Name:

Exam Style Questions

Standard Form

Equipment needed: Calculator, pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorials

Videos 300 to 303

Answers and Video Solutions

1. (a) Write in standard form 35000

3.5×10^4

(1)

(b) Write as an ordinary number 1.2×10^3

1200

(1)

2. (a) Write in standard form 8200000

8.2×10^6

(1)

(b) Write as an ordinary number 4.7×10^{-2}

0.047

(1)

3. Circle the number in standard form.

$5.55 + 10^{-8}$ 36×10^{-5} 0.3×10^5 6.5×10^8

(1)

4. Write the following numbers in standard form.

(a) 40000

4×10^4

(1)

(b) 5600

5.6×10^3

(1)

(c) 41200000

4.12×10^7

(1)

(d) 0.00000008

8×10^{-8}

(1)

(e) 0.000345

3.45×10^{-4}

(1)

5. Write 37341000000 in standard form.

3.7341×10^{10}

(1)

6. Nadal has been asked to write the number 48100000 in standard form.

He writes 481×10^5

Explain why Nadal is incorrect.

A number in standard form has to be in the form $a \times 10^n$, where $1 \leq a < 10$. 481 is too large.

(1)

7. Amelia has been asked to write the number 0.0054 in standard form.

She writes 5.4×10^3

Explain why Amelia is incorrect.

It should be 5.4×10^{-3}. Numbers less than 1 will lead to a negative power.

(1)

8. (a) Write 1.52×10^6 as an ordinary number

1520000

(1)

(b) Write 9.8×10^{-5} as an ordinary number

0.000098

(1)

9. Write 0.000000000000412 in standard form.

4.12×10^{-13}

(1)

10. Write 375×10^6 in standard form.

↓ ÷100 ↑ ×100

3.75×10^8

(1)

11. Write 0.68×10^{12} in standard form.

↑ ×10 ↓ ÷10

6.8×10^{11}

(1)

12. Write 92×10^{-8} in standard form.

↓ ÷10 ↑ ×10

9.2×10^{-7}

(1)

13. Write these numbers in order of size, smallest to largest.

2.04×10^3 250 0.3×10^3 4×10^{-2}

2040 300 0·04

4×10^{-2}, 250, 0.3×10^3, 2.04×10^3

(2)

14. Calculate, writing your answer in standard form

$(2.05 \times 10^5) \times (8.17 \times 10^3)$

1.67485×10^9

(2)

15. Work out, giving each answer in standard form.

(a) $(4 \times 10^5) \times (2 \times 10^4)$

8×10^9

(2)

(b) $(5 \times 10^6) \times (7 \times 10^8)$

35×10^{14}

3.5×10^{15}

(2)

16. Work out, giving each answer in standard form.

(a) $(3 \times 10^4) \div (6 \times 10^{-3})$

0.5×10^7

5×10^6

.....

(2)

(b) $(2.1 \times 10^{-5}) \div (7 \times 10^{-4})$

0.3×10^{-1}

3×10^{-2}

3×10^{-2}

.....

(2)

(c) $(5 \times 10^4)^2$

$5 \times 10^4 \times 5 \times 10^4$

25×10^8

2.5×10^9

.....

(2)

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17. (a) Write 0.0083 as an ordinary number.

8.3×10^{-3}

.....

(1)

(b) Work out $\dfrac{2 \times 10^4}{5 \times 10^8}$

Give your answer in standard form.

0.4×10^{-4}

4×10^{-5}

.....

(2)

18. Work out $\dfrac{6.32 \times 10^{13}}{1.6 \times 10^{8}}$

Give your answer in standard form.

3.95×10^{5}

(2)

19. Mr. Holland has 2500kg of rice.

(a) Write 2500 kg in grams.
Give your answer in standard form.

2500000

2.5×10^{6} g

(2)

(b) One grain of rice has a mass of 0.03g
Write the mass of one grain of rice in standard form.

3×10^{-2} g

(1)

(c) How many grains of rice are there in 2500kg of rice?
Give your answer in standard form.

$(2.5 \times 10^{6}) \div (3 \times 10^{-2})$

$8.\dot{3} \times 10^{7}$

(2)

20. (a) Write five million in standard form.

5×10^6

.....

(1)

(b) Write three hundred thousand in standard form.

3×10^5

.....

(1)

(c) Work out five million multiplied by three hundred thousand.
Give your answer in standard form.

15×10^{11}

1.5×10^{12}

1.5×10^{12}

.....

(2)

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21. A calculator displays a number in standard form.

8.1×10^{-5}

Write the number as an ordinary number.

0.000081

.....

(1)

22. (a) Work out $(2.6 \times 10^6) + (7.1 \times 10^5)$

Give your answer in standard form.

2600000
+ 710000
3310000

3.31×10^6

(3)

(b) Work out $(9.2 \times 10^5) - (8.3 \times 10^4)$

Give your answer in standard form.

8 1 1
9 2 0000
- 83000
837000

8.37×10^5

(3)

23. Work out $\sqrt[3]{8 \times 10^{12}}$

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

2×10^4

(2)

24. The number of visitors to some tourist attractions is shown in the table below.

The King's Palace	5.4 million
Castle	923,840
Theme Park	1.43×10^7
Science Museum	4,192,900

(a) Write the number of visitors to the Theme Park as an ordinary number.

143 00000

.....

(1)

(b) Write the number of visitors to the Castle in standard form.

9.2384×10^5

.....

(1)

(c) How many more people visited the Theme Park than the Science Museum?

$$\begin{array}{r} 14300000 \\ -\ 4192900 \\ \hline 10107100 \end{array}$$

10, 107, 100

.....

(2)

25. The number of loaves of bread baked each year by five companies is shown below.

Company	Number of loaves
Mavis	1.51×10^8
Norton's	1.6×10^5
Greenmill	2.53×10^6
Dan the Baker	4.02×10^6
Bread World	8.07×10^7

(a) Jenson says that Bread World baked approximately twice as many loaves as Dan the Baker.

Is Jenson correct? Explain why.

$(8.07 \times 10^7) \div (4.02 \times 10^6) = 20.07...$

No, Bread World bake over 20 times more than Dan the Baker.

(2)

(b) Find the mean number of loaves of bread baked by the companies.

$(1.51 \times 10^8) + (1.6 \times 10^5) + (2.53 \times 10^6) + (4.02 \times 10^6) + (8.07 \times 10^7)$

$= 238410000$

$238410000 \div 5 = 47682000$

47682000

or

4.7682×10^7

(2)

26. The table gives the circumference, in metres, of planets in the solar system.
The circumferences are given to an accuracy of 3 significant figures.

Planet	Circumference (metres)
Mercury	1.54×10^7
Venus	3.81×10^7
Earth	4.01×10^7
Mars	2.13×10^7
Jupiter	4.39×10^8
Saturn	3.66×10^8
Uranus	1.59×10^8
Neptune	1.55×10^8

(a) Which planet has the largest circumference?

Jupiter
.....
(1)

(b) Which planet has the smallest circumference?

Mercury
.....
(1)

(c) Write 1.54×10^7 as an ordinary number.

15400000
.....
(1)

(d) Work out the diameter of Neptune.
Give your answer in standard form.

$C = \pi \times d$

$d = C \div \pi$

$1.55 \times 10^8 \div \pi$

49338032.36

4.934×10^7
.....
(2)

27. The distance of the moon to the Earth is 384,400 km.

The speed of light is 2.998×10^8 m/s

Work out how long it will take light to travel from the moon to the Earth.
Include suitable units.

$t = \frac{d}{s}$

$= \frac{384400000}{2.998 \times 10^8}$

1.282 seconds

(3)

28. a, b and c are standard form numbers.

$a = 5.4 \times 10^4$ $b = 4.9 \times 10^5$ $c = 4 \times 10^6$

(a) Calculate b – a

$490000 - 54000 = 436000$

4.36×10^5

(2)

(b) Calculate c^2

$(4 \times 10^6) \times (4 \times 10^6) = 16 \times 10^{12}$

1.6×10^{13}

(2)

(c) Calculate ac

$(5.4 \times 10^4) \times (4 \times 10^6)$

$= 21.6 \times 10^{10}$

2.16×10^{11}

(2)

29. The population of England is 5.604×10^7

The number of people who live in London is 8.982×10^6

What percentage of the population of England live in London?
Give your answer to 2 decimal places.

$\frac{8.982 \times 10^6}{5.604 \times 10^7} \times 100 =$

16.03%

.....

(2)

30. Work out $(2.19 \times 10^8) \times (3.52 \times 10^3)$

Give your answer in standard form.

7.7088×10^{11}

.....

(2)

31. Work out $(4.5 \times 10^7) \div (5 \times 10^{-2})$

Give your answer in standard form.

0.9×10^9

9×10^8

.....

(2)

32. (a) Write 5930000000 in standard form.

5.93×10^9

.....

(1)

(b) Write 8.024×10^{-4} as an ordinary number.

0.0008024

.....

(1)

c, w and y are positive numbers.

$c = 2 \times 10^9$ and $y = 6 \times 10^5$

$$w^2 = \frac{cy}{c - y}$$

(c) Work out the value of w.
Give your answer in standard form correct to 2 significant figures.

$w^2 = \frac{12 \times 10^{14}}{1.9994 \times 10^9} = 600180.054$

$w = \sqrt{600180.054}$

$= 774.712...$

7.7×10^2

.....

(3)

33. Work out $(1.5 \times 10^6) + (5 \times 10^5) \times (3 \times 10^2)$
Give your answer in standard form.

$1.5 \times 10^6 + 15 \times 10^7$

150000000
1500000
15 15 00 000

1.515×10^8

.....

(3)

34. The Earth is approximately a sphere of diameter 12742 km.

The surface area of a sphere is given by the formula $A = 4\pi r^2$

Calculate the surface area of the Earth.
Give your answer in metres and in standard form.

$d = 12742000\ m$

$r = 6371000\ m$

$SA = 4 \times \pi \times 6371000^2$

5.1×10^{14} ..... m^2

(4)