Class 6
Mental Mathematics
Exercise – 1

EXERCISE – 1 : Mental Mathematics (Class 6)
Full solutions

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1. Smallest and largest 5-digit numbers with 7 in tens place (no digit repeated)

Tens place must be 7: _ _ 7 _

Smallest 5-digit number

- Ten-thousands place must be the smallest non-zero digit → 1
- Thousands and ones places must be the next smallest unused digits → 0 and 2

Number: **10273**

Largest 5-digit number

- Ten-thousands place must be the greatest digit → 9
- Thousands and ones places: next greatest unused digits → 8 and 5

Number: **98675**

Answer: 10273, 98675 ✓

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2. Minimum and maximum digits in sum of two 4-digit numbers

Smallest 4-digit number = 1000
Largest 4-digit number = 9999

Minimum digits in the sum

1000 + 1000 = 2000 → 4 digits

Maximum digits in the sum

9999 + 9999 = 19998 → 5 digits

Answer: 4, 5 ✓

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3. Estimate without actual calculation

Round each number suitably.

(i) 49×61
$\approx 50 \times 60 = 3000$

(ii) $2404 - 305$
$\approx 2400 - 300 = 2100$

(iii) $87 + 21$
$\approx 90 + 20 = 110$

(iv) $492 \div 10$
$\approx 490 \div 10 = 49$

Answers: (i) 3000 (ii) 2100 (iii) 110 (iv) 49 ✓

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4. Make the number using 8, 5, 9, 4

Conditions:

- Biggest digit in hundreds place → 9 in hundreds
- 5 in ones place
- 4 in tens place
- 8 in thousands place

Number formed: **8945**

Answer: 8945 ✓

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5. Find the number

Conditions:

- Greater than number of days in November → greater than 30
- Less than 72
- Even number
- Multiple of 7
- Sum of digits = number of days in a week = 7

Multiples of 7 between 31 and 71: 35, 42, 49, 56, 63, 70

Even numbers among them: 42, 56, 70

Check sum of digits:

- 4 + 2 = 6
- 5 + 6 = 11
- 7 + 0 = 7 ✓

Only **70** satisfies all conditions.

Answer: 70 ✓

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6. Determine the sum by suitable grouping

(i) 547 + 315 + 453

Group 547 and 453:
547 + 453 = 1000
1000 + 315 = **1315**

(ii) 578 + 287 + 213

Group 287 and 213:
287 + 213 = 500
578 + 500 = **1078**

(iii) 1053 + 273 + 247 + 727

Group 1053 and 247: 1053 + 247 = 1300
Group 273 and 727: 273 + 727 = 1000
Total = 1300 + 1000 = **2300**

(iv) 1651 + 759 + 525 + 241 + 3349

Group 1651 and 3349: 1651 + 3349 = 5000
Group 759 and 241: 759 + 241 = 1000
Now 5000 + 1000 + 525 = **6525**

Answers: (i) 1315 (ii) 1078 (iii) 2300 (iv) 6525 ✓

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7. Multiply 94 and 985 by expressing 94 as a sum of two numbers

Write $94 = 100 - 6$

985×94

$= 985 \times (100 - 6)$

$= 985 \times 100 - 985 \times 6$

= 98500 − 5910
= **92590**

Answer: 92590 ✓

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8. Products by suitable rearrangement

(i) 125 × 8 × 40 × 25

(125 × 8) = 1000
(40 × 25) = 1000
1000 × 1000 = **1000000**

(ii) 2197 × 125 × 8

(125 × 8) = 1000
2197 × 1000 = **2197000**

(iii) 20 × 1548 × 50

(20 × 50) = 1000
1548 × 1000 = **1548000**

(iv) 5544 × 25 × 40

(25 × 40) = 1000
5544 × 1000 = **5544000**

Answers:
(i) 1000000 (ii) 2197000 (iii) 1548000 (iv) 5544000 ✓

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9. Product of odd numbers below 10

Odd numbers below 10: 1, 3, 5, 7, 9
Take any two:
1 × 3 = 3 (odd)
3 × 5 = 15 (odd)
5 × 7 = 35 (odd)
7 × 9 = 63 (odd), etc.
Every time, the product of two odd numbers is odd.

Answer: Yes ✓

MENTAL MATHEMATICS – CLASS 6
EXERCISE 2 – Based on Integers

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1. Using number line, do the following :

(i) 6 + (–3)
6 + (–3) means move 6 units to the right from 0, then 3 units to the left.

6 – 3 = 3
Answer: 3

(ii) 10 – 15
10 – 15 = 10 + (–15).
From 10 move 15 units to the left, we reach –5.
Answer: –5

(iii) –5 – 3
–5 – 3 = –5 + (–3).
From –5 move 3 units more to the left: –6, –7, –8.
Answer: –8

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2. Find the sum of the following :

(i) 100 + (–55) + (–45)
= 100 – 55 – 45
First, 100 – 55 = 45
Then, 45 – 45 = 0
Answer: 0

(ii) (–5) + 3 + 7
= 3 + 7 – 5
= 10 – 5 = 5
Answer: 5

(iii) (–53) + (–5) + (–100)
All are negative, so add the numbers and put minus sign.
53 + 5 + 100 = 158
So, sum = –158
Answer: –158

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3. Subtract the sum of –185 and 300 from –80.

First, find the sum of –185 and 300.
–185 + 300 = 300 – 185 = 115

Now subtract this sum from –80:
–80 – 115 = –(80 + 115) = –195

Answer: –195

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4. Write answer in the blanks :

(i) Which is greater: –4 or –5?
On the number line –4 lies to the right of –5, so –4 is greater.
Answer: –4

(ii) Which is smaller: 9 or –99?
All negative numbers are less than positive numbers. So –99 is smaller.
Answer: –99

(iii) 0, –1, –2, –3, 4 can be written in increasing order as:
Smallest to greatest: –3, –2, –1, 0, 4
Answer: –3, –2, –1, 0, 4

(iv) 0, –2, –3, –5 can be written in ascending order as:
Ascending = increasing: –5, –3, –2, 0
Answer: –5, –3, –2, 0

(v) 1, –2, –4, 5 can be written in descending order as:
Greatest to smallest: 5, 1, –2, –4
Answer: 5, 1, –2, –4

(vi) 0, –1, 2, –3, 5 can be written in decreasing order as:
Decreasing = descending: 5, 2, 0, –1, –3
Answer: 5, 2, 0, –1, –3

(vii) Any number lying to the _____ of zero on the number line is positive, whereas any number lying to the _____ of zero is negative.
Positive numbers are to the right, negative numbers are to the left.
Answer: right, left

(viii) –9 lies to the _____ of 9 on the number line so that –9 < 9.
–9 is on the left of 9.
Answer: left

(ix) The number 0 (zero) lies to the _____ of –2 on the number line so that 0 > –2.
0 is on the right of –2.
Answer: right

(x) Zero is greater than every _____ integer and less than every _____ integer.
Zero is greater than all negative integers and less than all positive integers.
Answer: negative, positive

MENTAL MATHEMATICS – EXERCISE 4
(Based on Sets)
Full Solutions with Explanation

1. Write True or False

(i) A set of the letters of the word 'SCHOOL' = {S, C, O, L, H}

Explanation:
The word "SCHOOL" contains the letters S, C, H, O, O, L.
In a set, **repetition is not allowed**, so repeated O and L appear only once.
Thus the set is correctly written.

Answer: True ✓ (matches answer key)

(ii) If $A = \{x : x = 3n - 5, n \in W\}$, then $-5 \in A$.

Explanation:
Take $n = 0$ (since $0 \in W$, the set of whole numbers).
$x = 3(0) - 5 = -5$.
So -5 is indeed a member of A.

Answer: True ✓ (matches answer key)

(iii) A collection of good persons of a country is a set.

Explanation:
The term "good persons" is **not well-defined** because goodness is a matter of opinion.
A set must have clearly defined elements.
So this cannot form a set.

Answer: False ✓ (matches answer key)

(iv) If $A = \{0, 3, 6, 9, \ldots, 33\}$, then $n(A) = 11$.

Explanation:
This is an arithmetic sequence of multiples of 3 from 0 to 33.
General term = 3n
Values: 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33
Number of terms = 12, not 11.

Answer: False ✓ (matches answer key)

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2. State the following set in Set-builder form

Given:
A = {Integers greater than −12 and divisible by 5}

Explanation:
A number divisible by 5 can be written as x = 5n.
Condition: x > −12.
So the set-builder form is:

Answer:
A = {x : x = 5n, n ∈ I, x > −12} ✓ (matches answer key)

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3. State the following set in Roster form

Given:
A = {x : x − 3 ≤ 0, x ∈ W}

Explanation:
Solve x − 3 ≤ 0 → x ≤ 3.
Since x ∈ W (whole numbers): 0, 1, 2, 3.

Answer:
A = {3, 2, 1, 0} ✓ (matches answer key)

(Note: Order does not matter in sets; book uses 3, 2, 1, 0.)

**4. A set is defined as P = {x | x ∈ W and x < 0}.

What type of set is it?**

Explanation:
Whole numbers (W) = {0, 1, 2, 3, …}.
No whole number is less than 0.
Therefore, the set has **no elements**.

Answer: Empty set ✓ (matches answer key)

MENTAL MATHEMATICS – CLASS 6
EXERCISE 5 – Based on Fractions
(Full solutions with steps)

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1. Which of the following pairs has/have equivalent fractions?

To check equivalence, simplify or cross-multiply.

(i) 3/5 and 15/25
3/5 = 3×5 / 5×5 = 15/25
So they are equal.

(ii) 4/5 and 28/35
28/35 = (28 ÷ 7)/(35 ÷ 7) = 4/5
So they are equal.

(iii) 5/6 and 25/36
5/6 = 0.833… and 25/36 ≈ 0.694… (or cross-multiply: 5×36 = 180, 6×25 = 150; not equal).
Not equivalent.

(iv) 3/7 and 21/28
3/7 = 0.428…, 21/28 = 0.75 (or 3×28 = 84, 7×21 = 147; not equal).
Not equivalent.

(v) 4/11 and 9/16
4×16 = 64, 11×9 = 99 → not equal.
Not equivalent.

(vi) 7/25 and 49/175
49/175 = (49 ÷ 7)/(175 ÷ 7) = 7/25
So they are equal.

Answer: (i), (ii) and (vi) ✓

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2. Write the following fractions in their lowest terms:

(i) 5/10
Divide numerator and denominator by 5:
5 ÷ 5 / 10 ÷ 5 = 1/2

(ii) 9/27
Divide by 9: 9 ÷ 9 / 27 ÷ 9 = 1/3

(iii) 6/9
Divide by 3: 6 ÷ 3 / 9 ÷ 3 = 2/3

(iv) 42/49
Divide by 7: 42 ÷ 7 / 49 ÷ 7 = 6/7

(v) 33/77
Divide by 11: 33 ÷ 11 / 77 ÷ 11 = 3/7

(vi) 81/144
Common factor 9: 81 ÷ 9 / 144 ÷ 9 = 9/16

Answers:
(i) 1/2 (ii) 1/3 (iii) 2/3 (iv) 6/7 (v) 3/7 (vi) 9/16 ✓

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3. Write the fraction with given numerator (N) and denominator (D). Classify as proper or improper.

(i) N = 3, D = 5 → 3/5 (numerator < denominator → proper)
(ii) N = 5, D = 9 → 5/9 (proper)
(iii) N = 3, D = 7 → 3/7 (proper)
(iv) N = 15, D = 4 → 15/4 (numerator > denominator → improper)
(v) N = 9, D = 2 → 9/2 (improper)
(vi) N = 7, D = 11 → 7/11 (proper)

Proper fractions: (i), (ii), (iii), (vi)
Improper fractions: (iv), (v) ✓

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4. Write an equivalent fraction with the given denominator (D):

Rule: multiply numerator and denominator by same number.

(i) 3/5, D = 15
5 × 3 = 15, so multiply top by 3:
3 × 3 / 5 × 3 = 9/15

(ii) 2/7, D = 21
7 × 3 = 21 → multiply numerator by 3: 2 × 3 = 6
Fraction = 6/21

(iii) 3/11, D = 44
11 × 4 = 44 → numerator 3 × 4 = 12
Fraction = 12/44

(iv) 1/2, D = 12
2 × 6 = 12 → 1 × 6 = 6
Fraction = 6/12

(v) 3/8, D = 40
8 × 5 = 40 → 3 × 5 = 15
Fraction = 15/40

(vi) 7/9, D = 108
9 × 12 = 108 → 7 × 12 = 84
Fraction = 84/108

Answers:
(i) 9/15 (ii) 6/21 (iii) 12/44 (iv) 6/12 (v) 15/40 (vi) 84/108 ✓

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5. Classify as like fractions or unlike fractions
   (Like fractions = same denominator)

(i) 1/7, 1/7 → same denominator → like
(ii) 2/7, 3/9 → denominators 7 and 9 → unlike
(iii) 1/3, 2/3 → same denominator 3 → like
(iv) 2/11, 3/11, 5/11 → same denominator 11 → like
(v) 5/9, 9/5 → denominators 9 and 5 → unlike
(vi) 1/5, 5/6, 6/7 → denominators 5, 6, 7 → unlike

Like fractions: (i), (iii), (iv)
Unlike fractions: (ii), (v), (vi) ✓

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6. Arrange the following fractions in ascending order
   (Ascending = smallest to greatest)

(i) 1/11, 9/11, 3/11, 5/11, 2/11
All have denominator 11; compare numerators:
1, 2, 3, 5, 9
Ascending order of fractions:
1/11, 2/11, 3/11, 5/11, 9/11

(ii) 1/9, 7/9, 3/9, 2/9, 5/9
Same denominator 9 → order by numerators:
1, 2, 3, 5, 7
Fractions: 1/9, 2/9, 3/9, 5/9, 7/9

(iii) 2/5, 4/5, 1/5, 3/5
Same denominator 5 → numerators 1, 2, 3, 4
Fractions: 1/5, 2/5, 3/5, 4/5

(iv) 1/24, 7/24, 13/24, 5/24, 11/24
Same denominator 24 → numerators 1, 5, 7, 11, 13
Fractions: 1/24, 5/24, 7/24, 11/24, 13/24

Answers:
(i) 1/11, 2/11, 3/11, 5/11, 9/11
(ii) 1/9, 2/9, 3/9, 5/9, 7/9

(iii) 1/5, 2/5, 3/5, 4/5
(iv) 1/24, 5/24, 7/24, 11/24, 13/24 ✓

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7. Arrange the following fractions in descending order
   (Descending = greatest to smallest)

(i) 7/11, 2/11, 5/11, 1/11, 9/11
Same denominator 11 → order numerators 9, 7, 5, 2, 1
Fractions: 9/11, 7/11, 5/11, 2/11, 1/11

(ii) 3/7, 1/7, 5/7, 2/7, 6/7
Same denominator 7 → numerators 6, 5, 3, 2, 1
Fractions: 6/7, 5/7, 3/7, 2/7, 1/7

(iii) 5/9, 8/9, 1/9, 3/9, 7/9
Same denominator 9 → numerators 8, 7, 5, 3, 1
Fractions: 8/9, 7/9, 5/9, 3/9, 1/9

(iv) 1/6, 5/6, 2/6, 3/6, 4/6
Same denominator 6 → numerators 5, 4, 3, 2, 1
Fractions: 5/6, 4/6, 3/6, 2/6, 1/6

Answers:
(i) 9/11, 7/11, 5/11, 2/11, 1/11
(ii) 6/7, 5/7, 3/7, 2/7, 1/7
(iii) 8/9, 7/9, 5/9, 3/9, 1/9
(iv) 5/6, 4/6, 3/6, 2/6, 1/6 ✓

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8. Add the following:

(i) 1/11 + 5/11 + 2/11
Same denominator → add numerators:
1 + 5 + 2 = 8 → 8/11

(ii) 11/25 + 1/25 + 8/25
Same denominator 25 → 11 + 1 + 8 = 20 → 20/25
Simplify: divide by 5 → 4/5

(iii) 1/2 + 1/3 + 1/4
LCM of 2, 3, 4 = 12
1/2 = 6/12, 1/3 = 4/12, 1/4 = 3/12
Sum = (6 + 4 + 3)/12 = 13/12

(iv) 1/3 + 1/5 + 4/15
LCM of 3, 5, 15 = 15

1/3 = 5/15, 1/5 = 3/15, 4/15 = 4/15
Sum = (5 + 3 + 4)/15 = 12/15 = 4/5

(v) 1/3 + 2/5 + 3/10
LCM of 3, 5, 10 = 30
1/3 = 10/30, 2/5 = 12/30, 3/10 = 9/30
Sum = (10 + 12 + 9)/30 = 31/30

(vi) 1/4 + 5/6 + 3/8
LCM of 4, 6, 8 = 24
1/4 = 6/24, 5/6 = 20/24, 3/8 = 9/24
Sum = (6 + 20 + 9)/24 = 35/24

Answers:
(i) 8/11 (ii) 4/5 (iii) 13/12 (iv) 4/5 (v) 31/30 (vi) 35/24 ✓

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9. Simplify:

(i) 1/2 + 1/3 − 1/5
LCM of 2, 3, 5 = 30
1/2 = 15/30, 1/3 = 10/30, 1/5 = 6/30
So total = (15 + 10 − 6)/30 = 19/30

(ii) 2/3 + 4/5 − 7/15
LCM of 3, 5, 15 = 15
2/3 = 10/15, 4/5 = 12/15, 7/15 = 7/15
Total = (10 + 12 − 7)/15 = 15/15 = 1

(iii) 2/3 + 3/4 − 3/8
LCM of 3, 4, 8 = 24
2/3 = 16/24, 3/4 = 18/24, 3/8 = 9/24
Total = (16 + 18 − 9)/24 = 25/24

(iv) 6/7 − 1/2 − 1/3
LCM of 7, 2, 3 = 42
6/7 = 36/42, 1/2 = 21/42, 1/3 = 14/42
Total = (36 − 21 − 14)/42 = 1/42

Answers:
(i) 19/30 (ii) 1 (iii) 25/24 (iv) 1/42 ✓

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10. Convert the following fractions into decimals:

(i) 2/10
Divide 2 by 10: 2 ÷ 10 = 0.2

(ii) 9/10
9 ÷ 10 = 0.9

(iii) 1/5
Make denominator 10: 1/5 = 2/10 = 0.2

(iv) 1/2
1 ÷ 2 = 0.5

(v) 27/100
27 ÷ 100 = 0.27

(vi) 21/1000
21 ÷ 1000 = 0.021

Answers:
(i) 0.2 (ii) 0.9 (iii) 0.2 (iv) 0.5 (v) 0.27 (vi) 0.021 ✓

The remaining of the chapter will be added soon