THIRD SPACE LEARNING

SATs Paper 2: Reasoning Worked Examples

A completed SATs reasoning paper for pupils to check.

Year 6

Name: ....   Class: ....

School: ....   Score: ....

Instructions

This SATs reasoning paper has already been completed by a child, but they're not sure they've got all the answers correct.

Check each question carefully to see if the answers are correct or incorrect.

Where the answers are incorrect, explain the mistake and find the correct answer.

Where the answers are correct, evaluate the method that has been used. Has the child used the most efficient method to solve the calculation? Which method would you use?

1a Circle the number that is closest to 1,000

(1,003)   909   1,090   996

1 mark

1b Write the missing value to make this number sentence correct.

| 13,507 | + 100 = 14,507

1 mark

2 This table shows average house prices in five cities in Britain:

Town	Average house price
Portsmouth	£215,700
Bournemouth	£265,000
Southampton	£214,600
Edinburgh	£203,500
Bristol	£253,400

Which of these cities has the **lowest** average property price?

Edinburgh

1 mark

3   Write the three missing digits to make this subtraction correct.

$$
\begin{array}{ccc}
7 & 3 & 7 \\
- \quad 4 & \boxed{2} & 3 \\
\hline
\boxed{3} & 5 & \boxed{4} \\
\hline
\end{array}
$$

2 marks

4a   This table shows the number of new car registrations in one year.

Brand	Registrations
Fiat	38,549
Hyundai	56,580
Jaguar	19,958
Land Rover	49,015
Toyota	62,030

What was the combined total of the two highest selling brands?

118,610

$$
\begin{array}{r}
6\ 2\ 0\ 3\ 0 \\
+\ 5\ 6\ 5\ 8\ 0 \\
\hline
1\ 1\ 8\ 6\ 1\ 0 \\
\hline
1
\end{array}
$$

1 mark

4b Volvo had 11,515 fewer registrations than Fiat.

Complete the table to show the number of Volvo registrations.

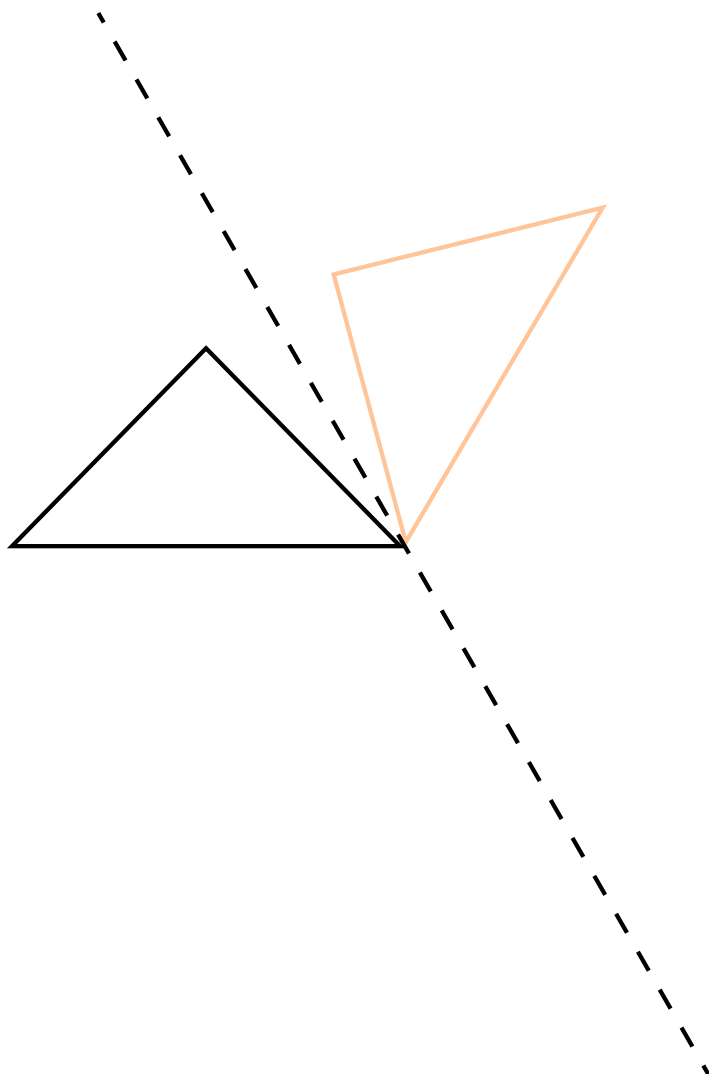| Brand	Registrations
Fiat	38,549
Hyundai	56,580
Jaguar	19,958
Land Rover	49,015
Toyota	62,030
Volvo	27,034

1 mark

5 $140 + 77 =$ 197 $- 20$

1 mark

6 Draw the **reflection** of the shape in the mirror line.

1 mark

7 $\frac{2}{6} + \frac{3}{12} + \frac{1}{3} = \boxed{\dfrac{6}{21}}$

1 mark

Write the letter for each fraction in order of size starting with the **smallest** fraction.

One has been done for you.

a $\frac{9}{10}$ b $\frac{1}{2}$ c $1\frac{3}{4}$ d $\frac{40}{30}$ e $\frac{4}{5}$

B   E   A   D   C
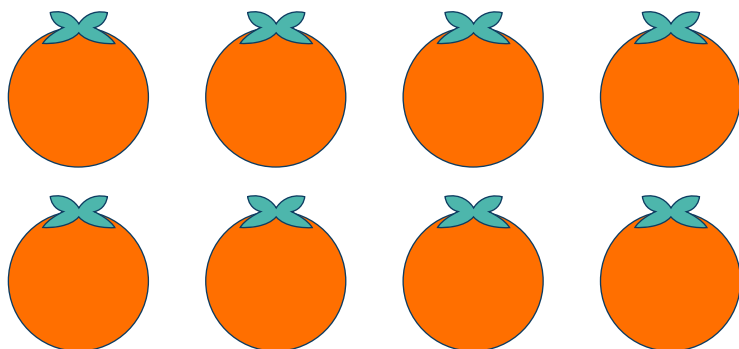
1 mark

---

8 Put the correct symbol, < or >, in each box.
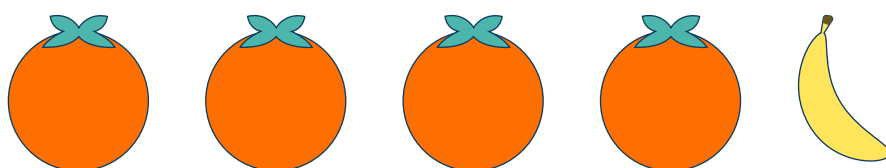
3.033 $\boxed{<}$ 3.3

1 mark

$2\frac{3}{7}$ $\boxed{<}$ $2\frac{4}{6}$

1 mark

---

9   8 oranges cost £1.52.

4 oranges and a banana cost 90p.

How much does **one banana** cost?

Show your method.

£ ⁰ₓ.¹5 2
−   9 0
_____ p
£ 0. 6 2

62p

2 marks

10 24 × [8] = 192

---

11 This diagram shows some parcels on a balance scale.
Each small parcel is identical.

Calculate the weight of **one** small parcel, in grams.

1 × large parcel
1.65kg

1 × large parcel
2.625kg

$$2 . \overset{5}{\cancel{6}} \overset{1}{2} 5$$
$$- 1 . 6 5$$
$$2 4 . 6 0$$

$$3 \overline{) 2 \overset{2}{4} . 6} \quad = \quad 0 8 . 2$$

[820] g

12   Work out the value of **p**.

7**p** – 4 = 24

$$\begin{array}{r} 0\ 2.\ 8 \\ 7\overline{)2^{2}0.^{6}0^{4}0} \end{array}$$

If **t** = 12, what is 5**t** + 8?

p = [   ]   [ ]

1 mark

[520]   [ ]

1 mark

---

13   In the sale a pair of boots has been **reduced** by 25%.
They now cost £37.50. What was the original price of
the boots?

$$\begin{array}{r} 0\ 9.\ 3\ 7\ 5 \\ 4\overline{)3^{3}7.^{1}5^{3}0^{2}0} \end{array}$$

£ 9.375   [ ]

2 marks

---

14   Complete this calculation using two different **prime numbers**.

[13] × [19] = 247

(or numbers swapped)

[ ]

1 mark

---

15 A delivery company charges £9.75 to deliver parcels weighing up to 20kg, then 30p for every 500 grams over that weight.

How much would they charge to deliver a parcel weighing 32kg?

32kg – 20kg = 12kg

12kg = 12,000g

12,000kg ÷ 500g = 24

```
      2  4
   x  3  0
   ────────  p
      0  0
   7  2  0
   ────────
   7  2  0
```

£7.20

2 marks

---

16 Write the number that is twenty less than one million.

99980

1 mark

Write the number that is ten thousand less than ten million.

9900000

1 mark

---

17 Calculate the sizes of angles a and b.
The diagram is not to scale.
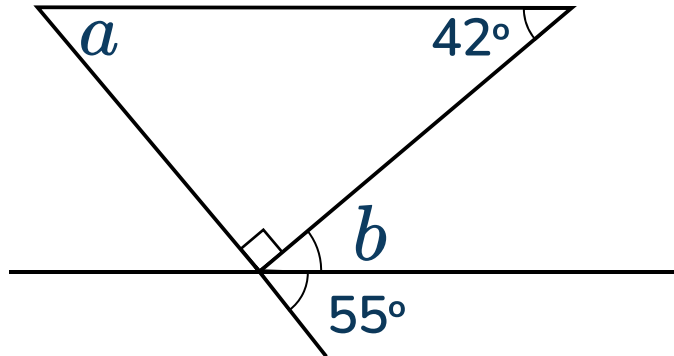
$a = 48°$ ☐

1 mark

$b = 35°$ ☐

1 mark

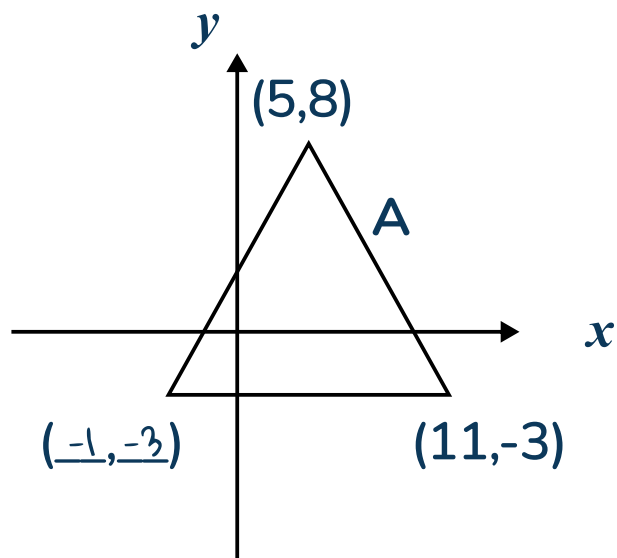**18** Write the missing numbers.

$100 \div \boxed{40} = 2.5$

☐

1 mark

$30 \times \boxed{0.9} = 27$

☐

1 mark

19 Shape A is an isosceles triangle drawn on co-ordinate axes.
    Write the missing co-ordinate.

(5,8)

A

(_−1_, _−3_)   (11,-3)

1 mark

20   Mr and Mrs Scott have employed a decorator to paint their kitchen and lay a new floor.

The decorator charges £10 per hour.

The paint costs £11.40 per litre.

Flooring costs £26.70 per m²

The decorator spends $18\frac{1}{2}$ hours decorating the kitchen.

He uses 3 litres of paint and 20m² of flooring.

Calculate the total cost to decorate the kitchen.
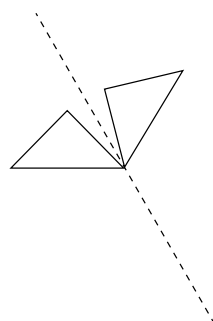
18.5hours x £10 = £185

```
    £ 1 1 . 4 0              £ 2 6 . 7 0                      £ 1 8 5
  x           3            x           2 0          +          £ 3 4 . 2 0
  _____              _____             £ 5 3 4 0 0
    £ 3 4 . 2 0                  0 0 0 0              _____
      1                          5 3 4 0 0           £ 5 3 6 1 9 . 2 0
                                 5 3 4 0 0                    1
```

£ 53,619.20   ☐

3 marks

Answers

Question Number	Question	Answer/ Explanation
1a	Circle the number that is closest to 1,000 1,003 , 909 , 1,090 , 996	Correct
1b	Write the missing value to make this number sentence correct. 13,507 + 100 = 14,507	Incorrect: The inverse has been correctly used but 1,000 has been subtracted instead of 100, **Correct answer: 14,407**
2	This table shows average house prices in five cities in Britain: Which of these cities has the lowest average property price? Edinburgh	Correct
3	Write the three missing digits to make this subtraction correct. 737 - 4$\underline{2}$3 = $\underline{3}$5$\underline{4}$	Incorrect: The tens column has been read as $5 - 3$, rather than identifying that an exchange is needed. This has then impacted on the calculation for the hundreds column (with exchanging, it would read $6 - 4$). **Correct answer:** 737 - 4$\underline{8}$3 = $\underline{2}$5$\underline{4}$
4a	This table shows the number of new car registrations in one year. What was the combined total of the two highest selling brands? $\quad\quad$ 6 2 0 3 0 $\quad$+ 5 6 5 8 0 $\quad$ 1 1 8 6 1 0 $\quad\quad\quad\quad\quad\quad$ 1 **Answer: 118,610**	Correct

Question Number	Question	Answer/ Explanation
4b	Volvo had 11,515 fewer registrations than Fiat. Complete the table to show the number of Volvo registrations. <table><tr><td>Brand</td><td>Registrations</td></tr><tr><td>Fiat</td><td>38,549</td></tr><tr><td>Hyundai</td><td>56,580</td></tr><tr><td>Jaguar</td><td>19,958</td></tr><tr><td>Land Rover</td><td>49,015</td></tr><tr><td>Toyota</td><td>62,030</td></tr><tr><td>Volvo</td><td>27,034</td></tr></table>	Correct
5	$140 + 77 = 197 - 20$	Incorrect: 20 has been subtracted from the answer to the addition ($140 + 77 = 217$ and $217 - 20 = 197$), rather than being added as a result of using the inverse. **Correct answer: 237**
6	Draw the reflection of the shape in the mirror line.	Correct
7	$\frac{2}{6} + \frac{3}{12} + \frac{1}{3} = \frac{6}{21}$	Incorrect: The numerators and denominators have been added. **Correct answer:** $\frac{11}{12}$
7	Write the letter for each fraction in order of size starting with the smallest fraction. One has been done for you. B E A D C	Correct

Question Number	Question	Answer/ Explanation
8	Put the correct symbol, < or >, in each box. 3.033 < 3.3 $2\frac{3}{7} < 2\frac{4}{6}$	Correct
9	8 oranges cost £1.52. 4 oranges and a banana cost 90p. How much does one banana cost? Show your method. Workings $\begin{array}{r} £\ ^0\cancel{x}\ .\ ^15\ 2 \\ -\qquad 9\ 0 \\ \hline £\ 0\ .\ 6\ 2 \end{array}$ p **Answer: 62p**	Incorrect: The two prices have been subtracted. **Correct answer: 14p**
10	24 x **8** = 192	Correct
11	This diagram shows some parcels on a balance scale. Each small parcel is identical. Calculate the weight of one small parcel, in grams. Workings $\begin{array}{r} 2\ .\ ^5\cancel{6}\ ^12\ 5 \\ -\quad 1\ .\ 6\ 5 \\ \hline 2\ 4\ .\ 6\ 0 \end{array}$ $\begin{array}{r} 0\ 8\ .\ 2 \\ 3\,\overline{)2^2\ 4\ .\ 6} \end{array}$ Answer: 820g.	Incorrect: The method is correct, but the first step is inaccurate as the place values haven't been aligned correctly – the 0 as a place holder is missing! This has then impacted the short division. **Correct answer: 325g**

Question Number	Question	Answer/ Explanation
12	Work out the value of p. $7p - 4 = 24$ Workings 24 - 4 = 20 $\begin{array}{r} 0\ 2\ .\ 8 \\ 7\overline{\smash)2^2\ 0^6.^40\ 0} \end{array}$ If $t = 12$, what is $5t + 8$? **520**	Incorrect: The inverse hasn't been used. **Correct answer: 4** Incorrect: The 12 has just replaced the t in front of the 5 so it reads as 512, instead of 5 x 12. **Correct answer: 68**
13	In the sale a pair of boots has been reduced by 25%. They now cost £37.50. What was the original price of the boots? Workings $\begin{array}{r} 0\ 9\ .\ 3\ 7\ 5 \\ 4\overline{\smash)3^3\ 7^1.^35^2 0\ 0} \end{array}$ **Answer: £9.375**	Incorrect: 25% of the new price has been found instead of calculating the original price before a 25% reduction. **Correct answer: £50**
14	Complete this calculation using two different prime numbers. 13 x 19 = 247 (or numbers swapped)	Correct

Question Number	Question	Answer/ Explanation

15	A delivery company charges £9.75 to deliver parcels weighing up to 20kg, then 30p for every 500 grams over that weight.
	How much would they charge to deliver a parcel weighing 32kg?
	
	Workings
	    32kg - 20kg = 12kg
	    12kg = 12,000g
	    12,000kg ÷ 500g = 24
	
	$$\begin{array}{r} 2\ 4 \\ \times\ 3\ 0 \\ \hline 0\ 0 \\ 7\ 2\ 0 \\ \hline 7\ 2\ 0 \end{array}$$
	
	Answer: £7.20.
		Incorrect: The question isn't complete until the amount has been added to the original cost of £9.75.
		Correct answer: £16.95

16	Write the number that is twenty less than one million. 99980 Write the number that is ten thousand less than ten million. 9900000	Incorrect: There is another digit 9 missing – this is actually 800,020 less than one million! **Correct answer: 999980 (or 999,980)** Incorrect: This is 100,000 less. **Correct answer: 9,990,000**
17	Calculate the sizes of angles a and b. The diagram is not to scale. a = 48, b = 35	Correct
18	Write the missing numbers. 100 ÷ 40 = 2.5 30 x 0.9 = 27	Correct

Question Number	Question	Answer/ Explanation
19	Shape A is an isosceles triangle drawn on coordinate axes. Write the missing coordinate. **(_–1_ , _–3_)**	Correct

20	Mr and Mrs Scott have employed a decorator to paint their kitchen and lay a new floor.
	The decorator charges £10 per hour.
	The paint costs £11.40 per litre.
	Flooring costs £26.70 per m2
	The decorator spends 18 ½ hours decorating the kitchen.
	He uses 3 litres of paint and 20m2 of flooring.
	Calculate the total cost to decorate the kitchen.
	
	Workings
	
	18.5hours x £10 = £185
	
	  £ 1 1 . 4 0
	x 3
	  £ 3 4 . 2 0
	    1
	
	  £ 2 6 . 7 0
	x 2 0
	  1 0 0 0 0
	  5 3 4 0 0
	  5 3 4 0 0
	
	  £ 1 8 5
	+ £ 3 4 . 2 0
	£ 5 3 4 0 0
	£ 5 3 6 1 9 . 2 0
	    1
	
	Answer: £53,619.20
		Incorrect: It is almost perfectly calculated until the penultimate step where the decimal point is missing from the answer in the multiplication – it has been read as £53,400 instead of £534! This has an impact on the final answer once it has been added to the previous two amounts of £185 and £34.20.
		Correct answer: £753.20

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