1.9 Standard form

Student name: _____ Score: _____

1. The distance from the Earth to the Moon is 3.8×10^5 km.
   A spacecraft travels this distance four times.
   Calculate the total distance travelled.
   Give your answer in standard form.

   ....1.52×10^6............Km [2]

2. Write 36 000 in standard form.

   ....3.6×10^4............ [1]

3. The population of India in 2011 was 1.21×10^9 .
   The population of Pakistan in 2011 was 1.77×10^8 .

   Calculate the total population of India and Pakistan in 2011.
   Give your answer in standard form.

   ....1.387×10^9............ [2]

4. Find the value of ax^3 when $a = 1200$ and $x = 5$.
   Give your answer in standard form.

   ....1.5×10^5............ [2]

5. Work out $(1.6 \times 10^3) \div (4 \times 10^5)$.
   Give your answer in standard form.

   ....4×10^{-3}............ [2]

6. Work out the following, giving your answers in standard form.

   (a) $(4.6 \times 10^{-5}) + (3 \times 10^{-6})$

   ....4.9×10^{-5}............ [2]

   (b) $(4.6 \times 10^{-5}) \times (3 \times 10^{-6})$

   ....1.38×10^{-10}............ [2]

7. (a) Write 0.0063 in standard form.

   ....6.3×10^{-3}............ [1]

   (b) $5.7 \times 10^9 + 2.4 \times 10^8 = k \times 10^9$

   Find the value of k.

   $k =$ ....5.94............ [2]

8. Work out $\dfrac{8 \times 10^7}{5 \times 10^{-12}}$.

   Give your answer in standard form.

   ....1.6×10^{19}............ [2]

9. Work out $\dfrac{4 \times 10^7}{8 \times 10^{22}}$.

   Give your answer in standard form.

   ....5×10^{-16}............ [2]

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10. Work out, giving your answer in standard form.

(a) $(7.5 \times 10^{-4}) + (4 \times 10^{-6})$

.... 7.54×10^{-4} .... [2]

(b) $(7.5 \times 10^{-4}) \times (4 \times 10^{-6})$

.... 3×10^{-9} .... [2]

11. Write 375×10^{12} in standard form.

.... 3.75×10^{14} .... [1]

12. Calculate.

$$(3.24 \times 10^{-3}) \div (4 \times 10^{4})$$

Give your answer in standard form.

.... 8.1×10^{-8} .... [2]

13. (a) Write 0.000048 in standard form.

.... 4.8×10^{-5} .... [1]

(b) Work out $(2 \times 10^{8}) \times (6 \times 10^{7})$, giving your answer in standard form.

.... 1.2×10^{16} .... [2]

14. In standard form, $x = a \times 10^5$ and $y = b \times 10^7$ where $a < b$.

In standard form, $\dfrac{x}{y} = c \times 10^d$ where $1 \leqslant c < 10$.

(a) Find the value of d.

.... -3 .... [1]

(b) Find c in terms of a and b.

.... $\dfrac{10a}{b}$ .... [2]

15. Work out $(8 \times 10^{-4}) \times (2 \times 10^{-3})$, giving your answer in standard form.

.... 1.6×10^{-6} .... [2]

16. Write 4.07×10^{-3} as an ordinary number.

.... 0.00407 .... [1]

17. Work out the following, giving each answer in standard form.

(a) $(6.4 \times 10^{-2}) - (1.6 \times 10^{-3})$

.... 6.24×10^{-2} .... [2]

(b) $(6.4 \times 10^{-2}) \div (1.6 \times 10^{-3})$

.... 4×10^{1} .... [2]

18. Work out $(5.6 \times 10^{-7}) - (7.8 \times 10^{-8})$.
Give your answer in standard form.

.... 4.82×10^{-7} .... [2]

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19. Work out $(5.2 \times 10^{18}) - (2.4 \times 10^{17})$.
Give your answer in standard form.

.... 4.96×10^{18} .... [2]

20. Work out $1.1 \times 10^{30} + 1.1 \times 10^{29}$, giving your answer in standard form.

.... 1.21×10^{30} .... [2]

21. Work out the following.
Give each answer in standard form.

(a) $(1 \times 10^{1}) + (2 \times 10^{-2})$

.... $1.002 \times 10^{[1]}$ .... [2]

(b) $(1 \times 10^{1}) \div (2 \times 10^{-2})$

.... 5×10^{2} .... [2]

22. Work out the following, giving each answer in standard form.

(a) $(4.3 \times 10^{4}) \times (3 \times 10^{-4})$

.... $1.29 \times 10^{[1]}$ .... [2]

(b) $(6 \times 10^{-2}) + (3 \times 10^{-3})$

.... 6.3×10^{-2} .... [2]

23. $c = 4 \times 10^{7}$ $d = 5.8 \times 10^{6}$

Work out, giving your answers in standard form,

(a) c^{2} ,

.... 1.6×10^{15} .... [2]

(b) $c - d$.

.... 3.42×10^{7} .... [2]

24.   Write   0.000 003 06   in standard form.

.... 3.06×10^{-6} .... [1]

25. Work out, giving your answer in standard form.

$$(6.3 \times 10^{4}) + (5.6 \times 10^{5})$$

.... 6.23×10^{5} .... [2]

26. Work out $(3.2 \times 10^{20}) + (2.3 \times 10^{21})$,   giving your answer in standard form.

.... 2.62×10^{21} .... [2]

27. Write each number in standard form.

   (a) 58 000

                                                   5.8×10^4 .... [1]

   (b) 0.008 09

                         8.09×10^{-3} .... [1]

28. Write each number in standard form.

   (a) 28 010

                         2.801×10^4 .... [1]

   (b) 0.100 209

                 1.00209×10^{-1} .... [1]

29. **(a)** Write 0.000 058 6 in standard form.

                         5.86×10^{-5} .... [1]

   (b) $(2 \times 10^a) \div (8 \times 10^b) = k \times 10^n$ where $1 \leqslant k < 10$.

      (i) Find the value of k.

                    $k =$ 2.5 .... [1]

      (ii) Write an expression for n in terms of a and b.

                    $n =$ $a - b - 1$ .... [1]

30. **(a)** Work out $(1.5 \times 10^1) \times (7 \times 10^{-3})$.
       Give your answer in standard form.

                         1.05×10^{-1} .... [2]

   (b) Work out $(6.5 \times 10^{-2}) + (7.8 \times 10^{-3})$.
       Give your answer in standard form.

                         7.28×10^{-2} .... [2]

31. Simplify $(3 \times 10^{85}) \times (7 \times 10^{15})$.
   Give your answer in standard form.

                         2.1×10^{101} .... [2]