Resonance®
Educating for better tomorrow

P

ASSOCIATION OF MATHEMATICS TEACHERS OF INDIA
Screening Test- Gauss Contest

(NMTC PRIMARY LEVEL - V & VI GRADES)

Saturday, the 31 August 2024

(2024-2025)

INSTRUCTIONS

1. Fill in the Response sheet with your Name, Class and the Institution through which you appear, in the specified places.

2. Diagrams are only Visual guides; they are not drawn to scale.

3. You may use separate sheets to do rough work.

4. Use of Electronic gadgets such as Calculator, Mobile Phone or Computer is not permitted.

5. Duration of Test: 10 am to 12 Noon (Two hours)

6. For each correct response you get 1 mark; for each incorrect response, you lose ½ mark.

---

1. Saket wanted to add two 2-digit numbers. But he multiplied them and got 629 as the answer. The sum of the two 2-digit numbers is

a) 56 b) 52 c) 54 d) 54

Ans. **(c)**

Sol. a × b = 629
a + b = ?
a × b = 37 × 17
Than sum of two digit no.
A + b = 37 +17 = 54 Answer

2. The sum of three integers is 1. Their product is 36. The greatest of these three numbers is

a) 12 b) 8 c) 4 d) 6

Ans. **(d)**

Sol. Sum of there integer is 1.
A + b + c = 1
a. b. c = 36
[By hit & trial] a.b.c = 6 × (–3) × (–2)
And a + b + c = 6 – 3 – 2 = 6 – 2
a + b + c = 1
The greatest of these is 6

3. The sum of five consecutive even numbers is 150. When written in ascending order, the fourth number is

a) 34 b) 32 c) 36 d) 38

Ans. **(b)**

Sol. Let a even number is 2x the than five consecutive no. is
(2x – 4), (2x –2), 2x, (2x + 2), (2x + 4)
According to question
2x – 4 + 2x –2 + 2x + 2x + 2 + 2x + 4 = 150
10x = 150
x = 15
26, 28, 30, 32, 34
Then
Fourth No. is = 32

4. The price of a cell phone is decreased by 25%. What percentage increase must be done in the delivered price to get back the original price?

a) 25 % b) 27½ % c) 30 % d) 33⅓ %

Ans. **(d)**

Sol. Let price of cell phone is 100 Ks.

If Price is decreased by 25%

Then latest Price is = $100\left[1-\frac{25}{100}\right]$

$= 100 \times \frac{75}{100} = 75$ Rs

Now % Increase in the delivered price to get bak the original price

$= \frac{\text{Final value} - \text{initial value}}{\text{initial value}} \times 100$

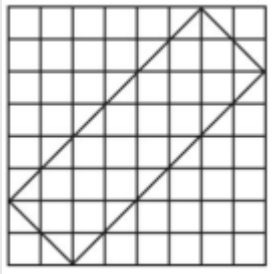
Final value = 100

Initial value = 75

% Increase = $\frac{100-75}{75} \times 100$

$= \frac{25}{75} \times 100 = \frac{1}{3} \times 100 = 33\frac{1}{3}\%$

5. A rectangular carpet is placed in 8 m × 8 m room, as shown in the diagram. What fraction of the floor is not covered?



a) $\frac{1}{4}$ b) $\frac{5}{11}$ c) $\frac{5}{8}$ d) $\frac{13}{24}$

Ans. **(c)**

Sol. Room Area = 8 × 8 = 64

Carpet Area = l × b

Diagonal of Squar. = $\sqrt{1^2+1^2} = \sqrt{2}$

Then = $\begin{matrix}\ell = 6\sqrt{2} \\ b = 2\sqrt{2}\end{matrix}$

Carpet area = $6\sqrt{2} \times 2\sqrt{2}$

$= 12 \times 2 = 24$

Fraction of floor is Covered

$= \frac{24}{64}$

$= \frac{3}{8}$

Fraction of floor is not Covered = $1-\frac{3}{8} = \frac{8-3}{8}$

$= \frac{5}{8}$

6. p and p +1 are two prime numbers. Then the value of $\frac{p(p+1)}{2p+1}$ lies between

a) $\frac{4}{5}$ and 1 b) 1 and $\frac{7}{5}$ c) $\frac{6}{5}$ and $\frac{7}{5}$ d) $\frac{7}{5}$ and $\frac{8}{5}$

Ans. **(b)**

Sol. P and P + 1 are two Price No. then

Let P = 2

P +1 = 3

Than $\frac{P(P+1)}{2P+1} = \frac{2\times 3}{2\times 2+1} = \frac{6}{5} = 1.2$

1.2 Lie bitterer 1 and $\frac{7}{5} = (1.4)$

$$\underline{(1) < (1.2) <}\left(\frac{7}{5}\right)$$

7. a, b, c, d are real numbers such that a – 2023 = b + 2024 = c – 2025 = d + 2026. Then the greatest among a, b, c, d is

a) a b) b c) c d) d

Ans. **(c)**

Sol. a – 2023 = b + 2024 = c – 2025 = d + 2026 = K

a – 2023 = K a = K + 2023

b + 2024 = K b = K – 2024

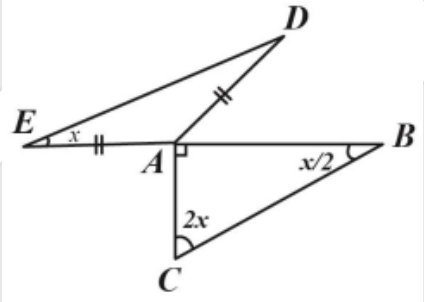
c – 2025 = K c = K + 2025

d + 2026 = K d = K – 2026

Then C is greatest (K+ 2025)

Among a, b, c, d

8. In the adjoining figure, AD = AE. Then measure of ∠EAD is



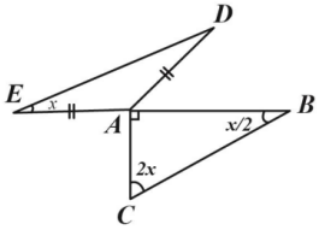
a) 100º b) 105º c) 106º d) 108º

Ans. **(d)**

Sol. Given :

AD = AE

Find ∠EAD = ?



AD = AE

∠EDA = X

In Δ ABC

$90 + 2x + \frac{x}{2} = 180$

$\frac{5x}{2} = 90$

$x = \frac{180}{5}$ 36º

$x = 36º$

In Δ AED

$x + x + \angle EAD = 180º$

$\angle EAD = 180º - 2x$

$\angle EAD = 180 - 72 = 108º$

9. The largest 3-digit number which is exactly divisible by the H.C.F. of 24 and 36 is n. Then n + 4 is equal to

a) 994 b) 996 c) 998 d) 1000

Ans. **(d)**

Sol. HCF of 24 and 36

$24 = 2^3 \times 3$

$26 = 2^3 \times 3^2$

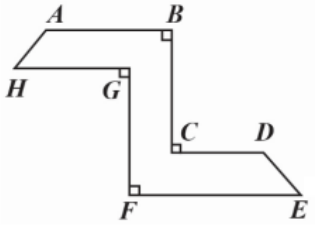
HCF = 4 × 3 = 12

Now a 3 digit no. which is Exactly dividable by 12 is 996

n = 996

n + 4 = 996 +4 = 1000

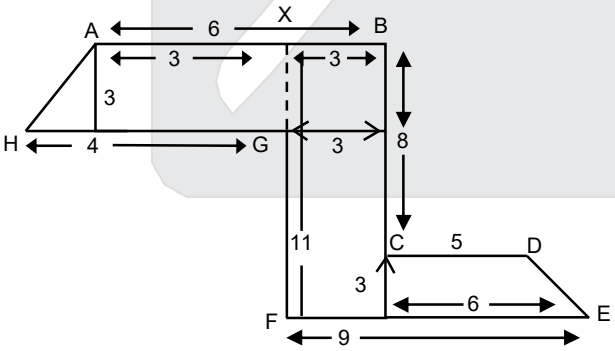
10. In the given figure, AB ∥ HG ∥ CD ∥ FE. AB = 6, GH = 4, CD = 5, FE = 9 and BC = 8. Distance between the pair of parallel lines (AB, HG), (BC, GF) and (CD, FE) is the same and equal to 3. The area of the total figure is



a) 64 b) 60 c) 45 d) 65

Ans. **(b)**

Sol.



AB = 6

GH = 4

CD = 5

FE = 9

BC = 8

Total area = Area of trapezium A × GH + Area of Rectangle + Area of Trapezium CDEY

$= \frac{1}{2} \times (3 + 4) \times 3 + 3 \times 11 + \frac{1}{2} \times (5 + 6) \times 3$

$= \frac{1}{2} \times 7 \times 3 + 33 + \frac{1}{2} \times 11 \times 3$

$\frac{21}{2} + 33 + \frac{33}{2} = \frac{21+66+33}{2} = \frac{120}{2} = 60$

11. The number of pairs of two digit square numbers, the sum or difference of which are also squares is

a) 0 b) 1 c) 2 d) 3

Ans. **(c)**

Sol. Two digit square number is

16, 25, 36, 49, 64, 81

diff. = $25 - 16 = 9 = 3^2$

Sum = $36 + 64 = 100 = 10^2$

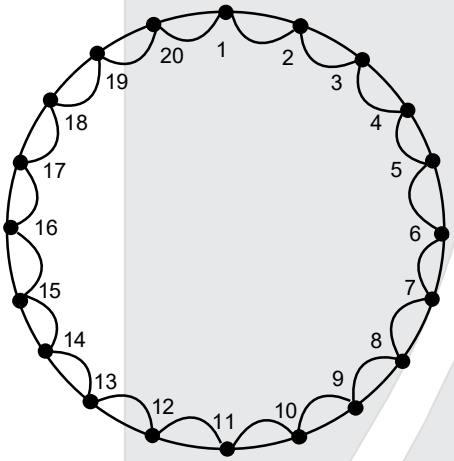
two pair are possible

12. There are 20 people around a table. Each of them shakes hands with the people to his (or her) immediate left and immediate right. The total number of handshakes that takes place is

a) 40 b) 30 c) 32 d) 20

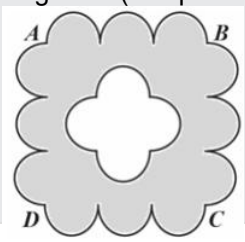
Ans. **(d)**

Sol. 20 people around a table = 20



Total no. of handshakes that take place is = 20

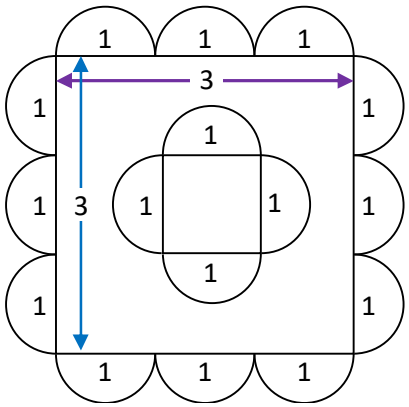
13. In the adjoining figure, A, B, C, D are the vertices of a square of side 3 units. All the semi-circles are equal. Then the area of the shaded region is (in sq. units)



a) $8 + \pi$ b) $6 + \pi$ c) $12 + \pi$ d) $7 + \pi$

Ans. **(a)**

Sol.



Area of one semi circle = $\frac{1}{2}\left[\pi\left(\frac{1}{2}\right)^2\right] = \frac{\pi}{8}$

Inner total semicircle = $4\times\frac{\pi}{8} = \frac{\pi}{2}$

Total area of Inner figure = $\frac{\pi}{2}+1$

Now Total Area of figure

$= 12\times\left(\frac{1}{8}\right)+3\times3-\left[1-\frac{\pi}{2}\right]$

$= \frac{3}{2}\pi + 9 - 1 - \frac{\pi}{2}$

$= 8 + \pi$

14. There are two boxes A and B which can hold 38 candles and 20 candles respectively. 288 candles have to be placed to the maximum capacity of the boxes. If we require m number of A-type boxes and n number of B-type boxes, then the value of $\frac{m}{n}$ is

a) 1 b) 2 c) 3 d) 4

Ans. **(b)**

Sol. Type A box candle = 38
Type B box candle = 20
then

$m \times 38 + n \times 20 = 288$
$2\,[19m + 10n] = 288$
$[19m + 10n = 144]$

Let $n = 3$ then

$19m + 30 = 144$
$19m = 114$
$m = \frac{114}{19} = 6$

then $\frac{m}{n} = \frac{6}{3} = 2$ Ans.

15. The divisors of 6 are 1, 2, 3, 6. Leaving 1 and 6, the divisors are 2 and 3. Let us denote 

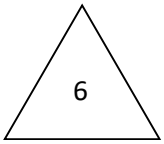
2 + 3 = 5. Then the value of 

is _____

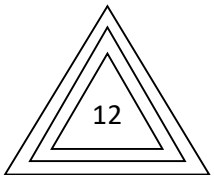
a) 6 b) 8 c) 5 d) 12

Ans. **(a)**

Sol.



2 + 3 = 5



Case 1 → 12 = 1, 2, 3, 4, 6, 12
2 + 3 + 4 + 6 = 15

Case-2 → 15 = 1 , 3, 5, 15
3 + 5 = 8

Case-3 → 8 = 1, 2, 4, 8
2 + 4 = 6

= 6 Ans.

Section B (Fill in the blanks)

16. The fraction $\frac{(2\times3\times4)+(4\times6\times8)+(6\times9\times12)+.....+(20\times30\times40)}{(1\times2\times3)+(2\times4\times6)+(3\times6\times9)+.....+(10\times20\times30)}$ reduces to _____.

Ans. 04

Sol. $\frac{(2\times3\times4)+(4\times6\times8)+(6\times9\times12)+.....+(20\times30\times40)}{(1\times2\times3)+(2\times4\times6)+(3\times6\times9)+.....+(10\times20\times30)}$

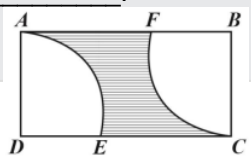
$= \frac{24+192+648+.....24000}{6+48+162+.....6000}$

$= \frac{24[1+8+7+.....1000]}{6[1+8+27+.....1000]}$

= 4 Ans.

17. In the adjoining figure, ABCD is a rectangle.

AE and CF are quadrants. The length of the rectangle is twice its breadth. Taking $\pi = \frac{22}{7}$, the area of the shaded region is 21 cm^2.
Then the area of the rectangle is _____.



Ans. 98

Sol. Let the breadth of rectangle is = x cm
then length is = 2x

Area of both quadrants = $2 \times \frac{90}{360}\times\frac{22}{7}\times x^2$

Area of shaded region = 21 cm^2

Area of rectangle = $\frac{11}{7}x^2 + 21$

Area of rectangle = 2x × x

$= 2x^2$

$\frac{11}{7}x^2 + 21 = 2x^2$

$\frac{2x^2}{1} - \frac{11x^2}{7} = 21$

$\frac{3x^2}{7} = 21$

$x^2 = 49$

$x = 7$ cm

Area of rectangle $= 2\times(7)^2$

$= 2\times49$

$= 98\ cm^2$

18. The number m has factors 2, 5 and 6. The number n has factors 4 and 8. The smallest value of m + n is _____

Ans. **38**

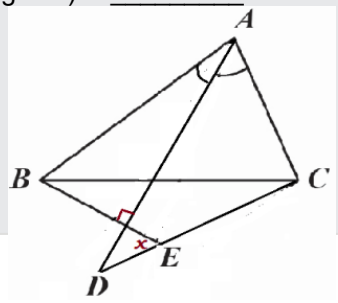
Sol. Factors of number M = 2, 5 and 6
We can say that smallest number is = 30
Factors of number n is = 4 and 8
We can say that smallest number is = 8
Smallest value of m + n is = 30 + 8 = 38

19. There are two bus stops on opposite sides of a road. Bus route X has a frequency of 15 minutes at one stop. Bus route Y has a frequency of 40 minutes in the opposite bus stop. Currently both buses arrived in the opposite stops. Again two buses will simultaneously arrive at opposite stops after _____ hours.

Ans. **02**

Sol. LCM of 15 min and 40 min. = 120 minutes
They are two route X and Y
Two buses will simultaneously arrive at opposite stop after 2 hours.

20. In the adjoining figure, $\angle ABC = 60^\circ$ and $\angle ACB = 80^\circ$. AD is the bisector of $\angle A$. Through C, a line making $\frac{\angle A}{2}$ with BC is drawn. This line cuts the bisector at D and the perpendicular from B to AD at E. Then the measure of x (in degrees) is _____



Ans. **30**

Sol. $\angle ABC = 60^\circ$
$\angle ACB = 80^\circ$
then $\angle A + \angle ABC + \angle ACB = 180^\circ$
$\angle A = 180 - [60 + 80]$
$\angle A = 180 - 140$
$\angle A = 40^\circ$

AD is bisector of $\angle A$, then $\frac{\angle A}{2} = 20^\circ$

Let O is intersecting point of AD and BC
$\angle AOC = 80°$ (by exterior angle)
$\angle BOD = 80°$ (Vertically opposite angle)
Let F is point intersecting point of BE and OD
$\angle BFO = 90°$ (Perpendicular drawn)

In triangle BOF
$\angle OBF + \angle OFB + \angle BOF = 180°$
$\angle OBF = 180 - (90 + 80)$
$\angle OBF = 180 - 170 = 10°$
$\angle BCD = \frac{\angle A}{2} = 20°$ (given)
Angle x is exterior angle
$x = \angle B + \angle C$
$x = 10° + 20$
$x = 30°$

21. For two real numbers a and b, we have
$a * b = \left(a + \frac{b}{2}\right) \times \left(b + \frac{a}{2}\right)$.
Then the value of $(2 * 8) * 2$ is _____.

Ans. **1595**

Sol. $a * b = \left(a + \frac{b}{2}\right) \times \left(b + \frac{a}{2}\right)$

$2 * 8 = \left(2 + \frac{8}{2}\right) \times \left(8 + \frac{2}{2}\right)$

$= 6 \times 9$

$2 * 8 = 54$ .....(1)

Now →

$54 * 2 = \left(54 + \frac{2}{2}\right) \times \left(2 + \frac{54}{2}\right)$

$= 55 \times 29$

$= 1595$ Ans.

22. A 2-digit number has repeated digits. The number of such numbers having exactly 4 divisors is _____.

Ans. **04**

Sol. Our number like = aa
Where a is digit
Possible number, 11, 22, 33, 44, 55, 66, 77, 88, 99
Only 33, 55, 77, 99 have exactly four divisors
33 → 1, 3, 11, 33
55 → 1, 5, 11, 55
77 → 1, 7, 11, 77
99 → 1, 3, 33, 99

23. The salaries of Peter and Ali are in the ratio 3:2. Their expenditures are in the ratio 5 : 3 in that order. If each saves Rs.5000, then Peter's income (in Rs) is _____.

Ans. **30,000**

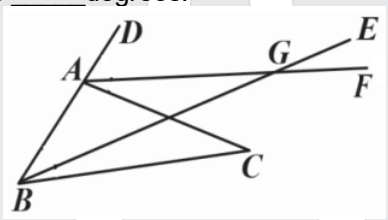
Sol. Ratio of salaries of Peter and Ali are in 3 : 2
Let the salaries of Peter and Ali 3x, and 2x
Ratio of their expenditure are = 5 : 3
Their expenditures are = 5y and 3y
Income – Expenditures = Saving

each saves = 5000 Rs.
$3x - 5y = 5000$ .....(1)
$2x - 3y = 5000$ .....(2)
We multiply (1) by 2 and (2) by 3 to eliminate x

$$\begin{array}{r} 6x - 10y = 10000 \\ 6x - 9y = 15000 \\ \hline - \quad + \quad - \\ - \quad y = -5000 \end{array}$$

$y = 5000$
Put y in eq. (1) to find x
$3x - 5 \times 5000 = 5000$
$3x = 5000 + 25000$
$3x = 30000$
$x = 10000$
Peter income is = 3x
$= 3 \times 10000$
= 30000 Rs

24. In the given figure, $\angle A : \angle B : \angle C = 14 : 3 : 1$. A line BE through B making an angle $\frac{\angle B}{3}$ with BC is drawn. A line through A, making an angle $\frac{1}{4}\angle CAD$ with AC is drawn. They cut at G. Then the measure of $\angle EGF$ is _____degrees.



Ans. **10**

Sol. $\angle A : \angle B : \angle C = 14 : 3 : 1$
Angles are 14x, 3x, x
$14x + 3x + x = 180^o$
$18x = 180$
$x = 10$
Angle are 140, 30, 10
A line BE through B making an angle $\frac{\angle B}{3}$ with BC
$\angle GBC = 10°$
A line through A making an angle $\frac{\angle CAD}{4}$
with AC, we know $\angle CAD = 180 - 140 = 40°$
$\angle FAC = 10°$
In figure $\angle GAC =$ and $\angle BCA$ are equal.
Alternate angle are equal that mean AG || BC
$\angle CBG = \angle AGB = 10°$ (Alternate angle)
$\angle AGB = \angle EGF = 10°$ (Vertically opposite angle)
$\angle EGF = 10°$

25. Ramaswamy, Krishnaswamy, Rangawamy, Gopalaswamy and Kumaraswamy have different amounts of money in rupees in their pockets, each an odd number and less than Rs.100. The largest possible total sum of money in rupees is _____

Ans. **475**

Sol. Ramaswamy, krishnaswamy, Rangawamy, Gopalaswamy and Kumaraswamy have different amounts of money in rupees.
Each have odd number and less than 100 Rs.
Suppose there are five person we take amount like 99 Rs, 97 Rs, 95 Rs, 93 Rs, 91 Rs
They are odd numbers in ruppes.
Their are odd numbers in ruppes.
Their sum = 99 + 97 + 95 + 93 + 91
Largest value = 475 Rs.

26. The cost price of 10 articles is equal to the selling price of 9 articles. The profit percent is $11\frac{1}{\alpha}$.

Then α = _____

Ans. **09**

Sol. The cost price of 10 articles = selling price of 9 articles.
Let the cost price of one article = x Rs.
Cost price of 9 articles = 9x Rs.
Cost price of 10 articles = 10x Rs.
We know selling price of 9 articles = 10x
Profit is = selling price of 9 articles cost price of 9 articles
= 10x – 9x = x Rs.

Profit % = $\frac{x}{9x} \times 100$

= $\frac{100}{9} = 11\ \frac{1}{9}\%$

Value of a = 9

27. When $2\frac{6}{11}$ of $1\frac{2}{7}$ is divided by $3\frac{3}{11}$, we get _____.

Ans. **01**

Sol. $2\ \frac{6}{11}$ of $1\ \frac{2}{7}$

$\frac{28}{11} \times \frac{9}{7}$

= $\frac{36}{11}$ divided by $\frac{36}{11}$

$\frac{36}{11} \div \frac{36}{11}$

$\frac{36}{11} \times \frac{11}{36} = 1$

28. Two cell phones were sold at the same price. If there is 10% gain on the one and 10% loss on the other, then the total percent of loss is _____

Ans. **01**

Sol. Let the selling price of each phone = x Rs.

10% gain on first phone cost price of first phone cost price = S.P× $\frac{100}{(100+\text{gain})}$

C.P. = $\frac{x \times 100}{110} = \frac{10x}{11}$

10% loss on second phone

cost price of second phone = C.P. = S.P. × $\frac{100}{(100-10)}$

C.P. = x × $\frac{100}{90}$ = $\frac{10x}{9}$

Total cost price = $\frac{10x}{11}+\frac{10x}{9}$

= $\frac{90x+110x}{99}$

= $\frac{200x}{99}$

Total selling price = 2x

Total loss = $\frac{200x}{99}-2x$

= $\frac{200x-198x}{99}$

= $\frac{2x}{29}$

% loss = $\frac{\frac{2x}{99}}{\frac{200x}{99}}\times 100$ = $\frac{2x}{99}$ × $\frac{99}{200x}$ × 100

= 1% loss

29. An office staff works for 4 days consecutively, then has the next day off; he works for 4 more days and has a day off on the next day; and so on. Today is his day-off and it is a Sunday. The minimum number of days the staff must work to have his off-day as Sunday is _____

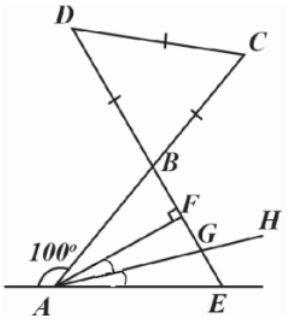
Ans. **28**

Sol. Let assume first day is off day.
and this day is sunday

S	M	T	W	Th	F	Sat
off	—	—	—	—	off	—
—	—	—	off	—	—	—
—	off	—	—	—	—	off
—	—	—	—	off	—	—
—	—	off	—	—	—	—
off						

Ans. 28

30. In the adjoining figure, triangle BCD is equilateral. If ∠AFB = 90o and AH is the bisector of ∠FAE, then the measure of ∠HGE (in degrees) is _____



Ans. **65**

Sol. Triangle BCD is equilateral
$\angle AFB = 90^\circ$, AH is the bisector of $\angle FAE$
In triangle BCD each angle is 60°
In ΔABE $\angle B = 60^\circ$ (Vertically opposite Angle)
BAE is $180 - 100 = 80^\circ$ (linear pair)
$\angle BEA + \angle ABE + \angle BAE = 180^\circ$
$\angle BEA + 60^\circ + 80^\circ = 180$
$\angle BEA = 180 - 140$
$\angle BEA = 40^\circ$
$\angle BAF + \angle AFB + \angle ABF = 180$
$\angle BAF + 90^\circ + 60^\circ = 180^\circ$
$\angle BAF = 180^\circ - 150^\circ$
$\angle BAF = 30^\circ$
$\angle FAE = 80^\circ - 30^\circ$
$\angle FAE = 50^\circ$
$\angle AG$ is bisector
$\angle FAG$ and $\angle GAE$ is 25°
Triangle $\angle FAG$
$\angle AFG + \angle FAG + \angle FGA = 180^\circ$
$\angle FGA = 180^\circ - 90^\circ - 25$
$\angle FGA = 180 - 115 = 65^\circ$
$\angle HGE = \angle FGA = 65^\circ$ (vertically opposite angle)
$\angle HGE = 65^\circ$