

Numerical reasoning: full practice bank: open practice pack

100 untimed questions across 10 authored sections.

Detail	Value
Pack	cognitive-skills-numerical-reasoning
Source	cognitive-skills
Pack version	v1
Worksheet items	100
Authored hints	0
Worked explanations	100

This is untimed educational practice for one cognitive skill. It is not a clinical, diagnostic, employment, or professionally recognized assessment, and it does not produce an IQ score or credential.

The answer key and worked explanations in this file belong only to this public, untimed educational practice source. No active aptitude suite or Novus Reasoning Challenge answer key is ever included in any download.

Learner worksheet

One hundred short problems in ten themed sections, starting gently and building up. Work at your own pace from the numbers given in each question. No outside data or calculator tricks needed.

Choose one answer for each item. For a delayed-recall item, read its study text, cover it, and then answer without looking back.

Everyday arithmetic

Warm up with whole-number addition, subtraction, multiplication, and division.

1. numerical-reasoning-s01-q01

One shelf holds 24 books and a second shelf holds 38 books. How many books are there altogether?

- A. 62
- B. 64
- C. 68
- D. 72

Your answer: _____

2. numerical-reasoning-s01-q02

A box of 96 pencils is shared equally among 8 pupils. How many pencils does each pupil receive?

- A. 6
- B. 8
- C. 10
- D. 12

Your answer: _____

3. numerical-reasoning-s01-q03

Cinema tickets cost £9 each. What is the total cost of 7 tickets?

- A. £56
- B. £63
- C. £66
- D. £72

Your answer: _____

4. numerical-reasoning-s01-q04

A tank holds 500 litres of water. If 137 litres are drained out, how many litres remain?

- A. 337 litres
- B. 353 litres
- C. 363 litres
- D. 373 litres

Your answer: _____

5. numerical-reasoning-s01-q05

What is the value of $18 - 12 \div 3$?

- A. 2
- B. 6
- C. 10
- D. 14

Your answer: _____

6. numerical-reasoning-s01-q06

A train has 6 carriages and each carriage seats 72 passengers. How many seats does the train have in total?

- A. 432
- B. 440
- C. 452
- D. 468

Your answer: _____

7. numerical-reasoning-s01-q07

A crate contains 12 boxes, and each box holds 15 apples. How many apples are in the crate?

- A. 175
- B. 180
- C. 185
- D. 190

Your answer: _____

8. numerical-reasoning-s01-q08

75 chairs are arranged into complete rows of 9, with any spare chairs left at the side. How many chairs are left over?

- A. 0
- B. 1
- C. 2
- D. 3

Your answer: _____

9. numerical-reasoning-s01-q09

What is the value of $7 \times 8 - 6$?

- A. 50
- B. 52
- C. 56
- D. 62

Your answer: _____

10. numerical-reasoning-s01-q10

A shop opens at 9:00 am and closes at 5:30 pm. For how many hours is it open?

- A. 7.5 hours
- B. 8 hours
- C. 8.5 hours
- D. 9 hours

Your answer: _____

Fractions and decimals

Add, compare, and convert simple fractions and decimals.

11. numerical-reasoning-s02-q01

What is $\frac{1}{2} + \frac{1}{4}$?

- A. $\frac{2}{6}$
- B. $\frac{3}{4}$
- C. $\frac{5}{6}$
- D. $1 \frac{1}{4}$

Your answer: _____

12. numerical-reasoning-s02-q02

What is $\frac{3}{5}$ of 40?

- A. 24
- B. 26
- C. 28
- D. 32

Your answer: _____

13. numerical-reasoning-s02-q03

What is 0.25×80 ?

- A. 8
- B. 12
- C. 16
- D. 20

Your answer: _____

14. numerical-reasoning-s02-q04

Which of these fractions is the largest?

- A. $\frac{3}{5}$
- B. $\frac{7}{12}$
- C. $\frac{2}{3}$
- D. $\frac{5}{8}$

Your answer: _____

15. numerical-reasoning-s02-q05

What is $7.2 - 3.85$?

- A. 3.35
- B. 3.45
- C. 3.55
- D. 4.35

Your answer: _____

16. numerical-reasoning-s02-q06

A ribbon 3.6 metres long is cut into pieces each 0.4 metres long. How many pieces are made?

- A. 8
- B. 9
- C. 10
- D. 12

Your answer: _____

17. numerical-reasoning-s02-q07

What is $\frac{18}{24}$ written in its simplest form?

- A. $\frac{2}{3}$
- B. $\frac{4}{6}$
- C. $\frac{6}{8}$
- D. $\frac{3}{4}$

Your answer: _____

18. numerical-reasoning-s02-q08

Two thirds of a class of 27 pupils walk to school. How many pupils walk?

- A. 12
- B. 18
- C. 21
- D. 24

Your answer: _____

19. numerical-reasoning-s02-q09

What is 0.3×0.4 ?

- A. 0.12
- B. 0.7
- C. 1.2
- D. 12

Your answer: _____

20. numerical-reasoning-s02-q10

A recipe needs $\frac{3}{4}$ of a cup of flour. If you triple the recipe, how many cups of flour do you need?

- A. $1 \frac{1}{2}$
- B. 2
- C. $2 \frac{1}{4}$
- D. $2 \frac{3}{4}$

Your answer: _____

Percentages

Find percentages of amounts, and express changes as percentages.

21. numerical-reasoning-q1

A jacket normally costs \$80. It is discounted by 25%. What is the sale price?

- A. \$55
- B. \$60
- C. \$65
- D. \$70

Your answer: _____

22. numerical-reasoning-s03-q02

What is 15% of 60?

- A. 3
- B. 6
- C. 7.5
- D. 9

Your answer: _____

23. numerical-reasoning-s03-q03

A pupil scores 45 marks out of 60. What percentage is this?

- A. 75%
- B. 80%
- C. 85%
- D. 90%

Your answer: _____

24. numerical-reasoning-s03-q04

A price rises from £50 to £58. What is the percentage increase?

- A. 8%
- B. 16%
- C. 18%
- D. 20%

Your answer: _____

25. numerical-reasoning-s03-q05

A restaurant meal costs £40, and a 12.5% service charge is added. What is the total bill?

- A. £42
- B. £44
- C. £45
- D. £47.50

Your answer: _____

26. numerical-reasoning-q3

In a class of 30 students, 40% are boys. How many girls are in the class?

- A. 12
- B. 15
- C. 18
- D. 20

Your answer: _____

27. numerical-reasoning-s03-q07

30% of a number is 21. What is the number?

- A. 70
- B. 72
- C. 75
- D. 90

Your answer: _____

28. numerical-reasoning-s03-q08

A test is marked out of 25. A pupil scores 68%. How many marks did they get?

- A. 14
- B. 15
- C. 16
- D. 17

Your answer: _____

29. numerical-reasoning-s03-q09

A village's population falls from 2,500 to 2,300 over a decade. What is the percentage decrease?

- A. 6%
- B. 8%
- C. 9%
- D. 10%

Your answer: _____

30. numerical-reasoning-s03-q10

Which is greater: 25% of 80, or 30% of 70?

- A. 30% of 70
- B. 25% of 80
- C. They are equal
- D. It cannot be determined

Your answer: _____

Ratios and proportion

Share amounts in a given ratio and scale quantities proportionally.

31. numerical-reasoning-s04-q01

£60 is shared between two people in the ratio 2 : 1. How much does the person with the larger share receive?

- A. £30
- B. £40
- C. £45
- D. £50

Your answer: _____

32. numerical-reasoning-s04-q02

A shelter houses 12 cats and 18 dogs. What is the ratio of cats to dogs in its simplest form?

- A. 3 : 2
- B. 6 : 9
- C. 2 : 3
- D. 4 : 6

Your answer: _____

33. numerical-reasoning-s04-q03

A map uses a scale of 1 : 50,000. Two towns are 4 cm apart on the map. What is the real distance between them?

- A. 0.2 km
- B. 0.5 km
- C. 1 km
- D. 2 km

Your answer: _____

34. numerical-reasoning-s04-q04

A squash drink is mixed from concentrate and water in the ratio 1 : 4. How much water is needed for 250 ml of concentrate?

- A. 1,000 ml
- B. 1,250 ml
- C. 1,500 ml
- D. 2,000 ml

Your answer: _____

35. numerical-reasoning-q4

A recipe uses a ratio of 2 cups flour to 3 cups sugar. If you use 9 cups of sugar, how many cups of flour do you need?

- A. 4
- B. 5
- C. 6
- D. 7

Your answer: _____

36. numerical-reasoning-s04-q06

45 sweets are shared between two children in the ratio 4 : 5. How many sweets does the child with the smaller share receive?

- A. 18
- B. 20
- C. 22
- D. 25

Your answer: _____

37. numerical-reasoning-s04-q07

In a car park, the ratio of red cars to silver cars is 3 : 7. If there are 21 red cars, how many silver cars are there?

- A. 35

- B. 42
- C. 45
- D. 49

Your answer: _____

38. numerical-reasoning-s04-q08

Three identical printers together produce 360 pages in an hour. At the same rate, how many pages would five such printers produce in an hour?

- A. 480
- B. 540
- C. 600
- D. 720

Your answer: _____

39. numerical-reasoning-s04-q09

A biscuit mix uses flour, butter, and sugar in the ratio 3 : 2 : 1. If the mix weighs 480 g in total, how much butter does it contain?

- A. 80 g
- B. 160 g
- C. 240 g
- D. 320 g

Your answer: _____

40. numerical-reasoning-s04-q10

8 identical pens cost £6. How much would 12 of the same pens cost?

- A. £9
- B. £10
- C. £10.50
- D. £12

Your answer: _____

Rates, time, and conversions

Work with speed, unit rates, clock arithmetic, and unit conversions.

41. numerical-reasoning-q2

A car travels 180 km in 3 hours at a constant speed. How far will it travel in 5 hours at the same speed?

- A. 240 km
- B. 270 km
- C. 300 km
- D. 320 km

Your answer: _____

42. numerical-reasoning-s05-q02

Convert 3,200 metres into kilometres.

- A. 3.2 km
- B. 32 km
- C. 320 km
- D. 3,200 km

Your answer: _____

43. numerical-reasoning-s05-q03

A cyclist covers 45 km in 2.5 hours. What is her average speed?

- A. 12 km/h
- B. 15 km/h
- C. 16 km/h
- D. 18 km/h

Your answer: _____

44. numerical-reasoning-s05-q04

A coach departs at 09:40 and the journey takes 1 hour 35 minutes. At what time does it arrive?

- A. 11:05
- B. 11:15
- C. 11:25
- D. 11:35

Your answer: _____

45. numerical-reasoning-s05-q05

A tap fills a paddling pool at 4 litres per minute. How long will it take to fill a 90-litre pool?

- A. 20 minutes
- B. 21.5 minutes
- C. 22.5 minutes
- D. 24 minutes

Your answer: _____

46. numerical-reasoning-s05-q06

Walking at a steady 5 km/h, how long does a 12 km walk take?

- A. 2 hours 24 minutes
- B. 2 hours 30 minutes
- C. 2 hours 36 minutes
- D. 2 hours 48 minutes

Your answer: _____

47. numerical-reasoning-s05-q07

The exchange rate is £1 = €1.15. How many euros do you receive for £60?

- A. €63
- B. €65
- C. €66
- D. €69

Your answer: _____

48. numerical-reasoning-s05-q08

Express 45 minutes as a decimal fraction of an hour.

- A. 0.45
- B. 0.6
- C. 0.75
- D. 0.8

Your answer: _____

49. numerical-reasoning-s05-q09

A bottling machine fills 240 bottles in 20 minutes. At the same rate, how many bottles does it fill per hour?

- A. 480
- B. 720
- C. 960
- D. 1,200

Your answer: _____

50. numerical-reasoning-s05-q10

A lorry travels at a steady 64 km/h for 2 hours 15 minutes. How far does it travel?

- A. 144 km
- B. 148 km
- C. 152 km
- D. 160 km

Your answer: _____

Money and financial arithmetic

Handle change, wages, unit pricing, interest, and simple profit.

51. numerical-reasoning-s06-q01

You buy items costing £7.35 and £4.20, and pay with a £20 note. How much change should you receive?

- A. £8.35
- B. £8.45
- C. £8.55
- D. £9.45

Your answer: _____

52. numerical-reasoning-s06-q02

A 500 g pack of rice costs £2.40 and a 750 g pack of the same rice costs £3.30. Which is the better value for money?

- A. The 750 g pack
- B. The 500 g pack
- C. Both offer identical value
- D. It cannot be determined

Your answer: _____

53. numerical-reasoning-s06-q03

£800 is saved in an account paying 5% simple interest per year. How much interest is earned over 3 years?

- A. £40
- B. £80
- C. £100
- D. £120

Your answer: _____

54. numerical-reasoning-s06-q04

A worker earns £2,400 per month and spends 35% of it on rent. How much is the rent?

- A. £760
- B. £800
- C. £840
- D. £960

Your answer: _____

55. numerical-reasoning-q5

A \$500 investment grows by 10% in year one, then by 10% of the new amount in year two. What is the value after two years?

- A. \$590
- B. \$600
- C. \$605
- D. \$610

Your answer: _____

56. numerical-reasoning-s06-q06

A restaurant bill of £86.40 is split equally among 6 diners. How much does each pay?

- A. £13.40
- B. £14.40
- C. £14.60
- D. £15.40

Your answer: _____

57. numerical-reasoning-s06-q07

A washing machine costs £640. A buyer pays a 15% deposit. How much is left to pay afterwards?

- A. £544
- B. £560
- C. £576
- D. £600

Your answer: _____

58. numerical-reasoning-s06-q08

An employee works 38 hours in a week at £12.50 per hour. What is the weekly wage?

- A. £455
- B. £462.50
- C. £470
- D. £475

Your answer: _____

59. numerical-reasoning-s06-q09

A shop runs a 'buy three, get one free' offer on drinks costing £2.50 each. How much do you pay if you take 8 drinks?

- A. £12.50
- B. £15
- C. £17.50
- D. £20

Your answer: _____

60. numerical-reasoning-s06-q10

A trader buys 40 plants at £1.20 each and sells them all at £2 each. What is the total profit?

- A. £32
- B. £38
- C. £40
- D. £48

Your answer: _____

Averages and simple data

Calculate and interpret means, medians, modes, ranges, and weighted averages.

61. numerical-reasoning-s07-q01

What is the mean of 4, 8, 9, and 11?

- A. 6

- B. 7
- C. 8
- D. 9

Your answer: _____

62. numerical-reasoning-s07-q02

What is the median of 3, 7, 8, 12, and 15?

- A. 7
- B. 8
- C. 9
- D. 12

Your answer: _____

63. numerical-reasoning-s07-q03

What is the mode of the data set 2, 4, 4, 5, 7, 4, 9?

- A. 4
- B. 5
- C. 7
- D. 9

Your answer: _____

64. numerical-reasoning-s07-q04

What is the range of the data set 12, 5, 19, 8, 23?

- A. 11
- B. 15
- C. 18
- D. 23

Your answer: _____

65. numerical-reasoning-s07-q05

The mean of five test scores is 14. Four of the scores are 12, 15, 10, and 18. What is the fifth score?

- A. 11
- B. 12
- C. 14
- D. 15

Your answer: _____

66. numerical-reasoning-s07-q06

Class A has 20 pupils with a mean score of 60. Class B has 10 pupils with a mean score of 75. What is the mean score across both classes combined?

- A. 65

- B. 66
- C. 67.5
- D. 70

Your answer: _____

67. numerical-reasoning-s07-q07

A van drives 120 km in the first 2 hours, then 60 km in the next hour. What is its average speed over the whole journey?

- A. 55 km/h
- B. 60 km/h
- C. 65 km/h
- D. 67.5 km/h

Your answer: _____

68. numerical-reasoning-s07-q08

A stall's sales were 40 cakes on Monday, 55 on Tuesday, and 25 on Wednesday. What was the mean daily sale?

- A. 35
- B. 38
- C. 40
- D. 45

Your answer: _____

69. numerical-reasoning-s07-q09

The mean of six numbers is 10. A seventh number, 24, is added to the set. What is the new mean?

- A. 10.5
- B. 11
- C. 11.5
- D. 12

Your answer: _____

70. numerical-reasoning-s07-q10

A quiz team of five players has a mean score of 50 points per player. What is the highest score achieved by any single player?

- A. It cannot be determined from the information given
- B. Exactly 50
- C. Exactly 250
- D. At least 60

Your answer: _____

Number sequences and relationships

Find the rule behind each sequence, then apply it to the missing term.

71. numerical-reasoning-s08-q01

What is the next number in the sequence 5, 9, 13, 17, ...?

- A. 18
- B. 19
- C. 20
- D. 21

Your answer: _____

72. numerical-reasoning-s08-q02

What is the next number in the sequence 2, 6, 18, 54, ...?

- A. 108
- B. 148
- C. 162
- D. 216

Your answer: _____

73. numerical-reasoning-s08-q03

What is the next number in the sequence 64, 32, 16, 8, ...?

- A. 2
- B. 4
- C. 5
- D. 6

Your answer: _____

74. numerical-reasoning-s08-q04

What is the next number in the sequence 1, 4, 9, 16, 25, ...?

- A. 36
- B. 42
- C. 49
- D. 50

Your answer: _____

75. numerical-reasoning-s08-q05

What is the next number in the sequence 3, 4, 7, 11, 18, ...?

- A. 29
- B. 30
- C. 32
- D. 36

Your answer: _____

76. numerical-reasoning-s08-q06

What is the next number in the sequence 40, 37, 33, 28, 22, ...?

- A. 14
- B. 15
- C. 16
- D. 17

Your answer: _____

77. numerical-reasoning-s08-q07

What is the next number in the sequence 1, 10, 3, 8, 5, 6, 7, ...?

- A. 4
- B. 5
- C. 6
- D. 8

Your answer: _____

78. numerical-reasoning-s08-q08

What is the next number in the sequence 5, 6, 8, 11, 15, 20, ...?

- A. 24
- B. 25
- C. 26
- D. 27

Your answer: _____

79. numerical-reasoning-s08-q09

Which number does not belong with the others: 8, 27, 64, 100, 125?

- A. 27
- B. 64
- C. 100
- D. 125

Your answer: _____

80. numerical-reasoning-s08-q10

A sequence follows the rule 'double the previous term, then subtract 1': 3, 5, 9, 17, ... What is the next term?

- A. 31
- B. 33
- C. 34
- D. 35

Your answer: _____

Multi-step word problems

Combine two or more operations: plan the steps before you calculate.

81. numerical-reasoning-s09-q01

A hall has 18 rows of 22 seats. If 315 tickets are sold for a concert, how many seats remain empty?

- A. 71
- B. 79
- C. 81
- D. 91

Your answer: _____

82. numerical-reasoning-s09-q02

A plumber charges a £40 call-out fee plus £15 per hour of work. If a bill comes to £145, how many hours did the job take?

- A. 6
- B. 7
- C. 8
- D. 9

Your answer: _____

83. numerical-reasoning-s09-q03

A car uses 6 litres of fuel per 100 km, and fuel costs £1.50 per litre. How much does the fuel for a 450 km trip cost?

- A. £36.00
- B. £37.50
- C. £40.00
- D. £40.50

Your answer: _____

84. numerical-reasoning-s09-q04

A jumper priced at £45 is reduced by 20% in a sale, and a £5 voucher is then taken off the sale price. What do you pay?

- A. £31
- B. £32
- C. £35
- D. £36

Your answer: _____

85. numerical-reasoning-s09-q05

Amir is twice as old as Beth, and their ages add up to 36. How old is Amir?

- A. 18
- B. 20

- C. 24
- D. 27

Your answer: _____

86. numerical-reasoning-s09-q06

A number is multiplied by 4 and then 6 is added, giving 46. What was the original number?

- A. 7
- B. 8
- C. 9
- D. 10

Your answer: _____

87. numerical-reasoning-s09-q07

A warehouse holds 1,200 units. On Monday it ships out 15% of its stock, and on Tuesday it receives a delivery of 250 units. How many units does it hold after Tuesday?

- A. 1,270
- B. 1,330
- C. 1,370
- D. 1,450

Your answer: _____

88. numerical-reasoning-s09-q08

A floor measures 4 m by 3 m. Each tile covers 0.25 m², and tiles are sold in boxes of 10. How many boxes are needed to cover the floor exactly?

- A. 4
- B. 5
- C. 6
- D. 48

Your answer: _____

89. numerical-reasoning-s09-q09

Adult tickets cost £9 and child tickets cost £5. A family buys 2 adult and 3 child tickets, paying with a £50 note. How much change do they receive?

- A. £14
- B. £15
- C. £16
- D. £17

Your answer: _____

90. numerical-reasoning-s09-q10

A shop's June sales were 20% higher than its May sales. June sales were 660 units. How many units were sold in May?

- A. 550
- B. 572
- C. 605
- D. 792

Your answer: _____

Compound change and combined rates

The toughest set: repeated percentage change, reverse percentages, and rates working together.

91. numerical-reasoning-s10-q01

A machine worth £2,000 loses 10% of its value each year. What is it worth after two years?

- A. £1,600
- B. £1,620
- C. £1,640
- D. £1,800

Your answer: _____

92. numerical-reasoning-s10-q02

A coat priced at £150 is reduced by 20%, and the sale price is later reduced by a further 10%. What is the final price?

- A. £102
- B. £104
- C. £105
- D. £108

Your answer: _____

93. numerical-reasoning-s10-q03

After a 20% price increase, a ticket costs £96. What did it cost before the increase?

- A. £80
- B. £84
- C. £88
- D. £92

Your answer: _____

94. numerical-reasoning-s10-q04

Working alone, machine A completes a job in 3 hours. Working together, machines A and B complete the same job in 2 hours. How long would machine B take alone?

- A. 4 hours
- B. 5 hours
- C. 6 hours
- D. 12 hours

Your answer: _____

95. numerical-reasoning-s10-q05

A driver travels from town P to town Q at 60 km/h and returns along the same road at 40 km/h. What is the average speed for the whole round trip?

- A. 45 km/h
- B. 48 km/h
- C. 50 km/h
- D. 52 km/h

Your answer: _____

96. numerical-reasoning-s10-q06

In a company, 30% of the staff work part-time, and 40% of those part-time staff work at weekends. What percentage of all staff are part-time weekend workers?

- A. 8%
- B. 10%
- C. 11%
- D. 12%

Your answer: _____

97. numerical-reasoning-s10-q07

Without calculating exactly, which is the best estimate of $41,872 \div 68.9$?

- A. About 600
- B. About 6,000
- C. About 60,000
- D. About 600,000

Your answer: _____

98. numerical-reasoning-q6

Pipe A fills a tank alone in 4 hours; pipe B fills it alone in 6 hours. Working together, about how many hours will it take?

- A. 2 hours
- B. 2.4 hours
- C. 3 hours
- D. 5 hours

Your answer: _____

99. numerical-reasoning-s10-q09

A bag contains red and blue counters in the ratio 3 : 2, and holds 30 counters in total. If 6 more blue counters are added, what is the new ratio of red to blue?

- A. 3 : 2
- B. 6 : 5
- C. 1 : 1
- D. 2 : 3

Your answer: _____

100. numerical-reasoning-s10-q10

An investment rises in value by 25% in its first year and then falls by 20% in its second year. What is the overall effect on its value?

- A. A 5% overall increase
- B. No overall change
- C. A 5% overall decrease
- D. A 10% overall increase

Your answer: _____

Authored hints

This cognitive practice source does not publish authored hints. Every item is listed as missing a hint, and no hint text is generated or inferred.

100 worksheet items do not have an authored hint. No hint text was generated for them.

Answer key

The answer key and worked explanations in this file belong only to this public, untimed educational practice source. No active aptitude suite or Novus Reasoning Challenge answer key is ever included in any download.

Numerical reasoning: full practice bank: open practice pack answer key

Item	Choice	Answer
numerical-reasoning-s01-q01	A	62
numerical-reasoning-s01-q02	D	12
numerical-reasoning-s01-q03	B	£63
numerical-reasoning-s01-q04	C	363 litres
numerical-reasoning-s01-q05	D	14
numerical-reasoning-s01-q06	A	432
numerical-reasoning-s01-q07	B	180
numerical-reasoning-s01-q08	D	3
numerical-reasoning-s01-q09	A	50
numerical-reasoning-s01-q10	C	8.5 hours
numerical-reasoning-s02-q01	B	3/4
numerical-reasoning-s02-q02	A	24
numerical-reasoning-s02-q03	D	20
numerical-reasoning-s02-q04	C	2/3
numerical-reasoning-s02-q05	A	3.35
numerical-reasoning-s02-q06	B	9
numerical-reasoning-s02-q07	D	3/4
numerical-reasoning-s02-q08	B	18

numerical-reasoning-s02-q09	A	0.12
numerical-reasoning-s02-q10	C	2 1/4
numerical-reasoning-q1	B	\$60
numerical-reasoning-s03-q02	D	9
numerical-reasoning-s03-q03	A	75%
numerical-reasoning-s03-q04	B	16%
numerical-reasoning-s03-q05	C	£45
numerical-reasoning-q3	C	18
numerical-reasoning-s03-q07	A	70
numerical-reasoning-s03-q08	D	17
numerical-reasoning-s03-q09	B	8%
numerical-reasoning-s03-q10	A	30% of 70
numerical-reasoning-s04-q01	B	£40
numerical-reasoning-s04-q02	C	2 : 3
numerical-reasoning-s04-q03	D	2 km
numerical-reasoning-s04-q04	A	1,000 ml
numerical-reasoning-q4	C	6
numerical-reasoning-s04-q06	B	20
numerical-reasoning-s04-q07	D	49
numerical-reasoning-s04-q08	C	600
numerical-reasoning-s04-q09	B	160 g
numerical-reasoning-s04-q10	A	£9
numerical-reasoning-q2	C	300 km
numerical-reasoning-s05-q02	A	3.2 km
numerical-reasoning-s05-q03	D	18 km/h
numerical-reasoning-s05-q04	B	11:15
numerical-reasoning-s05-q05	C	22.5 minutes
numerical-reasoning-s05-q06	A	2 hours 24 minutes
numerical-reasoning-s05-q07	D	€69
numerical-reasoning-s05-q08	C	0.75
numerical-reasoning-s05-q09	B	720
numerical-reasoning-s05-q10	A	144 km
numerical-reasoning-s06-q01	B	£8.45
numerical-reasoning-s06-q02	A	The 750 g pack
numerical-reasoning-s06-q03	D	£120
numerical-reasoning-s06-q04	C	£840
numerical-reasoning-q5	C	\$605
numerical-reasoning-s06-q06	B	£14.40
numerical-reasoning-s06-q07	A	£544
numerical-reasoning-s06-q08	D	£475

numerical-reasoning-s06-q09	B	£15
numerical-reasoning-s06-q10	A	£32
numerical-reasoning-s07-q01	C	8
numerical-reasoning-s07-q02	B	8
numerical-reasoning-s07-q03	A	4
numerical-reasoning-s07-q04	C	18
numerical-reasoning-s07-q05	D	15
numerical-reasoning-s07-q06	A	65
numerical-reasoning-s07-q07	B	60 km/h
numerical-reasoning-s07-q08	C	40
numerical-reasoning-s07-q09	D	12
numerical-reasoning-s07-q10	A	It cannot be determined from the information given
numerical-reasoning-s08-q01	D	21
numerical-reasoning-s08-q02	C	162
numerical-reasoning-s08-q03	B	4
numerical-reasoning-s08-q04	A	36
numerical-reasoning-s08-q05	A	29
numerical-reasoning-s08-q06	B	15
numerical-reasoning-s08-q07	A	4
numerical-reasoning-s08-q08	C	26
numerical-reasoning-s08-q09	C	100
numerical-reasoning-s08-q10	B	33
numerical-reasoning-s09-q01	C	81
numerical-reasoning-s09-q02	B	7
numerical-reasoning-s09-q03	D	£40.50
numerical-reasoning-s09-q04	A	£31
numerical-reasoning-s09-q05	C	24
numerical-reasoning-s09-q06	D	10
numerical-reasoning-s09-q07	A	1,270
numerical-reasoning-s09-q08	B	5
numerical-reasoning-s09-q09	D	£17
numerical-reasoning-s09-q10	A	550
numerical-reasoning-s10-q01	B	£1,620
numerical-reasoning-s10-q02	D	£108
numerical-reasoning-s10-q03	A	£80
numerical-reasoning-s10-q04	C	6 hours
numerical-reasoning-s10-q05	B	48 km/h
numerical-reasoning-s10-q06	D	12%
numerical-reasoning-s10-q07	A	About 600
numerical-reasoning-q6	B	2.4 hours

numerical-reasoning-s10-q09	C	1 : 1
numerical-reasoning-s10-q10	B	No overall change

Worked explanations

numerical-reasoning-s01-q01: Add the two shelf counts directly: $24 + 38 = 62$.

numerical-reasoning-s01-q02: Equal sharing is division: $96 \div 8 = 12$ pencils each.

numerical-reasoning-s01-q03: Repeated equal amounts call for multiplication: $7 \times £9 = £63$.

numerical-reasoning-s01-q04: Subtract the drained amount from the full tank: $500 - 137 = 363$ litres.

numerical-reasoning-s01-q05: Division is carried out before subtraction: $12 \div 3 = 4$, so $18 - 4 = 14$. Working left to right first would wrongly give 2.

numerical-reasoning-s01-q06: Multiply carriages by seats per carriage: $6 \times 72 = 432$.

numerical-reasoning-s01-q07: Multiply the number of boxes by apples per box: $12 \times 15 = 180$.

numerical-reasoning-s01-q08: $9 \times 8 = 72$ is the largest multiple of 9 that fits within 75, leaving a remainder of $75 - 72 = 3$.

numerical-reasoning-s01-q09: Multiplication comes before subtraction: $7 \times 8 = 56$, then $56 - 6 = 50$.

numerical-reasoning-s01-q10: From 9:00 am to 5:00 pm is 8 hours, plus the extra 30 minutes makes 8.5 hours.

numerical-reasoning-s02-q01: Convert to a common denominator first: $1/2 = 2/4$, so $2/4 + 1/4 = 3/4$. Adding tops and bottoms separately is the classic trap.

numerical-reasoning-s02-q02: Find one fifth first: $40 \div 5 = 8$, then multiply by three: $3 \times 8 = 24$.

numerical-reasoning-s02-q03: 0.25 is one quarter, so multiplying by it is dividing by 4: $80 \div 4 = 20$.

numerical-reasoning-s02-q04: Converting to decimals makes the comparison easy: $3/5 = 0.6$, $7/12 \approx 0.583$, $2/3 \approx 0.667$, and $5/8 = 0.625$, so $2/3$ is largest.

numerical-reasoning-s02-q05: Line up the decimal places by writing 7.2 as 7.20, then subtract: $7.20 - 3.85 = 3.35$.

numerical-reasoning-s02-q06: Divide the total length by the piece length: $3.6 \div 0.4 = 36 \div 4 = 9$ pieces.

numerical-reasoning-s02-q07: Divide top and bottom by their highest common factor, 6: $18 \div 6 = 3$ and $24 \div 6 = 4$, giving $3/4$. Equivalent fractions like $6/8$ are not fully simplified.

numerical-reasoning-s02-q08: One third of 27 is 9, so two thirds is $2 \times 9 = 18$ pupils.

numerical-reasoning-s02-q09: Multiply as whole numbers ($3 \times 4 = 12$), then place two decimal digits because the factors have one each: 0.12.

numerical-reasoning-s02-q10: Multiply the fraction by three: $3 \times 3/4 = 9/4$, which is $2 \frac{1}{4}$ cups.

numerical-reasoning-q1: 25% of \$80 is \$20, so the sale price is $\$80 - \$20 = \$60$.

numerical-reasoning-s03-q02: 10% of 60 is 6 and 5% is 3, so 15% is $6 + 3 = 9$.

numerical-reasoning-s03-q03: Divide the score by the total and multiply by 100: $45 \div 60 = 0.75$, which is 75%.

numerical-reasoning-s03-q04: Percentage change is the change divided by the original amount: $8 \div 50 = 0.16$, so a 16% increase.

numerical-reasoning-s03-q05: 12.5% is one eighth, so the charge is $£40 \div 8 = £5$, giving $£40 + £5 = £45$.

numerical-reasoning-q3: 40% of 30 is 12 boys, so the remaining $30 - 12 = 18$ students are girls.

numerical-reasoning-s03-q07: If 30% is 21, then 10% is $21 \div 3 = 7$, so the whole number (100%) is $7 \times 10 =$

70.

numerical-reasoning-s03-q08: Convert the percentage to a decimal and multiply: $0.68 \times 25 = 17$ marks.

numerical-reasoning-s03-q09: The fall is 200 people; divide by the original population: $200 \div 2,500 = 0.08$, an 8% decrease.

numerical-reasoning-s03-q10: Work both out: 25% of 80 is 20, while 30% of 70 is 21, so 30% of 70 is slightly greater.

numerical-reasoning-s04-q01: The ratio 2 : 1 has 3 equal parts, each worth $\pounds 60 \div 3 = \pounds 20$; the larger share is $2 \times \pounds 20 = \pounds 40$.

numerical-reasoning-s04-q02: Divide both sides by their highest common factor, 6: 12 : 18 becomes 2 : 3. Keep the order as asked: cats first.

numerical-reasoning-s04-q03: Multiply the map distance by the scale: $4 \text{ cm} \times 50,000 = 200,000 \text{ cm}$, and converting units gives $2,000 \text{ m} = 2 \text{ km}$.

numerical-reasoning-s04-q04: Every 1 part of concentrate needs 4 parts of water, so 250 ml needs $4 \times 250 = 1,000 \text{ ml}$ of water.

numerical-reasoning-q4: 9 cups of sugar is 3x the ratio's 3 cups, so flour scales the same way: $2 \times 3 = 6$ cups.

numerical-reasoning-s04-q06: The ratio 4 : 5 has 9 parts, each worth $45 \div 9 = 5$ sweets; the smaller share is $4 \times 5 = 20$.

numerical-reasoning-s04-q07: 21 red cars is 7 times the ratio's 3, so scale the silver side the same way: $7 \times 7 = 49$.

numerical-reasoning-s04-q08: Each printer produces $360 \div 3 = 120$ pages per hour, so five produce $5 \times 120 = 600$.

numerical-reasoning-s04-q09: The ratio has $3 + 2 + 1 = 6$ parts, each worth $480 \div 6 = 80 \text{ g}$; butter is 2 parts, so 160 g.

numerical-reasoning-s04-q10: One pen costs $\pounds 6 \div 8 = \pounds 0.75$, so 12 pens cost $12 \times \pounds 0.75 = \pounds 9$.

numerical-reasoning-q2: $180 \text{ km} \div 3 \text{ h} = 60 \text{ km/h}$. At 60 km/h for 5 hours: $60 \times 5 = 300 \text{ km}$.

numerical-reasoning-s05-q02: There are 1,000 metres in a kilometre, so divide by 1,000: $3,200 \text{ m} = 3.2 \text{ km}$.

numerical-reasoning-s05-q03: Average speed is distance divided by time: $45 \div 2.5 = 18 \text{ km/h}$.

numerical-reasoning-s05-q04: Break the journey into easy steps: 09:40 plus 20 minutes reaches 10:00, and the remaining 1 hour 15 minutes reaches 11:15.

numerical-reasoning-s05-q05: Divide the volume by the rate: $90 \div 4 = 22.5$ minutes.

numerical-reasoning-s05-q06: Time is distance divided by speed: $12 \div 5 = 2.4$ hours, and 0.4 of an hour is $0.4 \times 60 = 24$ minutes.

numerical-reasoning-s05-q07: Multiply the pounds by the rate per pound: $60 \times 1.15 = \text{€}69$.

numerical-reasoning-s05-q08: Divide by the 60 minutes in an hour: $45 \div 60 = 0.75$. Writing 45 minutes as 0.45 hours is the common slip.

numerical-reasoning-s05-q09: An hour contains three 20-minute periods, so the hourly total is $3 \times 240 = 720$ bottles.

numerical-reasoning-s05-q10: Convert the time to a decimal: 2 hours 15 minutes = 2.25 hours, then multiply: $64 \times 2.25 = 144 \text{ km}$.

numerical-reasoning-s06-q01: The total spend is $\pounds 7.35 + \pounds 4.20 = \pounds 11.55$, so the change is $\pounds 20 - \pounds 11.55 = \pounds 8.45$.

numerical-reasoning-s06-q02: Compare a common unit: per 100 g, the small pack costs $\pounds 2.40 \div 5 = \pounds 0.48$

while the large pack costs $\pounds 3.30 \div 7.5 = \pounds 0.44$, so the larger pack is cheaper per gram.

numerical-reasoning-s06-q03: Simple interest pays the same amount each year: 5% of $\pounds 800$ is $\pounds 40$, so three years earn $3 \times \pounds 40 = \pounds 120$.

numerical-reasoning-s06-q04: 10% of $\pounds 2,400$ is $\pounds 240$, so 35% is $3.5 \times \pounds 240 = \pounds 840$.

numerical-reasoning-q5: $\$500 \times 1.10 = \550 after year one; $\$550 \times 1.10 = \605 after year two.

numerical-reasoning-s06-q06: Divide the bill by the number of diners: $\pounds 86.40 \div 6 = \pounds 14.40$.

numerical-reasoning-s06-q07: The deposit is 15% of $\pounds 640 = \pounds 96$, leaving $\pounds 640 - \pounds 96 = \pounds 544$, or simply take 85% of the price directly.

numerical-reasoning-s06-q08: Multiply hours by the hourly rate: $38 \times \pounds 12.50 = \pounds 475$. Doubling $\pounds 12.50$ to $\pounds 25$ per 2 hours makes the mental sum easier: $19 \times \pounds 25 = \pounds 475$.

numerical-reasoning-s06-q09: Eight drinks form two groups of four, and in each group one is free, so you pay for 6 drinks: $6 \times \pounds 2.50 = \pounds 15$.

numerical-reasoning-s06-q10: The profit per plant is $\pounds 2 - \pounds 1.20 = \pounds 0.80$, so 40 plants earn $40 \times \pounds 0.80 = \pounds 32$.

numerical-reasoning-s07-q01: Add the values and divide by how many there are: $(4 + 8 + 9 + 11) \div 4 = 32 \div 4 = 8$.

numerical-reasoning-s07-q02: With the five values already in order, the median is the middle (third) value: 8.

numerical-reasoning-s07-q03: The mode is the most frequent value, and 4 appears three times, more than any other.

numerical-reasoning-s07-q04: The range is the largest value minus the smallest: $23 - 5 = 18$.

numerical-reasoning-s07-q05: A mean of 14 across five scores means a total of $5 \times 14 = 70$; the four known scores sum to 55, so the fifth is $70 - 55 = 15$.

numerical-reasoning-s07-q06: Weight each mean by its class size: total marks are $20 \times 60 + 10 \times 75 = 1,950$, spread over 30 pupils gives 65. Simply averaging 60 and 75 ignores the different class sizes.

numerical-reasoning-s07-q07: Average speed is total distance over total time: $(120 + 60) \div (2 + 1) = 180 \div 3 = 60$ km/h.

numerical-reasoning-s07-q08: Sum the three days and divide by three: $(40 + 55 + 25) \div 3 = 120 \div 3 = 40$.

numerical-reasoning-s07-q09: The original total is $6 \times 10 = 60$; adding 24 gives 84 across seven numbers, and $84 \div 7 = 12$.

numerical-reasoning-s07-q10: A mean only fixes the total ($5 \times 50 = 250$ points), not how the points are spread. Every player could have scored exactly 50, or one could have scored far more.

numerical-reasoning-s08-q01: Each term increases by 4, so the next term is $17 + 4 = 21$.

numerical-reasoning-s08-q02: Each term is multiplied by 3, so the next term is $54 \times 3 = 162$.

numerical-reasoning-s08-q03: Each term is halved, so the next term is $8 \div 2 = 4$.

numerical-reasoning-s08-q04: These are the square numbers $1^2, 2^2, 3^2, 4^2, 5^2$, so the next is $6^2 = 36$.

numerical-reasoning-s08-q05: Each term is the sum of the two before it: $11 + 18 = 29$.

numerical-reasoning-s08-q06: The amount subtracted grows by one each step (3, 4, 5, 6), so the next step subtracts 7: $22 - 7 = 15$.

numerical-reasoning-s08-q07: Two sequences alternate: the odd positions climb 1, 3, 5, 7 while the even positions fall 10, 8, 6, so the next even-position term is 4.

numerical-reasoning-s08-q08: The gaps grow by one each time (1, 2, 3, 4, 5), so the next gap is 6: $20 + 6 = 26$.

numerical-reasoning-s08-q09: 8, 27, 64, and 125 are cube numbers ($2^3, 3^3, 4^3, 5^3$); 100 is a square but not a cube.

numerical-reasoning-s08-q10: Apply the rule to 17: $2 \times 17 = 34$, then $34 - 1 = 33$.

numerical-reasoning-s09-q01: First find the capacity: $18 \times 22 = 396$ seats; then subtract the tickets sold: $396 - 315 = 81$.

numerical-reasoning-s09-q02: Remove the fixed fee first: $\pounds 145 - \pounds 40 = \pounds 105$ of hourly work, then divide by the rate: $105 \div 15 = 7$ hours.

numerical-reasoning-s09-q03: The trip uses $4.5 \times 6 = 27$ litres, and $27 \times \pounds 1.50 = \pounds 40.50$.

numerical-reasoning-s09-q04: The 20% reduction takes $\pounds 45$ down to $\pounds 36$, and the $\pounds 5$ voucher then brings it to $\pounds 31$. The order of the steps matters.

numerical-reasoning-s09-q05: Their combined age is three equal 'Beth-sized' parts (Beth plus twice Beth), so Beth is $36 \div 3 = 12$ and Amir is 24.

numerical-reasoning-s09-q06: Work backwards, undoing each step in reverse: $46 - 6 = 40$, then $40 \div 4 = 10$.

numerical-reasoning-s09-q07: Monday's shipment is 15% of 1,200 = 180 units, leaving 1,020; Tuesday's delivery brings it to $1,020 + 250 = 1,270$.

numerical-reasoning-s09-q08: The floor area is $4 \times 3 = 12 \text{ m}^2$, needing $12 \div 0.25 = 48$ tiles, which is $48 \div 10 = 4.8$, so 5 full boxes must be bought.

numerical-reasoning-s09-q09: The tickets cost $2 \times \pounds 9 + 3 \times \pounds 5 = \pounds 18 + \pounds 15 = \pounds 33$, so the change is $\pounds 50 - \pounds 33 = \pounds 17$.

numerical-reasoning-s09-q10: June is 120% of May, so divide rather than take 20% off: $660 \div 1.2 = 550$. Subtracting 20% of June's figure would give the wrong base.

numerical-reasoning-s10-q01: Apply the multiplier twice: $\pounds 2,000 \times 0.9 \times 0.9 = \pounds 1,620$. The second year's 10% is taken from the reduced value, not the original.

numerical-reasoning-s10-q02: Chain the multipliers: $\pounds 150 \times 0.8 = \pounds 120$, then $\pounds 120 \times 0.9 = \pounds 108$. Two successive discounts of 20% and 10% are not the same as one 30% discount.

numerical-reasoning-s10-q03: $\pounds 96$ represents 120% of the original price, so divide by 1.2: $96 \div 1.2 = \pounds 80$. Taking 20% off $\pounds 96$ would use the wrong base.

numerical-reasoning-s10-q04: Work in rates: together they do $1/2$ of the job per hour and A alone does $1/3$, so B's rate is $1/2 - 1/3 = 1/6$ per hour. A full job takes B 6 hours.

numerical-reasoning-s10-q05: More time is spent at the slower speed, so the answer is below the midpoint. For a 120 km leg each way: 2 hours out plus 3 hours back is 240 km in 5 hours = 48 km/h.

numerical-reasoning-s10-q06: A percentage of a percentage multiplies: 40% of 30% is $0.4 \times 0.3 = 0.12$, which is 12% of all staff.

numerical-reasoning-s10-q07: Round to friendly numbers: $42,000 \div 70 = 600$, so the quotient is about 600. Estimation is mainly about keeping track of the size of the answer.

numerical-reasoning-s10-q08: Combined rate = $1/4 + 1/6 = 5/12$ of the tank per hour, so time = $12/5 = 2.4$ hours.

numerical-reasoning-s10-q09: Start from the actual counts: 3 : 2 across 30 counters means 18 red and 12 blue; adding 6 blue gives 18 : 18, which simplifies to 1 : 1.

numerical-reasoning-s10-q10: Multiply the two changes: $1.25 \times 0.8 = 1$, so the value ends exactly where it started. Percentage rises and falls of different sizes can cancel because they act on different bases.

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