



MATHEMATICS



N.S. Yr. 6 P.63

Use known facts to calculate mentally

Equipment

Paper, pencil, ruler

MathSphere

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Concepts

The mental calculation strategies for year 6 are very similar to earlier years, but the numbers do get very challenging, and many of the pages of this module are really for the most able of pupils.

It is recommended that tables in the teens eg 16 times table, can be worked out by adding the 6 times table to the ten times table.

Multiplying by 49 and 51 is introduced, again by multiplying by 50 and then adding or subtracting the number.

Multiplying two digits by one, mentally, is developed further by introducing decimals, with the emphasis on multiplying by the units first.

Decimal fractions are also used when recognising three other statements when given one

Eg if $1.2 \times 6 = 7.2$ then

$$6 \times 1.2 = 7.2 \text{ and } 7.2 \div 6 = 1.2 \text{ and } 7.2 \div 1.2 = 6$$

15 times table

It's not too difficult to multiply by 15 in your head.

First multiply by 10 and then by 5.

(To multiply by 5 you can just halve the answer you got when multiplying by 10).

Then add your two answers together.

eg $7 \times 15 = (7 \times 10) + (7 \times 5) = 70 + 35 = 105$

Try these:

1. $4 \times 15 =$ $+$ $=$

2. $10 \times 15 =$ $+$ $=$

3. $5 \times 15 =$ $+$ $=$

4. $3 \times 15 =$ $+$ $=$

5. $6 \times 15 =$ $+$ $=$

6. $11 \times 15 =$ $+$ $=$

7. $9 \times 15 =$ $+$ $=$

8. $8 \times 15 =$ $+$ $=$

Multiply by 17

It's not too difficult to multiply by 17 in your head.

First multiply by 10 and then by 7.

Then add your two answers together.

eg $3 \times 17 = (3 \times 10) + (3 \times 7) = 30 + 21 = 51$

Try these:

1. $5 \times 17 =$ $+$ $=$

2. $9 \times 17 =$ $+$ $=$

3. $4 \times 17 =$ $+$ $=$

4. $8 \times 17 =$ $+$ $=$

5. $7 \times 17 =$ $+$ $=$

6. $6 \times 17 =$ $+$ $=$

7. $11 \times 17 =$ $+$ $=$

8. $12 \times 17 =$ $+$ $=$

Multiply by 14

How about trying to multiply by 14 in your head?

First multiply by 10 and then by 4.

(To multiply by 4 you can just double and double again).

Then add your two answers together.

eg $3 \times 14 = (3 \times 10) + (3 \times 4) = 30 + 12 = 42$

Try these:

1. $6 \times 14 =$ $+$ $=$

2. $9 \times 14 =$ $+$ $=$

3. $5 \times 14 =$ $+$ $=$

4. $7 \times 14 =$ $+$ $=$

5. $12 \times 14 =$ $+$ $=$

6. $8 \times 14 =$ $+$ $=$

7. $4 \times 14 =$ $+$ $=$

8. $11 \times 14 =$ $+$ $=$

Multiply by 16

How about trying to multiply by 16 in your head?

First multiply by 10 and then by 6.

Then add your two answers together.

eg $3 \times 16 = (3 \times 10) + (3 \times 6) = 30 + 18 = 48$

Try these:

1. $4 \times 16 =$ $+$ $=$

2. $7 \times 16 =$ $+$ $=$

3. $5 \times 16 =$ $+$ $=$

4. $11 \times 16 =$ $+$ $=$

5. $8 \times 16 =$ $+$ $=$

6. $12 \times 16 =$ $+$ $=$

7. $9 \times 16 =$ $+$ $=$

8. $6 \times 16 =$ $+$ $=$

Multiply mentally

$$1. \ 7 \times 12 = \boxed{}$$

$$2. \ 8 \times 13 = \boxed{}$$

$$3. \ 9 \times 14 = \boxed{}$$

$$4. \ 4 \times 15 = \boxed{}$$

$$5. \ 6 \times 16 = \boxed{}$$

$$6. \ 5 \times 17 = \boxed{}$$

$$7. \ 9 \times 18 = \boxed{}$$

$$8. \ 8 \times 19 = \boxed{}$$

$$9. \ 6 \times 21 = \boxed{}$$

$$10. \ 8 \times 31 = \boxed{}$$

$$11. \ 7 \times 41 = \boxed{}$$

$$12. \ 9 \times 51 = \boxed{}$$

$$13. \ 40 \times 61 = \boxed{}$$

$$14. \ 30 \times 71 = \boxed{}$$

Multiply by 101

Sounds difficult, but you can do it by multiplying a number by 100 and then adding on the number.



$$\text{eg } 43 \times 101 = (43 \times 100) + 43 = 4300 + 43 = 4343$$

Try these:

$$1. 14 \times 101 = (14 \times 100) + 14 = \boxed{} + 14 = \boxed{}$$

$$2. 23 \times 101 = (23 \times 100) + 23 = \boxed{} + 23 = \boxed{}$$

$$3. 35 \times 101 = (35 \times 100) + 35 = \boxed{} + 35 = \boxed{}$$

$$4. 42 \times 101 = (42 \times 100) + 42 = \boxed{} + 42 = \boxed{}$$

$$5. 53 \times 101 = (53 \times 100) + 53 = \boxed{} + 53 = \boxed{}$$

$$6. 64 \times 101 = (64 \times 100) + 64 = \boxed{} + 64 = \boxed{}$$

$$7. 72 \times 101 = (72 \times 100) + 72 = \boxed{} + 72 = \boxed{}$$

$$8. 84 \times 101 = (84 \times 100) + 84 = \boxed{} + 84 = \boxed{}$$

Multiply by 99

How about an ice-cream?
Multiply by 100 and then subtract the
number.



eg $15 \times 99 = (15 \times 100) - 15 = 1500 - 15 = 1485$

Try these:

1. $25 \times 99 = (25 \times 100) - 25 = \boxed{} - 25 = \boxed{}$

2. $23 \times 99 = (23 \times 100) - 23 = \boxed{} - 23 = \boxed{}$

3. $35 \times 99 = (35 \times 100) - 35 = \boxed{} - 35 = \boxed{}$

4. $46 \times 99 = (46 \times 100) - 46 = \boxed{} - 46 = \boxed{}$

5. $56 \times 99 = (56 \times 100) - 56 = \boxed{} - 56 = \boxed{}$

6. $28 \times 99 = (28 \times 100) - 28 = \boxed{} - 28 = \boxed{}$

7. $39 \times 99 = (39 \times 100) - 39 = \boxed{} - 39 = \boxed{}$

8. $45 \times 99 = (45 \times 100) - 45 = \boxed{} - 45 = \boxed{}$

Multiply two digits by one

Time yourself on these, working mentally.
Remember, the quickest way is usually to multiply the tens digit first.

eg $35 \times 6 = (30 \times 6) + (5 \times 6) = 180 + 30 = 210$

1. $23 \times 9 =$

2. $34 \times 8 =$

3. $42 \times 7 =$

4. $56 \times 5 =$

5. $64 \times 4 =$

6. $72 \times 3 =$

7. $86 \times 2 =$

8. $91 \times 9 =$

9. $27 \times 5 =$

10. $36 \times 6 =$

11. $45 \times 7 =$

12. $37 \times 8 =$

13. $19 \times 9 =$

14. $23 \times 8 =$

15. $31 \times 7 =$

16. $48 \times 8 =$

17. $56 \times 9 =$

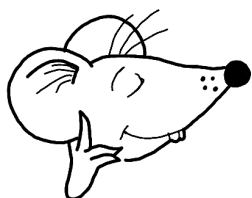
18. $67 \times 2 =$

19. $77 \times 3 =$

20. $88 \times 4 =$

How long
did you take?



Multiply whole number and tenths by a single digit

When multiplying numbers like these it is a good idea to start with the whole number or units.

eg $2.5 \times 5 = (2 \times 5) + (0.5 \times 5) = 10 + 2.5 = 12.5$

1. $2.4 \times 3 =$

2. $3.3 \times 4 =$

3. $4.6 \times 5 =$

4. $5.3 \times 6 =$

5. $6.1 \times 7 =$

6. $7.5 \times 8 =$

7. $8.2 \times 9 =$

8. $9.2 \times 2 =$

9. $8.4 \times 3 =$

10. $7.7 \times 4 =$

11. $6.4 \times 5 =$

12. $5.8 \times 6 =$

13. $4.4 \times 7 =$

14. $3.8 \times 8 =$

15. $2.7 \times 9 =$

16. $1.6 \times 8 =$

17. $2.9 \times 7 =$

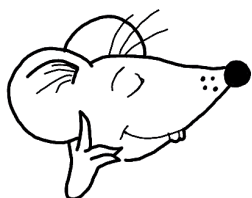
18. $3.4 \times 6 =$

19. $4.3 \times 5 =$

20. $2.9 \times 4 =$

Quite quick,
I hope!



Multiply whole number and tenths by a single digit

Start with the whole number or units and don't forget the decimal point in the answer!

eg $3.6 \times 5 = (3 \times 5) + (0.6 \times 5) = 15 + 3 = 18$

1. $2.8 \times 2 =$

2. $3.4 \times 5 =$

3. $4.7 \times 3 =$

4. $5.4 \times 5 =$

5. $6.2 \times 6 =$

6. $7.4 \times 7 =$

7. $8.3 \times 8 =$

8. $9.4 \times 9 =$

9. $8.7 \times 2 =$

10. $7.8 \times 3 =$

11. $6.5 \times 4 =$

12. $5.9 \times 5 =$

13. $4.5 \times 6 =$

14. $3.9 \times 7 =$

15. $2.5 \times 8 =$

16. $1.7 \times 9 =$

17. $3.3 \times 8 =$

18. $9.1 \times 7 =$

19. $5.3 \times 5 =$

20. $1.9 \times 6 =$

Quite quick,
I hope!



Relationship between multiplication and division

Knowing one thing means that you actually know 4.

Have a look: if $0.65 \times 5 = 3.25$ then:

$$5 \times 0.65 = 3.25$$

$$3.25 \div 0.65 = 5 \quad \text{and}$$

$$3.25 \div 5 = 0.65$$

Make up three other sums from each of these:

1. $0.25 \times 7 = 1.75$

2. $0.55 \times 6 = 3.3$

3. $0.47 \times 4 = 1.88$

4. $0.85 \times 5 = 4.25$

5. $0.9 \times 1.9 = 1.71$

6. $0.95 \times 9 = 8.55$

Relationship between multiplication and division

Knowing one thing means that you actually know 4.

Have a look: if $0.65 \times 5 = 3.25$ then:

$$5 \times 0.65 = 3.25$$

$$3.25 \div 0.65 = 5 \quad \text{and}$$

$$3.25 \div 5 = 0.65$$

Make up three other sums from each of these:

1. $0.35 \times 6 = 2.1$

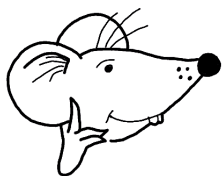
2. $0.45 \times 7 = 3.15$

3. $0.52 \times 4 = 2.08$

4. $0.4 \times 6 = 2.4$

5. $0.7 \times 6 = 4.2$

6. $0.99 \times 2 = 1.98$

Knowing one thing means you know another

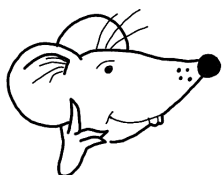
One thing just leads to three others.

Take a look:

If $30 \times 5 = 150$ then $\frac{1}{30}$ of 150 is 5 and $\frac{1}{5}$ of 150 is 30

Try filling the gaps in these statements

1. If $6 \times 40 = 240$ then of 240 is and of 240 is
2. If $7 \times 50 = 350$ then of 350 is and of 350 is
3. If $8 \times 60 = 480$ then of 480 is and of 480 is
4. If $9 \times 60 = 540$ then of 540 is and of 540 is
5. If $7 \times 70 = 490$ then of 490 is and of 490 is
6. If $6 \times 30 = 180$ then of 180 is and of 180 is

Knowing one thing means you know another

One thing just leads to three others.

Take a look:

If $25 \times 5 = 125$ then $\frac{1}{25}$ of 125 is 5 and $\frac{1}{5}$ of 125 is 25

Try filling the gaps in these statements

1. If $4 \times 75 = 300$ then of 300 is and of 300 is
2. If $5 \times 65 = 325$ then of 325 is and of 325 is
3. If $6 \times 55 = 330$ then of 330 is and of 330 is
4. If $7 \times 45 = 315$ then of 315 is and of 315 is
5. If $8 \times 35 = 280$ then of 280 is and of 280 is
6. If $9 \times 25 = 225$ then of 225 is and of 225 is

Relationship between multiplication and division

Think carefully about these and you will find them quite easy. If $1.3 \times 1.4 = 1.82$

Then:

$$1.4 \times 1.3 = 1.82$$

$$1.82 \div 1.3 = 1.4 \quad \text{and}$$

$$1.82 \div 1.4 = 1.3$$

Make up three other sums from each of these:

1. $1.4 \times 1.6 = 2.24$

2. $1.5 \times 1.8 = 2.7$

3. $2.08 \div 1.3 = 1.6$

4. $2.3 \times 2.4 = 5.52$

5. $12 \div 2.5 = 4.8$

6. $2.16 \div 1.2 = 1.8$

Answers**Page 3**

1. $40 + 20 = 60$

2. $100 + 50 = 150$

3. $50 + 25 = 75$

4. $30 + 15 = 45$

5. $60 + 30 = 90$

6. $110 + 55 = 165$

7. $90 + 45 = 135$

8. $80 + 40 = 120$

Page 4

1. $50 + 35 = 85$

2. $90 + 63 = 153$

3. $40 + 28 = 68$

4. $80 + 56 = 136$

5. $70 + 49 = 119$

6. $60 + 42 = 102$

7. $110 + 77 = 187$

8. $120 + 84 = 204$

Page 5

1. $60 + 24 = 84$

2. $90 + 36 = 126$

3. $50 + 20 = 70$

4. $70 + 28 = 98$

5. $120 + 48 = 168$

6. $80 + 32 = 112$

7. $40 + 16 = 56$

8. $110 + 44 = 154$

Page 6

1. $40 + 24 = 64$

2. $70 + 42 = 112$

3. $50 + 30 = 80$

4. $110 + 66 = 176$

5. $80 + 48 = 128$

6. $120 + 72 = 192$

7. $90 + 54 = 144$

8. $60 + 36 = 96$

Page 7

1. 84

2. 104

3. 126

4. 60

5. 96

6. 85

7. 162

8. 152

9. 126

10. 248

11. 287

12. 459

13. 2440

14. 2130

Page 8

1. $1400 + 14 = 1414$

2. $2300 + 23 = 2323$

3. $3500 + 35 = 3535$

4. $4200 + 42 = 4242$

5. $5300 + 53 = 5353$

6. $6400 + 64 = 6464$

7. $7200 + 72 = 7272$

8. $8400 + 84 = 8484$

Page 9

1. $2500 - 25 = 2475$

2. $2300 - 23 = 2277$

3. $3500 - 35 = 3465$

4. $4600 - 46 = 4554$

5. $5600 - 56 = 5544$

6. $2800 - 28 = 2772$

7. $3900 - 39 = 3861$

8. $4500 - 45 = 4455$

Page 10

1. 207

2. 272

3. 294

4. 280

5. 256

6. 216

7. 172

8. 819

9. 135

10. 216

11. 315

12. 296

13. 171

14. 184

15. 217

16. 384

17. 504

18. 134

19. 231

20. 352

Page 11

1. 7.2

2. 13.2

3. 23

4. 31.8

5. 42.7

6. 60

7. 73.8

8. 18.4

9. 25.2

10. 30.8

11. 32

12. 34.8

13. 30.8

14. 30.4

15. 24.3

16. 12.8

17. 20.3

18. 20.4

19. 21.5

20. 11.6

Answers**Page 12**

- | | | | | | | |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1. 5.6 | 2. 17 | 3. 14.1 | 4. 27 | 5. 37.2 | 6. 51.8 | 7. 66.4 |
| 8. 84.6 | 9. 17.4 | 10. 23.4 | 11. 26 | 12. 29.5 | 13. 27 | 14. 27.3 |
| 15. 20 | 16. 15.3 | 17. 26.4 | 18. 63.7 | 19. 26.5 | 20. 11.4 | |

Page 13

- | | | |
|-------------------------------------|-------------------------|------------------------|
| 1. $7 \times 0.25 = 1.75$, | $1.75 \div 7 = 0.25$, | $1.75 \div 0.25 = 7$ |
| 2. $6 \times 0.55 = 3.3$, | $3.3 \div 6 = 0.55$, | $3.3 \div 0.55 = 6$, |
| 3. $4 \times 0.47 = 1.88$, | $1.88 \div 4 = 0.47$ | $1.88 \div 0.47 = 4$, |
| 4. $5 \times 0.85 = 4.25$, | $4.25 \div 5 = 0.85$, | $4.25 \div 0.85 = 5$ |
| 5. $1.9 \times 0.9 = 1.71$, | $1.71 \div 1.9 = 0.9$, | $1.71 \div 0.9 = 1.9$ |
| 6. $9 \times 0.95 = 8.55$, | $8.55 \div 9 = 0.95$ | $8.55 \div 0.95 = 9$ |

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- | | | |
|------------------------------------|------------------------|------------------------|
| 1. $6 \times 0.35 = 2.1$, | $2.1 \div 6 = 0.35$, | $2.1 \div 0.35 = 6$ |
| 2. $7 \times 0.45 = 3.15$, | $3.15 \div 7 = 0.45$, | $3.15 \div 0.45 = 7$, |
| 3. $4 \times 0.52 = 2.08$, | $2.08 \div 4 = 0.52$ | $2.08 \div 0.52 = 4$, |
| 4. $6 \times 0.4 = 2.4$, | $2.4 \div 6 = 0.4$, | $2.4 \div 0.4 = 6$ |
| 5. $6 \times 0.7 = 4.2$, | $4.2 \div 6 = 0.7$, | $4.2 \div 0.7 = 6$ |
| 6. $2 \times 0.99 = 1.98$, | $1.98 \div 2 = 0.99$ | $1.98 \div 0.99 = 2$ |

Page 15

- | | |
|---|---|
| 1. $1/6$ of 240 is 40 and $1/40$ of 240 is 6 | 2. $1/7$ of 350 is 50 and $1/50$ of 350 is 7 |
| 3. $1/8$ of 480 is 60 and $1/60$ of 480 is 8 | 4. $1/9$ of 540 is 60 and $1/60$ of 540 is 9 |
| 5. $1/7$ of 490 is 70 and $1/70$ of 490 is 7 | 6. $1/6$ of 180 is 30 and $1/30$ of 180 is 6 |

Page 16

- | | |
|---|---|
| 1. $1/4$ of 300 is 75 and $1/75$ of 300 is 4 | 2. $1/5$ of 325 is 65 and $1/65$ of 325 is 5 |
| 3. $1/6$ of 330 is 55 and $1/55$ of 330 is 6 | 4. $1/7$ of 315 is 45 and $1/45$ of 315 is 7 |
| 5. $1/8$ of 280 is 35 and $1/35$ of 280 is 8 | 6. $1/9$ of 225 is 25 and $1/25$ of 225 is 9 |

Page 17

- | | | |
|-------------------------------------|-------------------------|-----------------------|
| 1. $1.6 \times 1.4 = 2.24$, | $2.24 \div 1.6 = 1.4$, | $2.24 \div 1.4 = 1.6$ |
| 2. $1.8 \times 1.5 = 2.7$, | $2.7 \div 1.8 = 1.5$, | $2.7 \div 1.5 = 1.8$ |
| 3. $1.6 \times 1.3 = 2.08$, | $1.3 \times 1.6 = 2.08$ | $2.08 \div 1.6 = 1.3$ |
| 4. $2.4 \times 2.3 = 5.52$, | $5.52 \div 2.4 = 2.3$, | $5.52 \div 2.3 = 2.4$ |
| 5. $4.8 \times 2.5 = 12$, | $2.5 \times 4.8 = 12$ | $12 \div 4.8 = 2.5$ |
| 6. $1.8 \times 1.2 = 2.16$, | $1.2 \times 1.8 = 2.16$ | $2.16 \div 1.8 = 1.2$ |