Unit 1: Number, powers, decimals, HCF and LCM, roots and rounding

Knowledge organiser and lesson worksheets

Name _____

Class _____

Teacher _____

KO	Knowledge organiser	page 2
1.1	Place value	page 7
1.2	Addition and subtraction	page 10
1.3	Multiplication and division	page 14
1.4	Negative numbers	page 18
1.5	Rounding	page 26
1.6	Factors, multiples and primes	page 30
1.7	Order of operations	page 35
1.8	Indices	page 40
1.9	Calculator skills	page 43

UNIT 1

Knowledge organiser

NUMBER, POWERS, DECIMALS, HCF AND LCM, ROOTS AND ROUNDING

Key words, rules and things to remember for every lesson in this unit.

1.1 Place value

How can we use place value to compare numbers and justify whether they are greater than, less than, equal to or not equal to each other?

KEY WORDS

Digit: One symbol from 0 to 9 used to make numbers. 583 has three digits: 5, 8 and 3.

Place value: The value a digit has because of its column. In 5,096 the 9 is worth 90.

Placeholder: A zero that keeps an empty column in place. 3,058 has no hundreds.

Decimal point: Separates the whole number from the tenths, hundredths and thousandths. 204.7: the 7 is worth 0.7

Million: 1,000,000: 1 followed by six zeros. 5.3 million = 5,300,000

RULES

Th H T U • t h th — Thousands, hundreds, tens, units • tenths, hundredths, thousandths. Each column is worth 10 times the column to its right.

608 > 580 — Compare from the left. The first digit that is different decides. e.g. 6 hundreds > 5 hundreds

3.5 = 3.50 — A trailing zero does not change the value. e.g. 0.42 = 0.420 · 125 < 152 · 204 ≠ 240

MUST REMEMBER

- Line up the digits and the decimal points in place-value columns.
- Compare from the left. The first digit that differs decides which number is larger.
- Trailing zeros do not change the value: 0.42 = 0.420.

1.2 Addition and subtraction

How can we choose efficient addition and subtraction methods, and use estimation and inverse operations to justify that our answers are reasonable?

KEY WORDS

Sum · difference: The answer to an addition · the answer to a subtraction. The difference between 9 and 4 is 5.

Exchange: Trade 10 units for 1 ten, or 1 ten for 10 units. 1 whole = 10 tenths = 100 hundredths

Estimate: A quick calculation using rounded numbers. 1635 + 386 ≈ 1600 + 400 = 2000

Inverse operation: An operation that undoes another. Addition and subtraction are inverses. 2436 + 1527 = 3963, so 3963 − 1527 = 2436

Column method: A written method, one column at a time, starting with the units.

RULES

63 − 21.4 → 63.0 − 21.4 — Line up the decimal points. A placeholder zero does not change the value.

700 + 299 = 999 — Mental method: add 300, then take away 1. e.g. 700 + 300 − 1 = 999

6000 − 3617 = 2383 — Number line: count on from the smaller number. e.g. +3, +80, +300, +2000 = 2383

MUST REMEMBER

- Line up place values. For decimals, line up the decimal points.
- Estimate first so you can spot an unreasonable answer.
- Check with the inverse operation. Show your exchanges.

1.3 Multiplication and division

How can we use place value to choose efficient multiplication and division methods, and justify that our answers are reasonable?

KEY WORDS

Product: The answer when you multiply. The product of 6 and 7 is 42.

Quotient: The answer when you divide. 42 ÷ 7: the quotient is 6.

Dividend · divisor: The number being divided · the number you divide by. In 2.4 ÷ 1.2, 2.4 is the dividend and 1.2 is the divisor.

Partial product: One part of a long multiplication, before adding. 58 × 46 = 58 × 40 + 58 × 6

Estimate: Round to 1 significant figure to check the size of an answer. 254 × 7 ≈ 300 × 7 = 2100

RULES

254 × 7 = 1,778 — Short multiplication: multiply the units first and carry into the next column.

5.2 × 3 = 15.6 — Work out 52 × 3 = 156, then put the 1 decimal place back. e.g. decimal places in the question = decimal places in the answer

2.4 ÷ 1.2 = 24 ÷ 12 — Make the divisor whole: multiply both numbers by the same power of 10. e.g. 71.2 ÷ 0.4 = 712 ÷ 4 = 178

MUST REMEMBER

- Long multiplication: 58 × 46 = 58 × 40 + 58 × 6 = 2,320 + 348 = 2,668.
- Count the decimal places in the question to place the decimal point in the answer.
- Estimate first and check with the inverse operation.

1.4 Negative numbers

How can we use number lines and operation rules to calculate with negative numbers and justify our answers?

KEY WORDS

Negative number: A number less than 0. −5 is 5 less than zero.

Positive number: A number greater than 0. Zero is neither positive nor negative.

Number line: A line showing numbers in order, getting bigger to the right.

Difference: The distance between two numbers. It is always positive. The difference between −8 and 5 is 13.

Inverse operation: An operation that undoes another. −20 ÷ (−4) = 5 because 5 × (−4) = −20

RULES

−3 < −2 < −1 < 0 < 1 < 2 < 3 — Numbers get smaller as you move left and bigger as you move right.

9 − (−4) = 13 — Subtracting a negative is the same as adding. e.g. + (−) moves left · − (−) moves right

−7 × 5 = −35 — Different signs give a negative. Same signs give a positive. e.g. −42 ÷ (−6) = 7 · the same rules work for ÷

MUST REMEMBER

- Subtracting a negative is the same as adding.
- Risen or increased means add. Fallen or lower means subtract.
- A difference is always written as a positive number.

1.5 Rounding

How can we choose an appropriate degree of accuracy, and justify whether a rounded answer is suitable for its purpose?

KEY WORDS

Rounding: Replacing a number with a nearby number that is easier to use. 7,642 ≈ 7,600 (nearest hundred)

Degree of accuracy: How close the rounded number is to the exact value.

Decimal place: Count the digits after the decimal point. 8.36 ≈ 8.4 (1 d.p.)

Significant figure: Count from the first non-zero digit. 0.4726 ≈ 0.47 (2 s.f.)

Approximately equal: The sign ≈ shows a rounded value. 49,782 ≈ 50,000

RULES

18.1693 ≈ 18.17 — Find the rounding digit. The next digit decides: 0 to 4 keep, 5 to 9 round up.

90437 ≈ 90,000 — Significant figures: start counting at the first non-zero digit. e.g. 2 s.f.: 9 and 0, then the next digit is 4, so keep

5.4096 ≈ 5.410 — Keep the zero at the end to show the accuracy. e.g. 3 d.p. needs 3 digits after the point

MUST REMEMBER

- Leading zeros are not significant: 0.00472 to 1 s.f. is 0.005.
- Zeros may need to stay: 67,480 to 1 s.f. is 70,000, not 7.
- Check the answer is sensible and has the accuracy the question asks for.

1.6 Factors, multiples and primes

How can we use factors, multiples and prime numbers to classify numbers, solve number puzzles and justify our answers?

KEY WORDS

Factor: A number that divides exactly into another number. Factors of 12: 1, 2, 3, 4, 6, 12

Multiple: A number in another number's times table. Multiples of 12: 12, 24, 36, 48, …

Prime number: A number with exactly two factors: 1 and itself. 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

Square number: A whole number multiplied by itself. 1, 4, 9, 16, 25, 36, 49

Factor pair: Two whole numbers that multiply to make the number. 24: 1 × 24, 2 × 12, 3 × 8, 4 × 6

RULES

24 = 1 × 24 = 2 × 12 = 3 × 8 = 4 × 6 — Work systematically and stop when the pairs start to repeat. Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24.

$36 = 2^2 \times 3^2$ — Prime factors: 36 = 2 × 2 × 3 × 3. e.g. the prime factors of 36 are 2 and 3

9 = 3 × 3 — Odd does not mean prime: 9 has three factors. e.g. 1, 3 and 9

MUST REMEMBER

- 1 is not a prime number. 2 is the only even prime.
- "Between 25 and 35" means numbers inside the gap.
- "From the list" means your answer must be one of the given numbers.

1.7 Order of operations

How can we apply the order of operations accurately, and justify how brackets can change the value of a calculation?

KEY WORDS

Operation: An instruction to calculate, such as +, −, × or ÷.

Brackets: The calculation inside ( ) is done first. (8 − 2) × 3 = 6 × 3 = 18

Indices: A power: how many times a number is multiplied by itself. $2^3 = 2 \times 2 \times 2 = 8$

Equal priority: × and ÷ have equal priority. So do + and −. Work left to right. 18 ÷ 3 × 2 = 6 × 2 = 12

Expression: Numbers, operations and brackets, with no equals sign. $3 + 10 \times 2^3$

RULES

B · I · D M · A S — Brackets, Indices, Division and Multiplication (left to right), Addition and Subtraction (left to right). BIDMAS and BODMAS mean the same thing.

2 + 4 × 5 = 22 — Multiply before you add. e.g. $3 + 10 \times 2^3 = 3 + 80 = 83$

(2 + 4) × 5 = 30 — Brackets change the order, so the answer changes. e.g. same numbers, different answer

MUST REMEMBER

- Multiplication does not always come before division: work left to right.
- Addition does not always come before subtraction: work left to right.
- Check: brackets? indices? × and ÷? + and −?

1.8 Indices

How can we use indices to write numbers efficiently, find square and cube numbers and use roots to find the original number?

KEY WORDS

Index · power: Tells you how many times the base is used as a factor. In 5^4 the index is 4.

Base: The number being multiplied. In 5^4 the base is 5.

Square · cube number: A whole number squared · a whole number cubed. 1, 4, 9, 16, 25 · 1, 8, 27, 64, 125

Square root: The positive number that multiplies by itself to give the value. $\sqrt{49} = 7$

Cube root: The number that multiplies by itself three times to give the value. $\sqrt[3]{27} = 3$

RULES

$5^4 = 5 \times 5 \times 5 \times 5 = 625$ — 5^4 does NOT mean 5 × 4.

$7^2 = 49 \rightleftarrows \sqrt{49} = 7$ — Squaring and square rooting are inverses. e.g. $1^2 = 1$ … $10^2 = 100$

$3^3 = 27 \rightleftarrows \sqrt[3]{27} = 3$ — Cubing and cube rooting are inverses. e.g. $1^3 = 1$, $2^3 = 8$, $3^3 = 27$, $4^3 = 64$, $5^3 = 125$

MUST REMEMBER

- Powers of 2: 2, 4, 8, 16, 32, 64.
- A square root is the **positive** number that squares to give the value.
- Work out the power first: $5 \times 10^3 = 5 \times 1{,}000$.

1.9 Calculator skills

How can we enter complex calculations accurately so that a scientific calculator follows the intended order of operations?

KEY WORDS

Bracket check: Every opening bracket needs a closing bracket. 3 × (8.5 − (2.7 + 1.9)) has two of each.

Power check: Is the square attached to the right number or bracket? $(18 - 7)^2 = 121$

Fraction check: Keep the whole top and the whole bottom together. (3.4 + 5.8) ÷ 8 = 1.15

Root bar: Everything under the bar is square-rooted. √(18 + 7) = 5, but √81 + 5 = 14

Final check: Round only the final answer, as the question asks. 1.597564… ≈ 1.60 (2 d.p.)

RULES

(18 − 7) x² = — Say the keys · enter it · check the display · press =

4.6 × (12.3 − 7.8) — Type × before a bracket. Do not rely on implied multiplication. e.g. = 20.7

(√81 + 5) ÷ 7 = 2 — A short root bar covers only 81. The + 5 is on top, but not inside the root. e.g. (9 + 5) ÷ 7 = 2

MUST REMEMBER

- Calculators follow BIDMAS: they multiply before they add.
- Close a bracket before the square key so the whole bracket is squared.
- Keep the unrounded value on screen and round at the end.

Place value

LEARNING QUESTION

How can we use place value to compare numbers and justify whether they are greater than, less than, equal to or not equal to each other?

Name _____ **Class** _____ **Date** _____

Show your working. Line up the place values.

1. Write down the value of the 8 in the number

   583

   Answer _____

2. Write down the value of the 5 in the number

   583.2

   Answer _____

3. Write down the value of the 3 in the number

   3091

   Answer _____

4. Write down the value of the 2 in the number

   6024

   Answer _____

5. Write down the value of the 7 in the number

   204.7

   Answer _____

6 Write down a 5 digit number that has 3 as its thousands digit. You can only use the digit 3 once.

Answer _____

7 Write down a 6 digit number that has 8 as its hundreds digit. You can only use the digit 8 once.

Answer _____

8 Write down a 4 digit number that has 7 as its tens digit. You can only use the digit 7 once.

Answer _____

9 Write in figures

2 million

Answer _____

10 Write in figures

5.3 million

Answer _____

11 Here are 4 number cards.

5	7	2	3

(a) Write down the largest three digit number that can be made using these cards.

(b) Arrange the cards to give the smallest possible answer to ☐☐ + ☐☐

Answer _____

12 Write these numbers in order of size. Start with the smallest number.

134 **153** **203** **146** **154**

Answer _____

13 Here are 4 number cards.

3 **9** **3** **5**

(a) Write down the smallest four digit number that can be made using these cards.

(b) Arrange the cards to give the largest possible answer to ☐☐ + ☐☐

Answer _____

14 Write these numbers in order of size. Start with the smallest number.

0.35 **0.305** **0.53** **0.053** **0.035**

Answer _____

15 Write these numbers in order of size. Start with the smallest number.

1.6 **1.06** **1.5** **1.53** **1.563**

Answer _____

16 Write these numbers in order of size. Start with the smallest number.

3.2 **3.27** **3.72** **3.702** **3.02**

Answer _____

UNIT 1 · LESSON 2

Addition and subtraction

LEARNING QUESTION

How can we choose efficient addition and subtraction methods, and use estimation and inverse operations to justify that our answers are reasonable?

Name _____ **Class** _____ **Date** _____

Show your working. Estimate first, then check with the inverse.

1 Work out

254 + 87

Answer _____

2 Work out

1582 + 357

Answer _____

3 Work out

2860 − 613

Answer _____

4 Work out

1652 + 304 + 85

Answer _____

5 Work out

63 – 21.4

Answer _____

6 Work out

£30 – £18.49

Answer _____

7 Work out

58.26 + 3.79

Answer _____

8 Work out

62 – 18.1

Answer _____

9 Work out

£5.95 + £12.49

Answer _____

10 Work out

15.2 + 26 − 3.74

Answer _____

11 Work out

63.1 + 28.74 − 19

Answer _____

12 Work out

5.4 + 13.62 + 265 − 29.3

Answer _____

13 Work out

84.6 − 15.32 − 9.17 + 26.4

Answer _____

14 Work out

180 − 26.3 − 15.27 − 8.14

Answer _____

15 Work out

52 – 14.84 + 29.6 – 5.7

Answer _____

Multiplication and division

LEARNING QUESTION

How can we use place value to choose efficient multiplication and division methods, and justify that our answers are reasonable?

Name _____ **Class** _____ **Date** _____

Show your working. Check with the inverse.

1 Work out

254 × 7

Answer _____

2 Work out

258 ÷ 6

Answer _____

3 Work out

1168 ÷ 8

Answer _____

4 Work out

672 × 4

Answer _____

5 Work out

813 × 5

Answer _____

6 Work out

582 ÷ 6

Answer _____

7 Work out

58 × 46

Answer _____

8 Work out

33.84 ÷ 9

Answer _____

9 Work out

74.25 × 3

Answer _____

10 Work out

71.2 ÷ 0.4

Answer _____

11 Work out

13.9 × 7

Answer _____

12 Work out

18.6 ÷ 0.8

Answer _____

13 Work out

37.1 × 9.3

Answer _____

14 Work out

29.1 ÷ 4

Answer _____

15 Work out

9.06 × 7.9

Answer _____

UNIT 1 · LESSON 4

Negative numbers

LEARNING QUESTION

How can we use number lines and operation rules to calculate with negative numbers and justify our answers?

Name _____ **Class** _____ **Date** _____

Use a number line or the sign rules. Check with the inverse.

1 Work out

5 − 9

Answer _____

2 Work out

−7 + 4

Answer _____

3 Work out

−8 − 10

Answer _____

4 Work out

−2 + (−11)

Answer _____

5 Work out

7 – (–9)

Answer _____

6 Work out

–5 – (–12)

Answer _____

7 Work out

–5 + 8

Answer _____

8 Work out

16 – (–4)

Answer _____

9 Here are four numbers. Write one of these numbers in each box to make a correct calculation.

–5	–4	4	5

☐ + ☐ = –9

Answer _____

10 Here are four numbers. Write one of these numbers in each box to make a correct calculation.

−7	−2	2	7

☐ + ☐ = −5

Answer _____

11 Here are four numbers. Write one of these numbers in each box to make a correct calculation.

−8	−2	2	8

☐ − ☐ = −10

Answer _____

12 Here are four numbers. Write one of these numbers in each box to make a correct calculation.

−9	−3	3	9

☐ − ☐ = 12

Answer _____

13 Work out

5 × (−4)

Answer _____

14 Work out

−7 × 3

Answer _____

15 Work out

$-2 \times (-6)$

Answer _____

16 Work out

-4×9

Answer _____

17 Work out

$-32 \div 4$

Answer _____

18 Work out

$-25 \div 5$

Answer _____

19 Work out

$-42 \div (-7)$

Answer _____

20 Work out

$-2 \times 4 \times (-9)$

Answer _____

21 Work out the missing number.

$4 \times \square = -12$

Answer _____

22 Work out the missing number.

$-10 \times \square = -20$

Answer _____

23 Work out the missing number.

$-6 \times \square = 24$

Answer _____

24 Work out the missing number.

$\square \times 8 = -16$

Answer _____

25 Work out the missing number.

$\square \div (-2) = 9$

Answer _____

26 Work out the missing number.

27 ÷ ☐ = −9

Answer _____

27 Find the missing numbers to continue the sequence.

11, 6, 1, ☐, ☐

Answer _____

28 Find the missing numbers to continue the sequence.

−20, −12, −4, ☐, ☐

Answer _____

29 Find the missing numbers to complete the sequence.

−11, ☐, −3, 1, ☐

Answer _____

30 Find the missing numbers to complete the sequence.

25, 10, ☐, ☐, −35

Answer _____

31 The temperature in Glasgow one day was −4°C. The next day the temperature was 3°C lower. Work out the new temperature.

Answer _____

32 The temperature in London at midnight was –3°C. By 11 am, the temperature had risen by 5°C. Work out the temperature at 11 am.

Answer _____

33 The temperature in Leeming at midnight was –2°C. The temperature at midday was 8°C. Work out the difference between the temperature at midnight and at midday.

Answer _____

34 The table shows the temperature in four cities on a day in January.

City	Temperature
London	3°C
New York	–2°C
Tokyo	5°C
Oslo	–4°C

(a) Write down the name of the city with the lowest temperature.

(b) Work out the difference between the temperature in New York and the temperature in Tokyo.

The next day the temperature in New York increased by 3°C. (c) Work out the new temperature in New York.

Answer _____

35 The table shows the temperature at midnight and midday on 2 January in four cities.

City	Midnight	Midday
Murmansk	−9°C	−6°C
Budapest	−3°C	4°C
Paris	4°C	8°C
Prague	−4°C	1°C

(a) Write down the name of the city with the lowest midnight temperature.

(b) Which city had the greatest rise in temperature from midnight to midday?

(c) At midnight, how many degrees colder was Murmansk than Paris?

Answer _____

36 The table shows the temperature at midnight on 1 December in four cities.

City	Temperature
Helsinki	−6°C
Berlin	3°C
Utrecht	−2°C
Rome	7°C

(a) Write down the name of the city with the lowest temperature.

(b) Work out the difference between the temperature in Utrecht and the temperature in Rome.

Answer _____

Rounding

LEARNING QUESTION

How can we choose an appropriate degree of accuracy, and justify whether a rounded answer is suitable for its purpose?

Name _____ **Class** _____ **Date** _____

Which digit decides? Explain why your answer has the accuracy asked for.

1 Write 6.47 correct to 1 decimal place.

6.47

Answer _____

2 Write 376 to the nearest hundred.

376

Answer _____

3 Write 5829 to the nearest thousand.

5829

Answer _____

4 Write 7518 to the nearest hundred.

7518

Answer _____

5 Write 1485 to the nearest thousand.

1485

Answer _____

6 Write 2.79 correct to 1 decimal place.

2.79

Answer _____

7 Write 2437 to the nearest hundred.

2437

Answer _____

8 Write 3.84761 correct to 3 decimal places.

3.84761

Answer _____

9 Write 37.62 correct to one significant figure.

37.62

Answer _____

10 Write 58.165 correct to one significant figure.

58.165

Answer _____

11 Write 18.1693 correct to 2 decimal places.

18.1693

Answer _____

12 Write 0.4726 correct to two significant figures.

0.4726

Answer _____

13 Write 67480 correct to one significant figure.

67480

Answer _____

14 Write 9325.822 correct to two significant figures.

9325.822

Answer _____

15 Write 384761 to the nearest thousand.

384761

Answer _____

16 Write 8732 correct to one significant figure.

8732

Answer _____

17 Write 72.173 correct to two significant figures.

72.173

Answer _____

18 Write 5.4096 correct to 3 decimal places.

5.4096

Answer _____

19 Write 4726.7 correct to three significant figures.

4726.7

Answer _____

20 Write 193.28 correct to one significant figure.

193.28

Answer _____

21 Write 90437 correct to two significant figures.

90437

Answer _____

Factors, multiples and primes

LEARNING QUESTION

How can we use factors, multiples and prime numbers to classify numbers, solve number puzzles and justify our answers?

Name _____ **Class** _____ **Date** _____

Explain how you know.

1. Write down a multiple of 7 that is between 20 and 30.

Answer _____

2. Write down the first even multiple of 9.

Answer _____

3. Write down a multiple of 9 that is between 30 and 50.

Answer _____

4. Write down a prime number between 25 and 35.

Answer _____

5. Write down two factors of 18.

Answer _____

6. Write down all the prime numbers between 20 and 30.

Answer _____

7 Write down two multiples of 10.

Answer _____

8 Here is a list of numbers. From the numbers on the list,

15 **19** **25** **31** **35** **39** **40**

(a) write down an even number.

(b) write down a multiple of 7.

Answer _____

9 Write down two multiples of 8.

Answer _____

10 Write down all the factors of 14.

Answer _____

11 Write down all the factors of 20.

Answer _____

12 Here is a list of numbers. From the numbers on the list,

30 **31** **32** **33** **34** **35** **36** **37** **38** **39**

(a) write down a square number.

(b) write down a multiple of 8.

(c) write down all of the prime numbers on the list.

Answer _____

13 Here is a list of numbers. From the numbers on the list,

2	9	11	15	18	31	32

(a) write down a factor of 8.

(b) write down a multiple of 6.

(c) write down all of the prime numbers on the list.

Answer _____

14 Write down all the prime numbers between 10 and 20.

Answer _____

15 Write down two multiples of 20.

Answer _____

16 Write down all the factors of 16.

Answer _____

17 Ian says: “21 is a prime number.”

Is Ian correct? You must give a reason for your answer.

Answer _____

18 Here is a list of numbers. From the numbers on the list,

3	5	9	16	19	27	28

(a) write down a factor of 12.

(b) write down a multiple of 7.

(c) write down all of the prime numbers on the list.

Answer _____

19 Gary is thinking of a number. He says, “My number is prime and it is a factor of 36.”
There are two possible numbers. Write down these two numbers.

Answer _____

20 Write down two prime numbers that have a sum of 30.

Answer _____

21 Write down two prime numbers that have a sum of 19.

Answer _____

22 Here is a list of numbers. From the numbers on the list,

8	12	15	17	23	27	32

(a) write down a factor of 16.

(b) write down a multiple of 9.

(c) write down all of the prime numbers on the list.

Answer _____

23 Barry is thinking of a number. He says, “My number is even. It is a factor of 30 and a multiple of 5.”

There are two possible numbers. Write down these two numbers.

Answer _____

24 Paul is thinking of a number. He says, “My number is odd. It is a factor of 18 and a multiple of 3.”

There are two possible numbers. Write down these two numbers.

Answer _____

Order of operations

LEARNING QUESTION

How can we apply the order of operations accurately, and justify how brackets can change the value of a calculation?

Name _____ **Class** _____ **Date** _____

Show each step. Which operation comes first?

1 Work out

$3 \times 5 - 4$

Answer _____

2 Work out

$2 + 4 \times 5$

Answer _____

3 Work out

$(8 - 2) \times 3$

Answer _____

4 Work out

$5 + 3^2$

Answer _____

5 Work out

$7 \times 2 - 3 \times 4$

Answer _____

6 Work out

$(5 + 2)^2$

Answer _____

7 Work out

$6 + 15 \div 3$

Answer _____

8 Work out

$3 + 10 \times 2^3$

Answer _____

9 Work out

$20 - 2 \times 7$

Answer _____

10 Work out

$5 + 4^2$

Answer _____

11 Work out

$(7 - 4) \times (5 - 1)$

Answer _____

12 Work out

$7^2 + 2 \times 4$

Answer _____

13 Work out

$7 \times (8 - 5)$

Answer _____

14 Work out

$5 + 2 \times 9 \div 3$

Answer _____

15 Work out

$2 \times 6 + 14 \div 2$

Answer _____

16 Work out

$4 - 3 + 2 \times 5$

Answer _____

17 Work out

$3 + 5 \times 7 + 2$

Answer _____

18 Work out

$2 + (5 + 3)^2$

Answer _____

19 Work out

$(4 \times 10) \div (10 \div 2)$

Answer _____

20c Write brackets to make this statement correct.

4 × 5 + 3 = 32

Answer _____

20b Write brackets to make this statement correct.

3 + 4 × 5 + 6 = 47

Answer _____

20c Write brackets to make this statement correct.

2 + 7 × 5 + 3 = 72

Answer _____

21c Write brackets to make this statement correct.

2 + 7 × 3 + 4 = 51

Answer _____

21b Write brackets to make this statement correct.

4 × 3 + 2 = 20

Answer _____

21c Write brackets to make this statement correct.

9 – 7 × 3 + 5 = 16

Answer _____

Indices

LEARNING QUESTION

How can we use indices to write numbers efficiently, find square and cube numbers and use roots to find the original number?

Name _____ **Class** _____ **Date** _____

Non-calculator. Write each power as repeated multiplication.

1 Work out 2^3

Answer _____

2 Work out the cube root of 64

Answer _____

3 Write down the value of $\sqrt{49}$

Answer _____

4 Write down the value of 3^2

Answer _____

5 Write down a square number that is also an even number.

Answer _____

6 Write down the value of 5^2

Answer _____

7 Work out 10^4

Answer _____

8 Write down the value of $\sqrt{36}$

Answer _____

9 Work out 2^4

Answer _____

10 Work out the cube root of 27

Answer _____

11 Write down the value of $\sqrt{81}$

Answer _____

12 Write down the value of 4^2

Answer _____

13 Write down a square number that is also an odd number.

Answer _____

14 Work out 5^3

Answer _____

15 Write down the value of 8^2

Answer _____

16 Work out the value of 5×10^3

Answer _____

17 From the list, write down all the numbers that are powers of 2.

4	6	8	11	12	15	16	25

Answer _____

18 Write $5 \times 5 \times 5 \times 5$ as a power of 5.

Answer _____

19 From the list, write down all the square numbers.

5	9	11	16	20	25	32	38

Answer _____

20 From the list, write down all the cube numbers.

6	12	15	21	27	36	64	80

Answer _____

Calculator skills

LEARNING QUESTION

How can we enter complex calculations accurately so that a scientific calculator follows the intended order of operations?

Name _____ **Class** _____ **Date** _____

Enter each calculation as one complete expression. Compare the display with the question before you press =.

1 Use your calculator to work out

$\sqrt{144}$

Answer _____

2 Use your calculator to work out

$\sqrt{0.81}$

Answer _____

3 Use your calculator to work out

7^2

Answer _____

4 Use your calculator to work out

2.4^2

Answer _____

5 Use your calculator to work out

5^3

Answer _____

6 Use your calculator to work out

$\sqrt[3]{2744}$

Answer _____

7 Use your calculator to work out

$3^4 + \sqrt{225}$

Answer _____

8 Use your calculator to work out

$(\sqrt{196})^2 - 5^2$

Answer _____

9 Use your calculator to work out

$\sqrt[3]{512} + 6^2$

Answer _____

10 Use your calculator to work out

$\sqrt{8^2 + 15^2}$

Answer _____

11 Use your calculator to work out

$(18 - 7)^2$

Answer _____

12 Use your calculator to work out

$4.6(12.3 - 7.8)$

Answer _____

13 Use your calculator to work out

$\sqrt{5.4^2 + 7.2^2}$

Answer _____

14 Use your calculator to work out

$3[8.5 - (2.7 + 1.9)]$

Answer _____

15 Use your calculator to work out

$(7.2 + 3.8)^2 - 4.5^2$

Answer _____

16 Use your calculator to work out

$$\frac{35}{8}$$

Answer _____

17 Use your calculator to work out

$$\frac{6.4 + 2.8}{9.1 - 5.1}$$

Answer _____

18 Use your calculator to work out

$$\frac{3}{4} + \frac{5}{8}$$

Answer _____

19 Use your calculator to work out

$$\frac{2.7 \times 4.3}{\sqrt{2.25}}$$

Answer _____

20 Use your calculator to work out

$$\frac{7^2 - \sqrt{121}}{3^2 + 2}$$

Answer _____

21 Use your calculator to work out

$$\frac{\sqrt{81} + 5^2}{\sqrt[3]{64}}$$

Answer _____

22 Use your calculator to work out

$$\sqrt{\frac{3.6^2 + 4.8^2}{0.75}}$$

Answer _____

23 Use your calculator to work out

$$\frac{(5.2 - 1.7)^3}{\sqrt{12.25}}$$

Answer _____

24 Use your calculator to work out

$$\frac{18.6 - (\sqrt{5.76} + 1.35^2)}{0.45}$$

Answer _____

25 Write down the full calculator display for

$$\frac{17}{6} + \sqrt{3}$$

Answer _____

26 Write down the full calculator display for

$$\sqrt{47} + \frac{2^5}{7}$$

Answer _____

27 Work out, to 3 decimal places,

$$\frac{\sqrt{38.7} + 4.2^2}{1.8^2}$$

Answer _____

28 Work out, to 3 significant figures,

$$\sqrt[3]{1250} + \sqrt{18.2}$$

Answer _____

29 Work out, to 2 decimal places,

$$\frac{5.7^2 - \sqrt{6.25}}{\sqrt[3]{15.625} + 0.8}$$

Answer _____