Redbridge
Publishing

FREE YEAR 6 SATs MATHS RESOURCE

Find the Gap

40-Question Mixed-Response Diagnostic

A calm, accessible diagnostic using a mixture of written answers and carefully designed five-option questions.

40	original questions
16	five-option diagnostic questions
24	written-response questions
7	skill areas

What makes this diagnostic different

Multiple-choice questions use five plausible choices only when the distractors add diagnostic value. Other questions require a written answer, so pupils cannot work backwards from the options.

Instructions

This diagnostic is not timed.

- Use a pencil.
- Do not use a calculator.
- For questions with choices A-E, choose one answer.
- For written questions, write your answer in the answer box and show working if it helps.
- If a question feels difficult, have a go and move on.
- You may stop after question 20 and finish the rest later.

If reading is a barrier

An adult may read a question aloud exactly as written. They should not explain the maths, simplify the wording, suggest an operation or indicate an answer.

The aim is to identify maths skills that need more teaching. This resource does not produce or predict a SATs scaled score.

Questions 1-2

1 Calculate 6.4 × 100.

Answer

Working

2 Which number is missing?
4,000,000 + 70,000 + + 8 = 4,075,008

- **A** 5
- **B** 500
- **C** 5,000
- **D** 50,000
- **E** 75,000

Questions 3-4

3 Round 349,909 to the nearest 1,000.

Answer _____

Working

4 In the number 3,742,615, what is the value of the digit 7?

- **A** 700
- **B** 7,000
- **C** 70,000
- **D** 700,000
- **E** 7,000,000

Questions 5-6

5 Which number is greatest?

- **A** 0.65
- **B** 0.605
- **C** 0.56
- **D** 0.655
- **E** 0.6055

6 Calculate 5,002 - 687.

Answer

Working

Questions 7-8

7 Complete the calculation.

\+ 3,875 = 10,000

Answer

Working

8 Calculate 18 + 6 × 4.

A 96

B 42

C 48

D 30

E 72

Questions 9-10

9 Calculate 326 × 47.

Answer

Working

10 Calculate 864 ÷ 24.

Answer

Working

Questions 11-12

11 Calculate 42,600 ÷ 100.

- **A** 4.26
- **B** 42.6
- **C** 426
- **D** 4,260
- **E** 42,600

12 Calculate 3,504 ÷ 8.

Answer

Working

Questions 13-14

13 Calculate 2,370 + 896.

Answer

Working

14 Calculate 84 - (12 × 5).

A 360

B 24

C 72

D 420

E 60

Questions 15-16

15 Calculate 3.6 × 7.

Answer _____

Working

16 Calculate 2/3 + 1/4.

A) 3/7

B) 5/12

C) 11/12

D) 7/12

E) 5/7

Questions 17-18

17 Calculate 3/5 of 240.

Answer

Working

18 Calculate 15% of 360.

Answer

Working

Questions 19-20

19 Which percentage is equal to 0.35?

- **A** 3.5%
- **B** 35%
- **C** 0.35%
- **D** 350%
- **E** 3,500%

20 Calculate 7/8 - 1/4.
Give your answer in its simplest form.

Answer

Working

Questions 21-22

Optional break: If you completed questions 1-20 today, you can stop here and return to the rest later.

21 Calculate 3/4 of 56.

Answer

Working

22 Which fraction is equal to 0.125?

A 1/5

B 1/8

C 1/4

D 1/10

E 1/20

Questions 23-24

23 25% of a number is 18.
What is the number?

Answer

Working

24 Calculate 2 1/3 + 1 5/6.

A 3 6/9

B 4 1/6

C 3 1/6

D 4 7/9

E 4 5/9

Questions 25-26

25 Which value is greatest?

- **A** 0.4
- **B** 39%
- **C** 3/8
- **D** 0.405
- **E** 40.2%

26 Red and blue counters are in the ratio 3 : 5.
There are 64 counters altogether.
How many counters are blue?

Answer

Working

Questions 27-28

27 A recipe uses 300 g of flour for 4 people.
How much flour is needed for 10 people?

Answer

Working

28 5 identical pens cost £3.50.
How much do 8 pens cost?

Answer

Working

Questions 29-30

29 At a club, the ratio of adults to children is 2 : 7.
There are 18 adults.
How many children are there?

- **A** 45
- **B** 63
- **C** 126
- **D** 7
- **E** 72

30 A ribbon is 2.35 m long.
75 cm is added. Then 40 cm is cut off.
What is the new length in metres?

Answer _____

Working

Questions 31-32

31 A rectangle is 8 cm long and 5 cm wide.
What is its perimeter?

- **A** 13 cm
- **B** 26 cm
- **C** 40 cm
- **D** 80 cm
- **E** 16 cm

32 A triangle has a base of 10 cm and a perpendicular height of 6 cm.
What is its area?

Answer _____

Working

Questions 33-34

33 Convert 2.4 litres to millilitres.

Answer

Working

34 The mean of four numbers is 14.
Three of the numbers are 9, 13 and 16.
What is the fourth number?

Answer

Working

Questions 35-36

35 Museum visitors were:
Monday 14, Tuesday 22, Wednesday 19, Thursday 27.
Find the mean for Monday and Tuesday. Then find how many more visitors came on Thursday than this mean.

Answer

Working

36 A shop sold 100 pens over four days. 30 were sold on Wednesday.
What fraction of the 100 pens was sold on Wednesday?
Choose the answer in its simplest form.

- **A** 3/5
- **B** 3/10
- **C** 30/70
- **D** 1/4
- **E** 30/100

Questions 37-38

37 A school is taking 157 pupils on a trip.
Each coach holds 30 pupils.
What is the smallest number of coaches needed?

- **A** 5
- **B** 5 remainder 7
- **C** 6
- **D** 7
- **E** 30

38 A theatre has 240 tickets.
First, 35% of the tickets are sold. Then 18 more tickets are sold.
How many tickets are left?

Answer _____

Working

Questions 39-40

39 Maya wants to find 3/4 of 28.
Which calculation shows a correct method that uses the denominator first?

- **A** 28 ÷ 4 × 3
- **B** 28 ÷ 3 × 4
- **C** 28 × 4 ÷ 3
- **D** 28 + 3 + 4
- **E** 28 ÷ (3 + 4)

40 A box contains 48 packs of pencils.
Each pack contains 6 pencils.
Then 75 pencils are used.
How many pencils are left?

Answer _____

Working

Parent & Tutor Diagnostic Guide

Use this section after the pupil has completed the diagnostic. A single wrong answer does not prove a misconception. Look at the pupil's working and look for repeated patterns across questions in the same skill area.

Skill area	Questions	Score	Next step
Number & place value	1-5	____ / 5	Secure Review Priority
Calculation	6-15	____ / 10	Secure Review Priority
Fractions, decimals & percentages	16-25	____ / 10	Secure Review Priority
Ratio & proportion	26-29	____ / 4	Secure Review Priority
Measurement	30-33	____ / 4	Secure Review Priority
Statistics	34-36	____ / 3	Secure Review Priority
Reasoning habit	37-40	____ / 4	Secure Review Priority

Suggested interpretation

Use the profile to decide what to teach next, not to estimate a SATs score. Re-teach skills where the pupil shows repeated errors, then reassess with fresh questions.

Answer Key - Questions 1-20

Q	Answer	Skill
1	640	Scaling by powers of 10
2	C - 5,000	Place value in large numbers
3	350,000	Rounding whole numbers
4	D - 700,000	Value of digits
5	D - 0.655	Ordering decimals
6	4,315	Column subtraction with regrouping
7	6,125	Inverse operations
8	B - 42	Order of operations
9	15,322	Long multiplication
10	36	Division by a 2-digit number
11	C - 426	Dividing by powers of 10
12	438	Short division
13	3,266	Column addition
14	B - 24	Order of operations with brackets
15	25.2	Multiplying decimals
16	C - 11/12	Adding fractions
17	144	Fraction of an amount
18	54	Percentage of an amount
19	B - 35%	Decimal-percentage equivalence
20	5/8	Subtracting fractions

Answer Key - Questions 21-40

Q	Answer	Skill
21	42	Fraction of an amount
22	B - 1/8	Decimal-fraction equivalence
23	72	Finding the whole from a percentage
24	B - 4 1/6	Adding mixed numbers
25	D - 0.405	Comparing FDP representations
26	40	Sharing in a ratio
27	750 g	Scaling quantities
28	£5.60	Unitary method
29	B - 63	Scaling a ratio
30	2.70 m	Converting and calculating with length
31	B - 26 cm	Perimeter
32	30 cm^2	Area of a triangle
33	2,400 ml	Metric conversion
34	18	Mean as average
35	9	Interpreting data and mean
36	B - 3/10	Interpreting a data table
37	C - 6	Interpreting remainders
38	138	Multi-step percentage problem
39	A - 28 ÷ 4 × 3	Explaining a fraction method
40	213	Multi-step problem solving

What the Answers May Tell You

Question 1 - Scaling by powers of 10

Correct answer: 640

If the answer is incorrect: Check whether the pupil understands that multiplying by 100 makes the value 100 times as large. Look for place-value errors rather than a simple slip.

Question 2 - Place value in large numbers

Correct: C - 5,000

If A was chosen: The missing value may have been treated as ones.

If B was chosen: Hundreds and thousands may have been confused.

If D was chosen: The missing value was made ten times too large.

If E was chosen: The pupil may have used the combined 75,000 rather than isolating the missing part.

Question 3 - Rounding whole numbers

Correct answer: 350,000

If the answer is incorrect: Check which digit the pupil used to decide whether to round up. The hundreds digit is 9, so 349,909 rounds to 350,000.

Question 4 - Value of digits

Correct: D - 700,000

If A was chosen: The 7 was read as a hundreds digit.

If B was chosen: The 7 was read as a thousands digit.

If C was chosen: The 7 was read as a ten-thousands digit.

If E was chosen: The 7 was read as a millions digit.

Question 5 - Ordering decimals

Correct: D - 0.655

If A was chosen: The thousandths digit in 0.655 may have been ignored.

If B was chosen: The digits may have been compared without aligning place values.

If C was chosen: The tenths digit may have been over-weighted.

If E was chosen: The pupil may be treating a longer decimal as automatically larger.

Question 6 - Column subtraction with regrouping

Correct answer: 4,315

If the answer is incorrect: Inspect regrouping across the two zeros. Errors here often show insecure exchanging in column subtraction.

Diagnostic Guide - continued

Question 7 - Inverse operations

Correct answer: 6,125

If the answer is incorrect: Check whether the pupil uses subtraction as the inverse of addition and can find a complement to 10,000.

Question 8 - Order of operations

Correct: B - 42

If A was chosen: Addition was completed before multiplication.

If C was chosen: The order of operations is not secure.

If D was chosen: Only part of the calculation may have been completed.

If E was chosen: The pupil may have combined the numbers without following the operation signs.

Question 9 - Long multiplication

Correct answer: 15,322

If the answer is incorrect: Check both partial products, especially whether the 4 in 47 is treated as 40, and then check the final addition.

Question 10 - Division by a 2-digit number

Correct answer: 36

If the answer is incorrect: Check division facts and whether the pupil verifies the quotient by multiplication.

Question 11 - Dividing by powers of 10

Correct: C - 426

If A was chosen: The digits were shifted too far.

If B was chosen: The number was effectively divided by 1,000.

If D was chosen: The number was divided by 10.

If E was chosen: The value was left unchanged.

Question 12 - Short division

Correct answer: 438

If the answer is incorrect: Inspect each stage of the short division, including regrouping from hundreds to tens and tens to ones.

Diagnostic Guide - continued

Question 13 - Column addition

Correct answer: 3,266

If the answer is incorrect: Check column alignment and regrouping from ones to tens and tens to hundreds.

Question 14 - Order of operations with brackets

Correct: B - 24

If A was chosen: The subtraction may have been done before the multiplication.

If C was chosen: Only 12 was subtracted from 84.

If D was chosen: The operations were combined incorrectly.

If E was chosen: The bracket was calculated, but the final subtraction was missed.

Question 15 - Multiplying decimals

Correct answer: 25.2

If the answer is incorrect: Check whether the pupil can multiply 36 × 7 and then place the decimal point correctly.

Question 16 - Adding fractions

Correct: C - 11/12

If A was chosen: The numerators and denominators were added directly.

If B was chosen: A common denominator may have been attempted but one numerator was not converted correctly.

If D was chosen: Only one fraction may have been converted correctly.

If E was chosen: The pupil may be combining numerator and denominator values without equivalent fractions.

Question 17 - Fraction of an amount

Correct answer: 144

If the answer is incorrect: Check whether the pupil divides by 5 and then multiplies by 3, or uses an equivalent efficient method.

Question 18 - Percentage of an amount

Correct answer: 54

If the answer is incorrect: Check whether the pupil can build 15% from known percentages such as 10% and 5%, or use an equivalent method accurately.

Diagnostic Guide - continued

Question 19 - Decimal-percentage equivalence

Correct: B - 35%

If A was chosen: The decimal was converted by ×10 rather than ×100.

If C was chosen: The decimal was treated as though it were already a percentage.

If D was chosen: The decimal was converted by ×1,000.

If E was chosen: The decimal was converted by ×10,000.

Question 20 - Subtracting fractions

Correct answer: 5/8

If the answer is incorrect: Check whether 1/4 is converted to 2/8 before subtracting, and whether the final fraction is simplified if needed.

Question 21 - Fraction of an amount

Correct answer: 42

If the answer is incorrect: Check whether the pupil divides by 4 and then multiplies by 3.

Question 22 - Decimal-fraction equivalence

Correct: B - 1/8

If A was chosen: 0.125 may have been confused with 0.2.

If C was chosen: 0.125 may have been confused with 0.25.

If D was chosen: 0.125 may have been confused with 0.1.

If E was chosen: 0.125 may have been confused with 0.05.

Question 23 - Finding the whole from a percentage

Correct answer: 72

If the answer is incorrect: Check whether the pupil recognises that 25% is one quarter and therefore scales 18 up to the whole.

Question 24 - Adding mixed numbers

Correct: B - 4 1/6

If A was chosen: Whole numbers, numerators and denominators may have been combined separately.

If C was chosen: Regrouping the fractional part into another whole was missed.

If D was chosen: The denominators were combined incorrectly.

If E was chosen: The fractional addition was not made with equivalent fractions.

Diagnostic Guide - continued

Question 25 - Comparing FDP representations

Correct: D - 0.405

If A was chosen: The thousandths digit in 0.405 may have been ignored.

If B was chosen: 39% may have been treated as larger than 0.4.

If C was chosen: 3/8 may not have been converted or compared accurately.

If E was chosen: 40.2% is 0.402, so the pupil may need more secure conversion between forms.

Question 26 - Sharing in a ratio

Correct answer: 40

If the answer is incorrect: Check whether the pupil finds 8 total ratio parts and then takes 5 of those parts.

Question 27 - Scaling quantities

Correct answer: 750 g

If the answer is incorrect: Check whether the pupil finds an amount for one person or uses an equivalent scale factor from 4 to 10.

Question 28 - Unitary method

Correct answer: £5.60

If the answer is incorrect: Check whether the pupil first finds the cost of one pen (£0.70) and then scales to 8 pens.

Question 29 - Scaling a ratio

Correct: B - 63

If A was chosen: The difference between group sizes may have been used instead of scaling the ratio.

If C was chosen: 18 was multiplied by 7 without first finding one ratio part.

If D was chosen: The ratio number was used without scaling it.

If E was chosen: The pupil may have multiplied the number of adults by 4 rather than finding the value of one ratio part.

Question 30 - Converting and calculating with length

Correct answer: 2.70 m

If the answer is incorrect: Check whether all lengths are converted to the same unit before calculating. 75 cm = 0.75 m and 40 cm = 0.40 m.

Diagnostic Guide - continued

Question 31 - Perimeter

Correct: B - 26 cm

If A was chosen: Only one length and one width were added.

If C was chosen: Area was calculated instead of perimeter.

If D was chosen: Area and perimeter methods may have been combined.

If E was chosen: Only the two lengths may have been added.

Question 32 - Area of a triangle

Correct answer: 30 cm^2

If the answer is incorrect: Check whether the pupil uses base × perpendicular height ÷ 2, rather than base × height alone.

Question 33 - Metric conversion

Correct answer: 2,400 ml

If the answer is incorrect: Check whether the pupil knows that 1 litre = 1,000 millilitres and scales 2.4 accordingly.

Question 34 - Mean as average

Correct answer: 18

If the answer is incorrect: Check whether the pupil first finds the total needed for four numbers (56) and then subtracts the known values (38).

Question 35 - Interpreting data and mean

Correct answer: 9

If the answer is incorrect: The mean of 14 and 22 is 18. Then 27 - 18 = 9. Check whether both stages were completed.

Question 36 - Interpreting a data table

Correct: B - 3/10

If A was chosen: 30/100 was simplified incorrectly.

If C was chosen: The denominator may have been changed to the number not sold.

If D was chosen: 30% may have been approximated as one quarter.

If E was chosen: This is equivalent to the correct value but is not in simplest form, as requested.

Diagnostic Guide - continued

Question 37 - Interpreting remainders

Correct: C - 6

If A was chosen: The remainder was ignored.

If B was chosen: The division result was not interpreted in context.

If D was chosen: The answer was rounded up too far.

If E was chosen: The coach capacity was used as the answer instead of the number of coaches.

Question 38 - Multi-step percentage problem

Correct answer: 138

If the answer is incorrect: Check all three stages: find 35% of 240 (=84), add the extra 18 sold (=102), then subtract from 240 (=138).

Question 39 - Explaining a fraction method

Correct: A - 28 ÷ 4 × 3

If B was chosen: The numerator and denominator roles are reversed.

If C was chosen: The numerator and denominator roles are still reversed.

If D was chosen: The fraction has been treated as two whole numbers to add.

If E was chosen: The numerator and denominator have been added together instead of used as a fraction.

Question 40 - Multi-step problem solving

Correct answer: 213

If the answer is incorrect: Check that the pupil first finds the total number of pencils (48 × 6 = 288) and then subtracts 75.

Two-Week Intervention Planner

Choose a small number of priority skills. Teach the method explicitly, practise it in isolation, then return to mixed SATs-style questions.

Priority skill	What will we teach?	Practice	Recheck