कक्षा : ८ *(Grade: 8)*

विषय: गणित *(Subject: Mathematics)*

तल दिइएका तथ्यहरू ठीक भए ⊤ र बेठीक भए F लेख :

Write (T) for true and f. for false statements given below:

1. M1TF_3

xᵃ र x⁻ᵃ को गुणनफल 1 हुन्छ ।

The product of x^a and x^{-a} is 1. ☐

2. M3TF_4

अर्धव्यास (r) = 14 cm भएको वृत्तको परिधि c. = 90 cm हुन्छ ।

If the radius (r) of a circle = 14 cm, its circumference c. = 90 cm. ☐

3. M4TF_8

ब्यक्तिगत श्रेणीको मध्यक निकाल्ने सूत्र $\overline{X} = \frac{\Sigma X}{N}$ हो ।

In the individual series, the formula to calculate mean is $\overline{X} = \frac{\Sigma X}{N}$. ☐

4. M1TF_1

खालि समूह ɸ प्रत्येक समूहको उपसमूह हो ।

The empty set ɸ is the subset of every set. ☐

सही उत्तरमा गोलोघेरा लगाऊ (Circle the correct alternative):

5. DTIMSS10

यदि a = 3, b = 1 भए,
2a + 3(2 − b) को मान कति हुन्छ ?
If a = 3, b = 1, what is the value of 2a + 3(2 − b) ?

a. 15　　　b . 14　　　c. 13　　　d. 9

6. DTIMSS15

a² X 3a =

a. 5a²　　　b. 5a³　　　c. 6a²　　　d. 6a³

7. **DTIMSS17**

$3(2x - 1) + 2x = 21$

x को मान कति हुन्छ ?

What is the value of x?

a. -3　　　　 b. $\dfrac{-11}{4}$　　　 c. $\dfrac{11}{4}$　　　　 d. 3

8. **M1D_22**

12 ओटा कलमको मूल्य रु. 360 भए एउटा कलमको मूल्य कति पर्दछ ?

If the cost of 12 pens is Rs. 360, what is the cost of one pen?

(a) 　 Rs. 20　　　　 b. 　 Rs. 25　　　 c. Rs. 30　　　　　　 d. 　 Rs. 35

9. **DTIMSS16**

Class	Boys	Girls
1	12	9
2	14	11
3	16	12
4	18	15

माथिको तालिकामा चार ओटा कक्षाका केटाकेटीहरुको संख्या देखाइएको छ । कुन दुईओटा कक्षाहरुमा केटा र केटीको संख्याको अनुपात बराबर छ ?

The table above shows the numbers of boys and girls in four classes. Which two classes have the same ratio of boys and girls?

a. 1 and 2　　　 b. 1 and 3　　　 c. 2 and 3　　　 d. 2 and 4

10. **M1D_16**

$x^2 + x + 1 + x$ 　 $=$

　　　　 a. 　 $4 - 4x + x^2$　　 b. $(x + 1)(x + 1)$　 c. 　 $(2x + 3)(2x - 3)$

　　　　 d. 　 $3x(3x - 1)$　　 e. 　 $3x(x - 3)$　　 f. 　 $4 + 4x - x^2$

11. **M4D_41**

700000 को वैज्ञानिक सङ्केत तलका मध्ये कुन हो ?

Which one of the following is the scientific notation of 700000?

a. 7×10^3 b. 7×10^4 c. 7×10^5 d. 7×10^6

12. **DTIMSS25**

तालिकाले कुनै दिनको विभिन्न समयको तापक्रम देखाएको छ ।
The table shows the temperatures at various times on a certain day.

| समय (Time)	6 a.m.	9 a.m.	noon	3 p.m.	6 p.m.
तापक्रम (Temperature) °C	12	17	14	18	15

ग्रफ कुनैपनि तापक्रमको स्केल प्रयोग नगरी खिचिएको छ । तलका मध्ये कुन ग्राफले माथिको सुचना देखाउँछ ?
A graph, without a temperature scale, is drawn. Of the following, which could be the graph that shows the information given in the table?

a)

b)

c)

d)
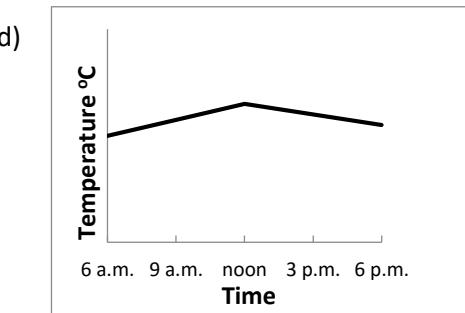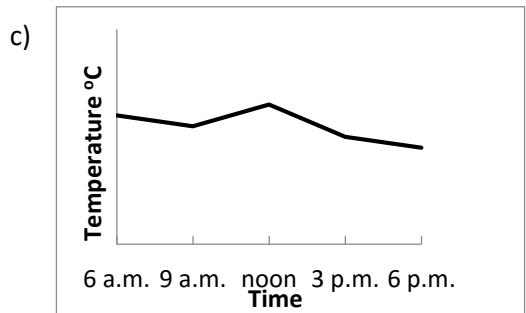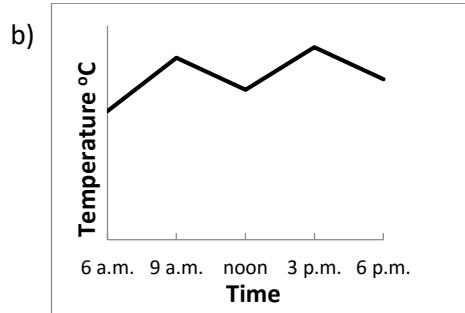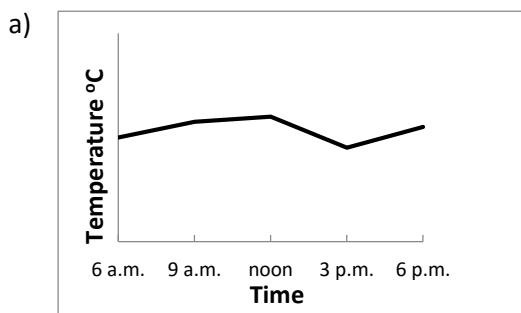
13. DTIMSS3

$$\frac{2}{5}+\frac{5}{4}+\frac{9}{8}=$$

a. $\frac{16}{17}$ b. $\frac{41}{40}$ c. $\frac{81}{40}$ d. $\frac{111}{40}$

14. M4D_17

सप्तभुज (Heptagon) =

a.   b.   c.   d.   e.   f.
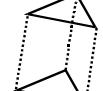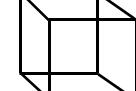
15. M2D_31

साधारण ब्याज (I) पत्ता लगाउने सूत्र तलका मध्ये कुन हो ?

Which of the following is used to calculate the simple interest (I)?

a. $\frac{100xI}{TR}$ b. $\frac{100xI}{PR}$ c. $\frac{PTR}{100}$ d. $\frac{100xI}{PT}$

16. M1D_15

$4x^2 - 9$ =

a. $4 - 4x + x^2$ b. $(x + 1)(x + 1)$ c. $(2x + 3)(2x - 3)$

d. $3x(3x - 1)$ e. $3x(x - 3)$ f. $4 + 4x - x^2$

17. M1D_39

तल दिइएका मध्ये अनानुपातिक सङ्ख्या कुन हो ?

Which one of the following is an irrational number?

a. $\sqrt{4}$ b. $\sqrt{5}$ c. $\sqrt{9}$ d. $\sqrt{16}$

18. M3D_24

दिइएको चित्रमा x को मान तलका मध्ये कुन हो ?

In the figure, which of the following is the value of x?

a. 60°

b. 90°

c. 120°

d. 150°
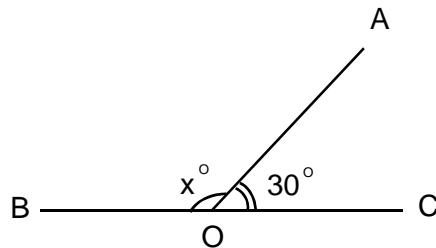
19. M3D_28

$\dfrac{2}{3\sqrt{5}}$ को हरलाई अनुपातीकरण गर्न तलका मध्ये कुन सङ्ख्याले अंश र हर दुबैलाई गुणन गर्नु पर्ला ?

Which number of the following is appropriate to rationalize the denominator of $\dfrac{2}{3\sqrt{5}}$?

a. $\sqrt{2}$ b. $\sqrt{3}$ c. $\sqrt{5}$ d. $\sqrt{7}$

20. M3D_14

$(x^2)^3 =$

a. x b. x^5 c. x^6 d. $(x + 5)$

21. M1D_30

(b + a) र (b − a) को गुणनफल तल दिइएका मध्ये कुन हो ?

Which one of the following is product of (b + a) and (b − a) ?

a. $a^2 - b^2$ b. $a^2 + b^2$ c. $-b^2 - a^2$ d. $b^2 - a^2$

22. M3D_42

एउटा परिवारको मासिक खर्च रु. 10,000 लाई दिइएको वृत्तग्राफमा देखाइएको छ भने खानामा भएको खर्च तलका मध्ये कुन हो ?

The monthly expenditure of Rs. 10,000 of a family is shown in the pie-chart. Which of the following is the expenditure on food?

a.   250

b.   2,500

c.   5,000

d.   10,000
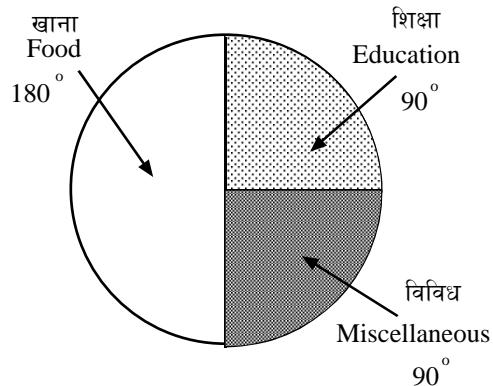
23. DTIMSS11

जेडल्यान्डमा पानीजहाजबाट सामग्रीहरु ढुवानी गर्दा लाग्ने पुरा खर्च $y = 4x + 30$ समिकरणले दिन्छ जहाँ x ले सामग्रीको तौल ग्राममा र y ले सोको मुल्य जेडमा छ । यदि तिमिसँग भएको रकम जम्मा 150 जेड छ भने कति ग्राम तिमीले पानीजहाजबाट ढुवानी गर्न सक्छौ ?
In Zedland, total shipping charges to ship an item are given by the equation $y = 4x + 30$, where x is the weight in grams and y is the cost in zeds. If you have 150 zeds, how many grams can you ship?

a. 630   b. 150   c. 120   d. 30

24. DTIMSS14

तलका मध्ये कुन $2(x + y) - (2x - y)$ सँग बराबर हुन्छ ?
Which of these is equal to $2(x + y) - (2x - y)$?

a. 3y   b. y   c. 4x + 3y   d. 4x + 2y

25. M3D_35

दिइएको चित्रमा {2,3} ले कुन समूहलाई जनाउँछ ?

From the given figure, what does {2,3} represent ?

a.   A – B

b.   B – A

c. $\bar{A}$

d.   A ∩ B
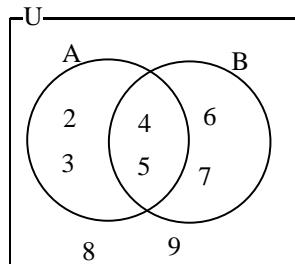
26. M3D_34

(x + y) र (x + y)² को लघुत्तम समापवर्त्य (ल.स.) तलका मध्ये कुन हो ?

Which one of the following is the Lowest Common Multiple (LCM) of (x + y) and (x + y)²?

a.   (y + x)   b. (y – x)   c. (y – x)²   d. (y + x)²

27. M2D_12

$a^2 = 4$ को कुनै एउटा रुट (one root of $a^2 = 4$)

a. a^2 b. – 1   c. 1   d. a   e. – 2   f. 0

28. M3D_25

दिइएको चित्रमा y को मान तलका मध्ये कुन हो ?

In the figure, which one of the following is the value of y?

a.   30º

b.   45º

c.   60º

d.   90º
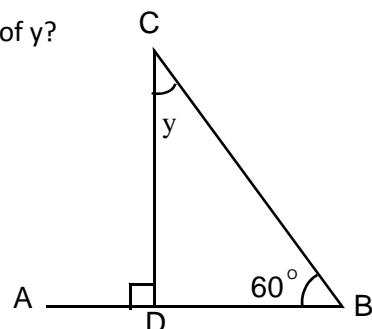
29. DTIMSS8

दिइएको चित्रमा रेखा *l* रेखा *m* सँग समानान्तर छ । कोण *DAC* को नाप *55º* भए *x + y* को मान पत्ता लगाउ ।
In this figure, line L is parallel to line M. The measure of angle DAC is 55º. What is the value of x + y?

a. 55

b. 110

c. 125

d. 135
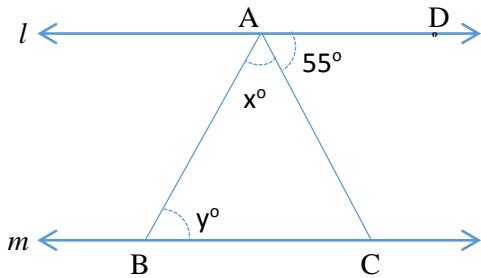
30. DTIMSS9

चित्रमा PQ एउटा सरल रेखा हो ।
कोण PRS को मान कति डिग्रि हुन्छ ?
In this figure, PQ is a straight line.
What is the degree measure of angle PRS?

a. 10º   b. 20º   c. 40º   d. 70º   e. 140º
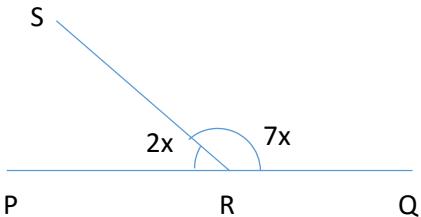
31. DTIMSS21.
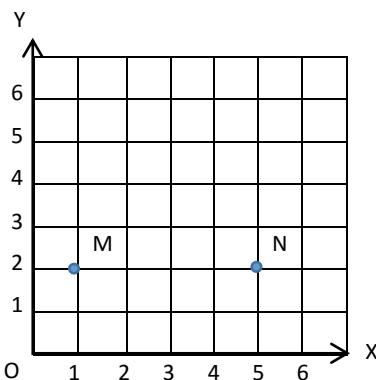
माथिको चित्रमा दुई विन्दुहरु M र N दिइएको छ । हरीले ग्राफमा त्रिभुज MNP समद्विबाहु त्रिभुज हुनेगरी विन्दु P को चिनो लगाउन तलका मध्ये कुन निर्देशांक छनोट गर्नु पर्दछ ?
Two points M and N are shown in the figure above. Hari is looking for a point P such that MNP is an isosceles triangle. Which of these points could be point P?

a. (3,5)   b. (3,2)   c. (1,5)   d. (5,1)

32. **M1D_35**

यदि एउटा वर्गको परिमिति 40 से.मि.भए यसको क्षेत्रफल तल दिइएका मध्ये कुन हो ?

If the perimeter of square is 40cm, which one of the following is area of the square?

a. 64 cm²   b. 81 cm²   c. 100 cm²   d. 225 cm²

33. **M3D_43**

चित्रमा ∆ABC र ∆ PQR कुन आधारमा समरूप हुन्छन् ?

In which condition ∆ ABC and ∆PQR are similar?

a.   स.क.भु (RHS)

b.   भु.को.भु. (SAS)

c.   को.को.को. (AAA)

d.   भु.भु.भु. (SSS)
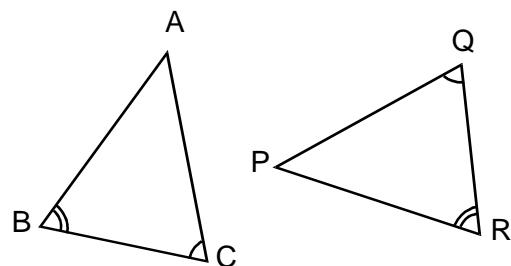
34. DTIMSS24
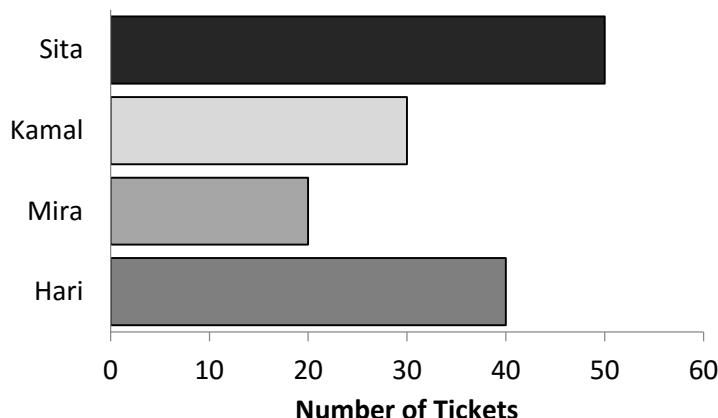
Number of Tickets

सीता, कमल, मीरा र हरी विद्यालयको कन्सर्टका लागि टिकट विक्री गरे ।
ग्राफले उनीहरुले बेचेका टिकटहरुको संख्या देखाउँछ ।
कुन दुइजनाले बेचेका टिकटहरुको जम्मा संख्या सीताले बेचेको संख्यासँग बराबर छ ।

Sita, Kamal, Mira, and Hari sold tickets for the school concert.
The graph shows the number of tickets each sold.
Two people together sold the same number of tickets as Sita sold. Who were they?

35. **M2S_46**   27 को घनमूल .... हुन्छ ।

The cube root of 27 is ....

36. M1S_43

अष्टभुजमा पञ्चभुजको भन्दा भुजाहरूको सङ्ख्या ……………ले बढी हुन्छ ।

The number of sides in octagon is …………… **more** than that of pentagon.

37. M3S_44

यदि A = {5, 6, 7, 8} र B = {6, 7, 8, 9, 10} भए A – B = {………………} हुन्छ ।

If A = {5, 6, 7, 8} and B = {6, 7, 8, 9, 10} then A – B = {………………}

38. M1S_48

दिइएको भेन चित्रमा समूह A को पूरक ($\bar{A}$) = ……………

In the given Venn-diagram, the complement of the set A, ($\bar{A}$) = ……………
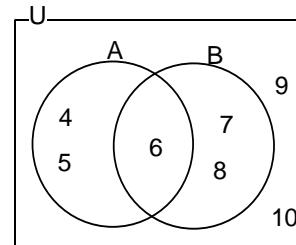
39. DTIMSS4

चित्रमा छायाँ पारिएको त्रिभुज वर्गभित्र देखाइएको छ ।

The figure shows a shaded triangle inside a square.

उक्त छाया पारिएको त्रिभुजको क्षेत्रफल कति हुन्छ ?

What is the area of the shaded triangle?
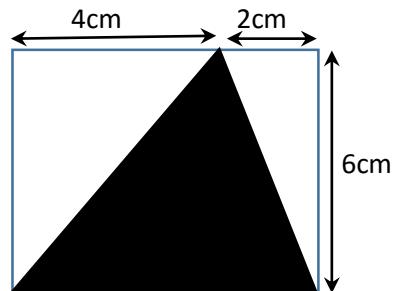
40. DTIMSS2

१०० वर्ग मिटर क्षेत्रफल हुने वर्गको परिमिति कति हुन्छ ?
What is the perimeter of a square whose area is 100 square meters?

41. M2S_60

जुनाले एउटा मोवाइल रु. 25000 मा किनेर 1 वर्षपछि रु. 5000 घाटा खाएर विक्रि गरिन् भने

(i) उक्त मोवाइलको विक्रय मूल्य कति होला ?

(ii) घाटा प्रतिशत पत्ता लगाऊ ।   [3]

Juna bought a mobile in Rs. 25000 and after one year she sold it with the loss of Rs. 5000, then

(i)   find the selling price of the mobile.

(ii)   find her loss percentage.

42. M2S_58

त्रिभुजका तीनओटा कोणहरूको योग 180° हुन्छ भनी प्रयोगद्वारा प्रमाणित गर । (दुईओटा चित्र अनिवार्य) [4]

Verify experimentally that the sum of angles of a triangle is 180°. (Two figures are necessary)

43. M2S_51

समूहहरू $\overline{A \cap B}$, $\overline{A \cup B}$ र $\bar{A} \cap \bar{B}$ लाई दिइएका तीनओटा अलग अलग भेन चित्रमा छायाँ पार र कुन कुन दुई समूहहरू बराबर छन् देखाऊ ।   **[4]**

Draw three Venn-diagrams of the sets $\overline{A \cap B}$, $\overline{A \cup B}$ and $\bar{A} \cap \bar{B}$ in the given Venn-diagram and shade them. Verify that which of two sets are equal.
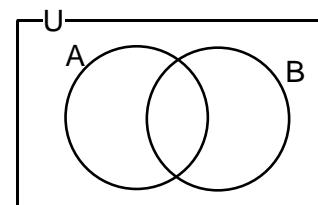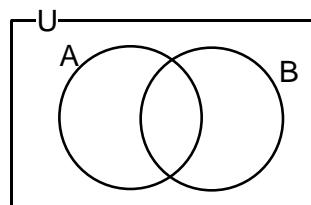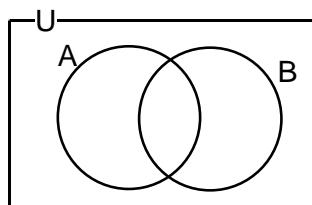
44. M2S_56

भेनचित्र प्रयोग गरी अभिब्यञ्जकहरू $(x - 1)^2$ र $x^2 - 1$ को म.स. निकाल ।   [3]

Find the HCF of the expression $(x - 1)^2$ and $x^2 - 1$, by using Venn-diagram.

45. M4S_52

एउटा विद्यालयको कक्षा ६, ७ र ८ मा पढ्ने विद्यार्थिहरूको कक्षागत विवरण तल तालिकामा प्रस्तुत गरिएको छ । यसलाई वृत्त चित्रमा देखाऊ । [4]

In a school, class wise number of students of grade 6, 7 and 8 is given in a table below. Represent the information in a pie-chart.

कक्षा (class)	6	7	8
विद्यार्थी सङ्ख्या (No. of Students)	125	130	105

46. M2S_57

हल गर (Solve): $6x^2 - 7x + 2 = 0$ [3]

47. M1S_56

रु. 5000 को 2 वर्षको 10% प्रतिवर्ष साधारण ब्याजका दरले हुन आउने मिश्रधन पत्ता लगाउनुहोस् । [3]

Find the amount of Rs. 5000 for 2 years at the rate of 10% per annum simple interest?

48. M1S_65

सरल गर्नुहोस् (Simplify) : [3]

$$\frac{a}{(a-b)(a-c)} + \frac{b}{(b-c)(b-a)} + \frac{c}{(c-a)(c-b)}$$

49. M2S_55

यदि समानान्तर चतुर्भुजको क्षेत्रफल $(12a^2 - 28ab + 15b^2)$ वर्ग एकाइ र यसको आधारको लम्बाइ $(6a - 5b)$ एकाइ भए यसको उचाइ पत्ता लगाऊ । [3]

If the area of a parallelogram is $(12a^2 - 28ab + 15b^2)$ square units and the base of the parallelogram is $(6a - 5b)$ units then find its height.

50. M1S_60

सँगैको चित्रमा ΔPQR ~ ΔPST भए RQ र RT को नाप पत्ता लगाऊ ।   [3]

In the adjoining figure, if ΔPQR ~ ΔPST then, find the
length of RQ and RT .
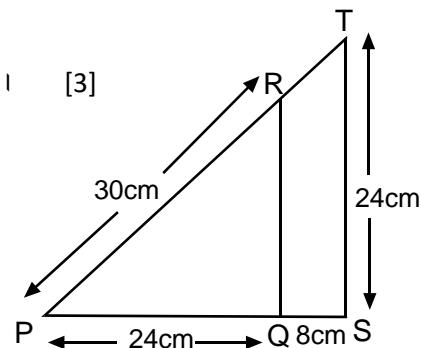
Item Statistics

SN	label	max value	% of correct answered	Difficulty level	Variance	Item-Total Correlation	Type	Topic	Subtopic	Hierarchical level	Beta Parameter (β)	Standard Error of β	
1	M1TF_3	1	0.711	70-84	0.206	0.291	Objective	Algebra	Indices	Knowledge	-1.684	0.134	
2	M3TF_4	1	0.703	70-84	0.209	0.317	Objective	Geometry	Mensuration	Comprehension	-1.738	0.137	
3	M4TF_8	1	0.688	50-69	0.215	0.175	Objective	Statistics	Mean	Knowledge	-1.730	0.135	
4	M1TF_1	1	0.668	50-69	0.223	0.190	Objective	Sets	Sets	Knowledge	-1.461	0.130	
5	DTIMSS10	1	0.994	85<	0.006	0.194	Objective	Algebra	Addition & Subtraction	Knowledge	**0.886**		TIMSS Item
6	DTIMSS15	1	0.922	85<	0.072	0.369	Objective	Algebra	Multiplication	Knowledge	**0.544**		TIMSS Item
7	DTIMSS17	1	0.864	85<	0.119	0.360	Objective	Algebra	Equation	Knowledge	**0.444**		TIMSS Item
8	M1D_22	1	**0.846**	85<	**0.130**	**0.369**	Objective	Arithmetic	Profit and Loss	Application	-2.648	0.084	
9	DTIMSS16	1	0.844	70-84	0.132	0.479	Objective	Arithmetic	Ratio and proportion	Application	**1.335**		TIMSS Item
10	M1D_16	1	0.819	70-84	0.149	0.280	Objective	Algebra	Factorization	Comprehension	-2.337	0.156	
11	M4D_41	1	0.817	70-84	0.150	0.339	Objective	Arithmetic	Numbers	Comprehension	-2.484	0.160	
12	DTIMSS25	1	0.838	70-84	0.137	0.337	Objective	Statistics	Graph and Chart	Application	**-0.495**		TIMSS Item

S N	label	max value	% of correct answered	Diffic ulty level	Varia nce	Item- Total Correl ation	Type	Topic	Subtopic	Hierarchical level	Beta Paramet er (β)	Standar d Error of β	
13	DTIMSS3	1	0.786	70-84	0.169	0.285	Objective	Arithmetic	Simplification	Knowledge	**0.370**		TIMSS Item
14	M4D_17	1	0.774	70-84	0.175	0.242	Objective	Geometry	Mensuration	Knowledge	-2.203	0.149	
15	M2D_31	1	0.768	70-84	0.179	0.426	Objective	Arithmetic	Simple Interest	Knowledge	-2.136	0.144	
16	M1D_15	1	0.708	70-84	0.207	0.456	Objective	Algebra	Factorization	Comprehension	-1.667	0.134	
17	M1D_39	1	0.654	50-69	0.227	0.410	Objective	Arithmetic	Irrational number	Knowledge	-1.395	0.129	
18	M3D_24	1	0.648	50-69	0.229	0.554	Objective	Geometry	Angle	Comprehension	-1.453	0.132	
19	M3D_28	1	0.634	50-69	0.233	0.492	Objective	Arithmetic	rational number	Comprehension	-1.384	0.131	
20	M3D_14	1	0.624	50-69	0.235	0.387	Objective	Algebra	Indices	Comprehension	-1.334	0.131	
21	M1D_30	1	0.611	50-69	0.239	0.422	Objective	Algebra	Multiplication	Comprehension	-1.187	0.126	
22	M3D_42	1	0.600	50-69	0.241	0.433	Objective	Statistics	Graph and Chart	Application	-1.217	0.129	
23	DTIMSS11	1	0.597	50-69	0.242	0.215	Objective	Algebra	Equation	Application	**0.912**		TIMSS Item
24	DTIMSS14	1	0.591	50-69	0.243	0.441	Objective	Algebra	Subtraction	Knowledge	**1.076**		TIMSS Item
25	M3D_35	1	0.562	50-69	0.247	0.494	Objective	Sets	Venn diagram	Comprehension	-1.038	0.128	
26	M3D_34	1	0.555	50-69	0.248	0.259	Objective	Algebra	LCM	Comprehension	-1.005	0.128	
27	M2D_12	1	0.539	50-69	0.249	0.319	Objective	Algebra	Quadratic Equation	Comprehension	-0.986	0.124	

S N	label	max value	% of correct answered	Difficulty level	Variance	Item-Total Correlation	Type	Topic	Subtopic	Hierarchical level	Beta Parameter (β)	Standard Error of β	
28	M3D_25	1	0.531	50-69	0.250	0.497	Objective	Geometry	Angle	Comprehension	-0.893	0.128	
29	DTIMSS8	1	0.513	50-69	0.251	0.554	Objective	Geometry	Parallel lines	Application	**0.876**		TIMSS Item
30	DTIMSS9	1	0.468	35-49	0.251	0.297	Objective	Geometry	Angles	Application	**0.326**		TIMSS Item
31	DTIMSS21	1	0.461	35-49	0.250	0.472	Objective	Geometry	Coordinates	Application	**0.125**		TIMSS Item
32	M1D_35	1	0.419	35-49	0.244	0.404	Objective	Geometry	Mensuration	Comprehension	-0.319	0.125	
33	M3D_43	1	0.297	0-34	0.209	0.425	Objective	Geometry	Similarity	Comprehension	0.250	0.138	
34	DTIMSS24	1	0.799	70-84	0.162	0.401	Objective	Statistics	Graph and Chart	Knowledge	**-0.549**		TIMSS Item
35	M2S_46	1	0.680	50-69	0.237	0.432	Objective	Arithmetic	Cube root	Comprehension	-1.619	0.131	
36	M1S_43	1	0.574	50-69	0.245	0.388	Objective	Geometry	Polygon	Comprehension	-1.017	0.125	
37	M3S_44	1	0.566	50-69	0.247	0.529	Objective	Sets	Difference of sets	Comprehension	-1.054	0.128	
38	M1S_48	1	0.393	35-49	0.239	0.545	Objective	Sets	Complement	Comprehension	-0.194	0.126	
39	DTIMSS4	1	0.331	0-34	0.223	0.658	Objective	Geometry	Mensuration	Application	**0.639**		TIMSS Item
40	DTIMSS2	1	0.240	0-34	0.184	0.500	Objective	Geometry	Mensuration	Application	**0.709**		TIMSS Item

S N	label	max value	% of correct answered	Difficulty level	Variance	Item-Total Correlation	Type	Topic	Subtopic	Hierarchical level	Beta Parameter (β)	Standard Error of β	
41	M2S_60	**3**	0.382	35-49	1.340	0.727	Subjective	Arithmetic	Profit and Loss	Application	**-0.490**	**0.200**	
42	M2S_58	**4**	0.331	0-34	2.280	0.671	Subjective	Geometry	Experimental Verification	Higher ability	**-0.377**	**0.246**	
43	M2S_51	**4**	0.296	0-34	1.611	0.693	Subjective	Sets	Venn diagram	Higher ability	**-0.156**	**0.238**	
44	M1S_56	**4**	0.282	0-34	1.721	0.671	Subjective	Arithmetic	Simple Interest	Application	**0.889**	**0.430**	
45	M4S_52	**4**	0.265	0-34	2.633	0.625	Subjective	Statistics	Chart and graph	Application	**-0.261**	**0.360**	
46	M2S_57	**3**	0.239	0-34	1.339	0.621	Subjective	Algebra	Quadratic Equation	Comprehension	**-0.005**	**0.292**	
47	M2S_56	**3**	0.213	0-34	0.873	0.641	Subjective	Algebra	HCF	Higher ability	**0.348**	**0.223**	
48	M1S_65	**4**	0.202	0-34	1.657	0.619	Subjective	Algebra	Simplification	Higher ability	**0.623**	**0.343**	
49	M2S_55	**3**	0.187	0-34	1.139	0.624	Subjective	Geometry	Mensuration	Higher ability	**0.108**	**0.467**	
50	M1S_60	**4**	0.124	0-34	0.904	0.708	Subjective	Geometry	Similarity	Higher ability	**1.291**	**0.453**	

The items remarked "TIMSS item" are taken from the TIMSS released items. The statistics mentioned here are based on the NASA results.