correct answers.

[4 *marks*]

Answer:

(a) $\sin x =$ $\frac{3}{5}$ $\frac{5}{13}$ $\frac{4}{5}$ $\frac{7}{17}$

(b) $\cos y =$ $\frac{3}{5}$ $\frac{5}{13}$ $\frac{4}{5}$ $\frac{7}{17}$

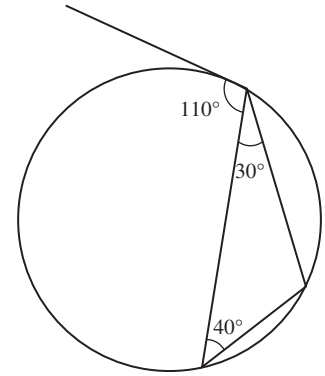
(c) $\frac{1 - \tan x}{1 + \tan x} =$ $\frac{3}{5}$ $\frac{5}{13}$ $\frac{4}{5}$ $\frac{7}{17}$

5 (a) Determine whether each of the following diagrams obeys the properties of angles of circles.
Write 'Yes' or 'No' in the boxes provided.

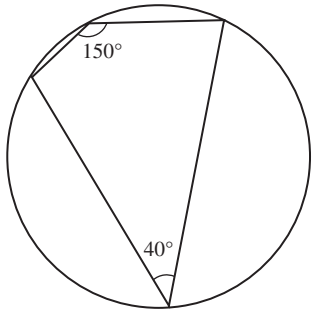
[2 *marks*]

Answer:

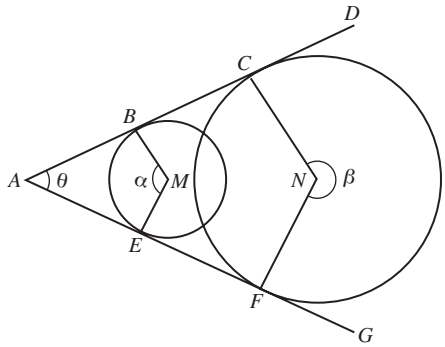
(i)



(ii)



(b) The following diagram shows two circles with centres *M* and *N*. *AD* and *AG* are common tangents to the circles.



Match the following.

[2 *marks*]

Answer:

	$90° - \theta$
α	$180° + \theta$
β	$90° + \theta$
	$180° - \theta$

Section C [60 *marks*]

Instruction: *Answer* **all** *questions*.

1 (a) (i) Round off 27.386 correct to three significant figures.

(ii) Find the value of $8 \times 10^{13} + 0.045 \times 10^{16}$ by giving the answer in standard form.

[4 *marks*]

Answer:

(i)

(ii)

(b) Evaluate $169^{-\frac{1}{2}} - 13^{-2}$.

[3 *marks*]

Answer:

(c) Simplify $\frac{16^{9-4x}}{128^{3x-2}}$ in the form 2^n.

[3 *marks*]

Answer:

2 (a) The following table shows the buying price per share and the number of Mvin shares invested by James Ong.

Buying price (RM)	Number of shares
2.30	4 000
2.80	2 000
2.00	5 000
1.60	n

(i) If the average cost per share of the share bought by James Ong is RM1.96, calculate the value of n.
(ii) James Ong sold all the shares at a price of RM2.50 per share. Find his return of investment.

[4 *marks*]

Answer:
(i)

(ii)

(b) A sum of RM1 000 is deposited in an investment that pays an interest rate of $7\frac{1}{2}$% per annum that is compounded yearly.
(i) Complete the table in the answer space.

[2 *marks*]

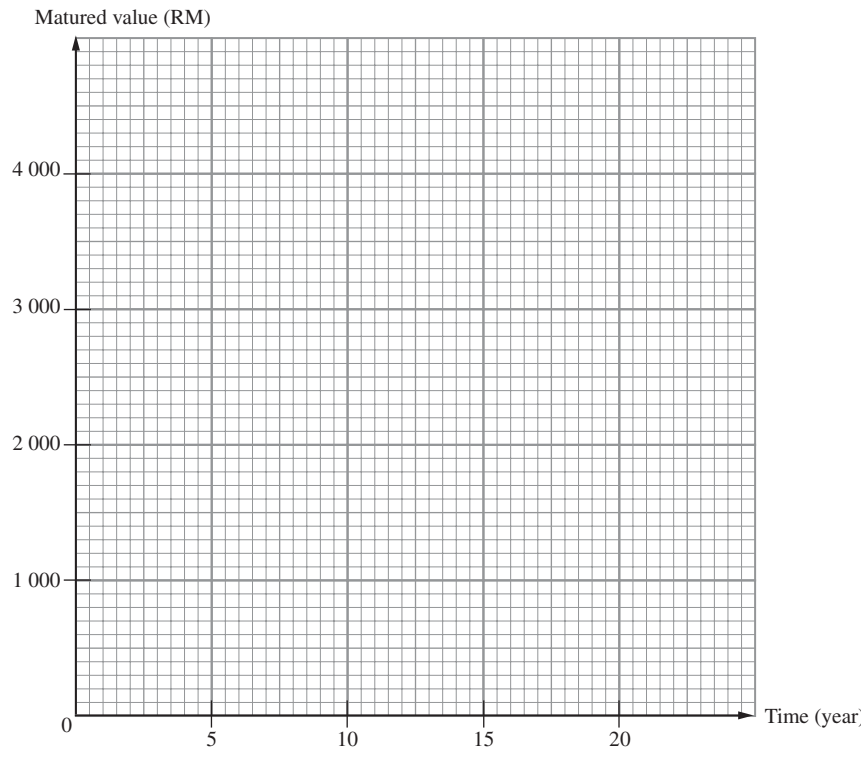
(ii) Based on the table in (b)(i), complete the graph in the answer space.

[2 *marks*]

Answer:
(i)

Time, t (year)	Matured value (RM)
0	1 000
5	1 436
10	
15	2 959
20	

(ii)



(c) Mei Lan bought a washing machine with an instalment payment of RM217 per month for 12 months. She paid a down payment of RM360. The electrical shop imposed an interest rate of 4.2% per annum on the balance of debt. Calculate the cash price of the washing machine.

[2 *marks*]

Answer:

3 (a) The following diagram shows the drawing of a pagoda with the height of the drawing is 12.16 cm.

The scale used in the drawing is 1 : 500.

(i) Calculate the actual height, in m, of the pagoda.

(ii) A tourist stood at a distance of 100 m from the pagoda. If the height of the tourist's eyes from the ground is 1.73 m, find the angle of elevation of the peak of the pagoda from the tourist's eyes.

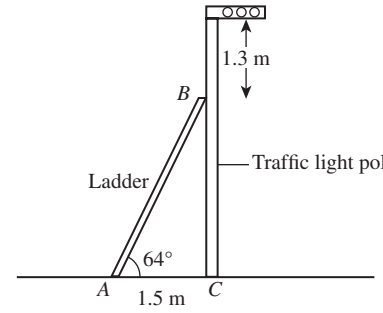
[5 *marks*]

Answer:

(i)

(ii)

(b) A technician needs to climb up a ladder to repair a malfunctioning traffic light as shown in the following diagram.



(i) Calculate the length, in m, of the ladder.

(ii) Find the height, in m, of the traffic light pole.

[5 *marks*]

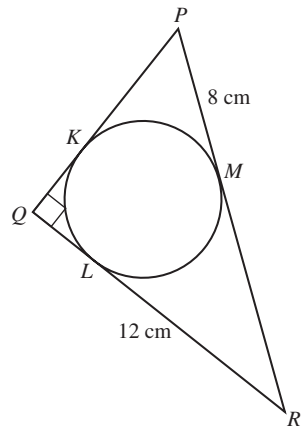
Answer:

(i)

(ii)

4 (a) In the following diagram, *PQ, QR* and *PR* are tangents to a circle at points *K, L* and *M* respectively.

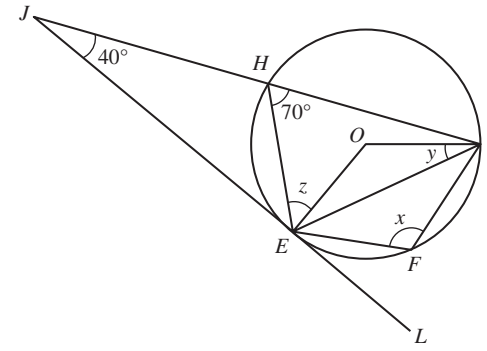
Find the radius of the circle.



[5 *marks*]

Answer:

(b) In the following diagram, *JEL* is the tangent to a circle *EFGH* with centre *O* at *E*. *GHJ* is a straight line.



Find the values of *x, y* and *z*.

[5 *marks*]

Answer:

5 (a) The diagram in the answer space shows a trapezium *PQRS* drawn on square grids. *A, B, C* and *D* are the midpoints of *PQ, QR, RS* and *PS* respectively.

On the diagram, draw the locus of point

(i) *X* that moves such that it is always equidistant from *PQ* and *RS*,

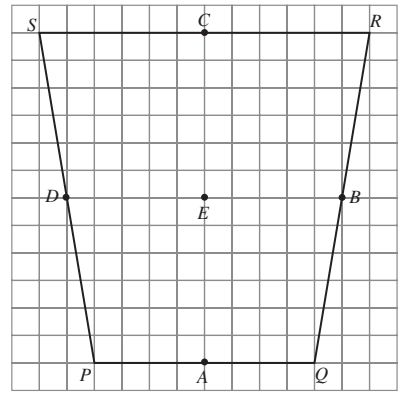
(ii) *Y* that moves such that *EY* = 4 units,

(iii) *Z* that moves such that its distance is always 10 units from point *R*.

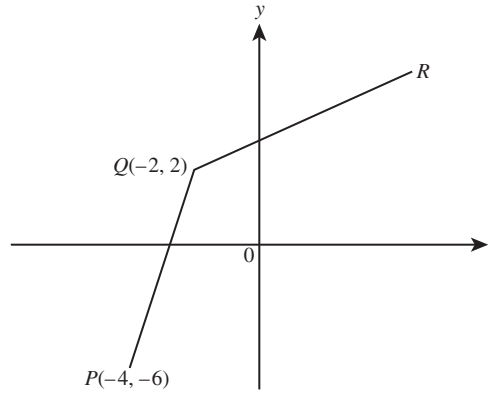
Hence, mark with the symbol ⊗ for the point of intersection of locus *X* and locus *Z*.

[5 *marks*]

Answer:



(b) In the following diagram, *PQ* and *QR* are two straight lines.



The gradient of straight line *QR* is $\frac{1}{3}$ times the gradient of straight line *PQ*.

(i) Determine the gradient of straight line *PQ*. Hence, find the *x*-intercept of the straight line *PQ*.

(ii) Find the equation of the straight line *QR* in the form $y = mx + c$.

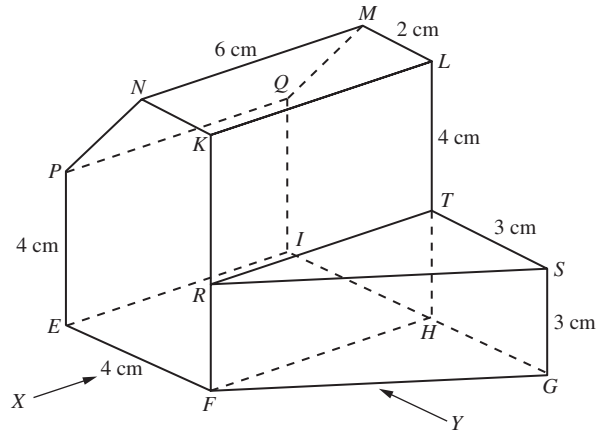
[5 *marks*]

Answer:

(i)

(ii)

6 The following diagram shows a solid consisting of two right prisms that are joined on the plane *FHTR*. The base of the solid in the shape of a trapezium *EFGHI* lies on a horizontal plane. One of the prisms has a right-angled triangle *FGH* as its uniform cross section. The other prism has the face *EFKNP* as its uniform cross section. The rectangle *KLMN* is a horizontal plane and *MNPQ* is an inclined plane.



On one diagram, draw to full scale

(a) the plan of the solid, [3 *marks*]

(b) the elevation of the solid on a vertical plane parallel to *EF* as viewed from *X*, [3 *marks*]

(c) the elevation of the solid on a vertical plane parallel to *FH* as viewed from *Y*. [4 *marks*]

Answer: