1.3 Number: Standard Form and Rounding: 2-hour Pack

Calculator allowed · about 120 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Work out $(5.6 \times 10^{-2}) \times (7.7 \times 10^{-1})$.
Give your answer in standard form.

(3)

---

2 Round 239.9911 to 1 significant figure.

(2)

---

3 Round 0.82513 to 3 decimal places.

(1)

---

4 Write these numbers in order, largest first.
9.2×10^5, 4.0×10^6, 1.9×10^6, 4.4×10^5

(2)

© Revision Library | revisionlibrary.co.uk

5 Work out $(2.2 \times 10^{-2}) \times (8.6 \times 10^{-1})$.
Give your answer in standard form.

(3)

---

6 Write these numbers in order, smallest first.
1.7×10^{2}, 1.2×10^{-2}, 2.0×10^{3}, 4.8×10^{-4}

(2)

---

7 Write 1.39×10^{3} as an ordinary number.

(1)

---

8 Round 8801352 to 3 significant figures.

(2)

---

9 Work out $(7.5 \times 10^{5}) \div (5 \times 10^{-3})$.
Give your answer in standard form.

(3)

© Revision Library | revisionlibrary.co.uk

10 Round 7945701 to 1 significant figure.

(2)

---

11 Write 8.77×10^{7} as an ordinary number.

(1)

---

12 Write these numbers in order, largest first.
7.7×10^{-4}, 3.1×10^{6}, 4.3×10^{-4}, 8.5×10^{3}

(2)

---

13 Work out $(2.2 \times 10^{7}) + (4.2 \times 10^{6})$.
Give your answer in standard form.

(3)

---

14 Write these numbers in order, smallest first.
1.7×10^{5}, 9.7×10^{-4}, 1.8×10^{-5}, 8.6×10^{3}

(2)

---

15 Write 4.39×10^{6} as an ordinary number.

(1)

© Revision Library | revisionlibrary.co.uk

16 Work out $(7 \times 10^7) + (9.7 \times 10^5)$.
Give your answer in standard form.

(3)

---

17 Round 4607193 to 3 significant figures.

(2)

---

18 Write 0.000049229 in standard form.

(1)

---

19 Write these numbers in order, largest first.
6.3×10^{-1}, 1.7×10^4, 3.4×10^{-3}, 8.7×10^3

(2)

---

20 Light from a lamp takes 3.5×10^3 seconds to reach a sensor. A signal travels 5.9×10^6 times as long. How long does the signal take?
Give your answer in standard form, with the number rounded to 3 significant figures.

(3)

© Revision Library | revisionlibrary.co.uk

21 Round 0.08774 to 3 decimal places.

(1)

---

22 Work out $(1 \times 10^8) \div (4 \times 10^1)$.
Give your answer in standard form.

(3)

---

23 Write 9.18×10^4 as an ordinary number.

(1)

---

24 Work out $(2.1 \times 10^4) \times (9.1 \times 10^{-5})$.
Give your answer in standard form.

(3)

---

25 Round 83.738 to 1 decimal place.

(1)

---

26 Write 0.002705 in standard form.

(1)

© Revision Library | revisionlibrary.co.uk

27 A small library has 7.6×10^3 books. A national library holds 8.4×10^8 books. How many times as many books does the national library hold?
Give your answer in standard form, with the number rounded to 3 significant figures.

(3)

---

28 Work out $(3.7 \times 10^5) \times (5.3 \times 10^1)$.
Give your answer in standard form.

(3)

---

29 Write 5.01×10^5 as an ordinary number.

(1)

---

30 Work out $(1.1 \times 10^7) - (6.4 \times 10^6)$.
Give your answer in standard form.

(3)

---

31 Round 0.93543 to 3 decimal places.

(1)

© Revision Library | revisionlibrary.co.uk

32 A computer chip contains 8.1×10^5 transistors. A phone has 6.4×10^5 of these chips. How many transistors are there altogether?
Give your answer in standard form, with the number rounded to 3 significant figures.

(3)

---

33 Write 2.82×10^7 as an ordinary number.

(1)

---

34 A grain of sand has a mass of 2.6×10^7 grams. How many grains are in 1.3×10^{11} grams of sand?
Give your answer in standard form, with the number rounded to 3 significant figures.

(3)

---

35 Work out $(9.6 \times 10^7) \div (8 \times 10^{-1})$.
Give your answer in standard form.

(3)

---

36 Work out $(6.1 \times 10^7) - (3.4 \times 10^6)$. Give your answer in standard form.

(2)

© Revision Library | revisionlibrary.co.uk

37 A bacterium has a width of 0.0000025 metres.

(a) Write this width in standard form. **(2)**

(b) 4000 of these bacteria are placed end to end. Calculate the total length in metres, giving your answer in standard form. **(2)**

38 The population of a country is 3.6×10^7. The population of a city within that country is 4.5×10^5. Calculate how many times bigger the population of the country is than the population of the city. Give your answer as an ordinary number.

(3)

39 The mass of the Earth is approximately 6×10^{24} kg. The mass of the Moon is approximately 7.5×10^{22} kg. Calculate how many times heavier the Earth is than the Moon, giving your answer as an ordinary number.

(3)

© Revision Library | revisionlibrary.co.uk

40 In 2023, a company's annual revenue was £4.6×10^9 and its costs were £3.85×10^9.

(a) Calculate the company's profit. Give your answer in standard form. **(2)**

(b) The company has 15000 employees. Work out the profit per employee, giving your answer as an ordinary number. **(2)**

(c) Round the total revenue, £4.6×10^9, to 1 significant figure and explain what this rounded value tells you about the size of the company. **(2)**

---

41 The diameter of a hydrogen atom is about 1×10^{-10} metres. The diameter of the Milky Way galaxy is about 9.5×10^{20} metres.

(a) Work out how many times bigger the diameter of the galaxy is than the diameter of the atom. Give your answer in standard form. **(3)**

(b) Round your answer to part a to 1 significant figure and comment on whether this level of precision is reasonable, given that the original diameters were only given to 2 significant figures. **(2)**

© Revision Library | revisionlibrary.co.uk

Mark scheme · 1.3 Number: Standard Form and Rounding: 2-hour Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

5.6 x 7.7 = 43.12 seen	M1
powers combined: $10^{-2} \times 10^{-1} = 10^{-3}$	M1
4.312×10^{-2} cao (answer adjusted into standard form)	A1

Answer: **4.312×10^{-2}**

Question 2

identifies the first significant figure and looks at the digit after the required place	M1
200 cao	A1

Answer: **200**

Question 3

0.825 cao	B1

Answer: **0.825**

Question 4

compares the powers of 10 first, or at least three numbers in order	M1
4.0×10^6, 1.9×10^6, 9.2×10^5, 4.4×10^5 cao	A1

Answer: **4.0×10^6, 1.9×10^6, 9.2×10^5, 4.4×10^5**

Question 5

2.2 x 8.6 = 18.92 seen	M1
powers combined: $10^{-2} \times 10^{-1} = 10^{-3}$	M1
1.892×10^{-2} cao (answer adjusted into standard form)	A1

Answer: **1.892×10^{-2}**

Question 6

compares the powers of 10 first, or at least three numbers in order	M1
4.8×10^{-4}, 1.2×10^{-2}, 1.7×10^2, 2.0×10^3 cao	A1

Answer: **4.8×10^{-4}, 1.2×10^{-2}, 1.7×10^2, 2.0×10^3**

Question 7

1390 (accept 1390.00)	B1

Answer: **1390**

Question 8

identifies the first significant figure and looks at the digit after the required place	M1
8800000 cao	A1

Answer: **8800000**

Question 9

7.5 ÷ 5 = 1.5 or powers subtracted	M1
both parts combined correctly	M1
1.5×10^8 cao	A1

Answer: **1.5×10^8**

Question 10

identifies the first significant figure and looks at the digit after the required place	M1
8000000 cao	A1

Answer: **8000000**

Question 11

87700000 (accept 87700000.00)	B1

Answer: **87700000**

Question 12

compares the powers of 10 first, or at least three numbers in order	M1
3.1×10^6, 8.5×10^3, 7.7×10^{-4}, 4.3×10^{-4} cao	A1

Answer: **3.1×10^6, 8.5×10^3, 7.7×10^{-4}, 4.3×10^{-4}**

Question 13

writes both numbers with the same power of 10 or as ordinary numbers	M1
adds or subtracts correctly	M1
2.62×10^7 cao	A1

Answer: **2.62×10^7**

Question 14

compares the powers of 10 first, or at least three numbers in order	M1
1.8×10^{-5}, 9.7×10^{-4}, 8.6×10^3, 1.7×10^5 cao	A1

Answer: **1.8×10^{-5}, 9.7×10^{-4}, 8.6×10^3, 1.7×10^5**

Question 15

4390000 (accept 4390000.00)	B1

Answer: **4390000**

Question 16

writes both numbers with the same power of 10 or as ordinary numbers	M1
adds or subtracts correctly	M1
7.097×10^7 cao	A1

Answer: **7.097×10^7**

Question 17

identifies the first significant figure and looks at the digit after the required place	M1
4610000 cao	A1

Answer: **4610000**

Question 18

4.9229×10^{-5} cao	B1

Answer: **4.9229×10^{-5}**

Question 19

compares the powers of 10 first, or at least three numbers in order	M1
1.7×10^4, 8.7×10^3, 6.3×10^{-1}, 3.4×10^{-3} cao	A1

Answer: **1.7×10^4, 8.7×10^3, 6.3×10^{-1}, 3.4×10^{-3}**

© Revision Library | revisionlibrary.co.uk

Question 20

chooses the correct operation (x or ÷)	M1
correct calculation with the numbers and the powers of 10	M1
2.07×10^{10} cao	A1

Answer: **2.07×10^{10}**

Question 21

0.088 cao	B1

Answer: **0.088**

Question 22

1 ÷ 4 = 0.25 or powers subtracted	M1
both parts combined correctly	M1
2.5×10^{6} cao	A1

Answer: **2.5×10^{6}**

Question 23

91800 (accept 91800.00)	B1

Answer: **91800**

Question 24

2.1 x 9.1 = 19.11 seen	M1
powers combined: $10^{4} \times 10^{-5} = 10^{-1}$	M1
1.911×10^{0} cao (answer adjusted into standard form)	A1

Answer: **1.911×10^{0}**

Question 25

83.7 cao	B1

Answer: **83.7**

Question 26

2.705×10^{-3} cao	B1

Answer: **2.705×10^{-3}**

Question 27

chooses the correct operation (x or ÷)	M1
correct calculation with the numbers and the powers of 10	M1
1.11×10^{5} cao	A1

Answer: **1.11×10^{5}**

Question 28

3.7 x 5.3 = 19.61 seen	M1
powers combined: $10^{5} \times 10^{1} = 10^{6}$	M1
1.961×10^{7} cao (answer adjusted into standard form)	A1

Answer: **1.961×10^{7}**

Question 29

501000 (accept 501000.00)	B1

Answer: **501000**

Question 30

writes both numbers with the same power of 10 or as ordinary numbers	M1
adds or subtracts correctly	M1
4.6×10^{6} cao	A1

Answer: **4.6×10^{6}**

Question 31

0.935 cao	B1

Answer: **0.935**

Question 32

chooses the correct operation (x or ÷)	M1
correct calculation with the numbers and the powers of 10	M1
5.18×10^{11} cao	A1

Answer: **5.18×10^{11}**

Question 33

28200000 (accept 28200000.00)	B1

Answer: **28200000**

Question 34

chooses the correct operation (x or ÷)	M1
correct calculation with the numbers and the powers of 10	M1
5×10^{3} cao	A1

Answer: **5×10^{3}**

Question 35

9.6 ÷ 8 = 1.2 or powers subtracted	M1
both parts combined correctly	M1
1.2×10^{8} cao	A1

Answer: **1.2×10^{8}**

Question 36

converts both numbers to the same power of 10 or to ordinary numbers: 61000000 and 3400000 (oe)	M1
5.76×10^{7} cao	A1

Answer: **5.76×10^{7}**

Question 37

(a) coefficient 2.5 identified	M1
(a) 2.5×10^{-6} cao	A1

(a) Answer: **2.5×10^{-6}**

(b) correct method: $4000 \times 2.5 \times 10^{-6}$, e.g. $(4 \times 10^{3}) \times (2.5 \times 10^{-6})$	M1
(b) 1×10^{-2} cao	A1

(b) Answer: **1×10^{-2} metres**

Question 38

correct division set up: $(3.6 \times 10^{7}) / (4.5 \times 10^{5})$	M1
3.6/4.5 = 0.8, index 7-5 = 2, giving 0.8×10^{2} oe	M1
80 cao	A1

Answer: **80**

Question 39

correct division set up: $(6 \times 10^{24}) / (7.5 \times 10^{22})$	M1
6/7.5 = 0.8, index 24-22 = 2, giving 0.8×10^{2} oe	M1
80 cao	A1

Answer: **80**

© Revision Library | revisionlibrary.co.uk

Question 40

(a) correct subtraction: $4.6 \times 10^9 - 3.85 \times 10^9 = 0.75 \times 10^9$ (oe) **M1**

(a) 7.5×10^8 cao **A1**

(a) Answer: **£7.5×10^8**

(b) correct division: $(7.5 \times 10^8) / 15000$ (ft from part a) **M1**

(b) £50000 cao **A1**

(b) Answer: **£50000**

(c) 5×10^9 cao **B1**

(c) sensible explanation, e.g. the rounded value shows the revenue is approximately 5 billion pounds, giving a quick sense of the company's scale (oe) **B1**

(c) Answer: **£5×10^9; shows revenue is about 5 billion pounds**

Question 41

(a) correct division set up: $(9.5 \times 10^{20}) / (1 \times 10^{-10})$ **M1**

(a) correct index subtraction: $20 - (-10) = 30$ (oe) **M1**

(a) 9.5×10^{30} cao **A1**

(a) Answer: **9.5×10^{30}**

(b) 1×10^{31} cao ft from part a **B1**

(b) sensible comment, e.g. since the original data only had 2 significant figures of accuracy, giving the answer to more figures would suggest a false level of precision, so rounding to 1 sf is reasonable (oe) **B1**

(b) Answer: **1×10^{31}; reasonable, since the original data was only accurate to 2 sf**

© Revision Library | revisionlibrary.co.uk