What have you learnt about standard form?

1. Describe how to recognise a number written in standard form.

2. Which are the correct conversions into standard form?

a.	7000000 =	7×10^6	0.7×10^6	70×10^6
b.	5600 =	56×10^2	5.6×10^2	5.6×10^3
c.	439000 =	439×10^3	4.39×10^3	4.39×10^5
d.	0.000072 =	72×10^{-6}	7.2×10^{-5}	72×10^{-4}
e.	0.01 =	0.1×10^{-1}	1×10^{-1}	1×10^{-2}

3. Which are the correct conversions from standard form to number?

a.	6×10^4 =	A: 600	B: 6.0000	C: 60000
b.	4.3×10^5 =	A: 4300000	B: 430000	C: 4.300000
c.	7.12×10^6 =	A: 7.120000	B: 712000000	C: 7120000
d.	2.5×10^{-3} =	A: 0.025	B: 0.0025	C: 0.00025
e.	3.47×10^{-5} =	A: 0.0000347	B: 0.00347	C: 0.00000347

4. Hugh is converting standard form numbers to normal numbers.
Which are correct? Correct his errors.

a. $7.3 \times 10^4 = 730000$

b. $1.45 \times 10^3 = 145000$

c. $8 \times 10^{-3} = 0.008$

d. $2.1 \times 10^{-2} = 0.0021$

e. $5.04 \times 10^5 = 540000$

f. $8.95 \times 10^7 = 89500000$

5. Write these numbers as correct standard form

a. 74×10^5

b. 187×10^3

c. 650×10^{-4}

d. 0.381×10^9

e. 47.8×10^{-6}

f. 0.0052×10^{-2}

6. Put the standard form numbers in order of size, smallest first.

a.	2.9×10^{23}	2.64×10^{22}	8.87×10^{24}	5.8×10^{20}	2.04×10^{23}
b.	4.1×10^{-12}	5.3×10^{-11}	2.6×10^{-12}	1.7×10^{-13}	6.5×10^{-11}

7. Sarah has her first calculation correct but is unsure of her final answer. Which is correct?

a.	$6 \times 10^5 \times 7 \times 10^6 = 42 \times 10^{11}$	A: 4.2×10^{10}	B: 4.2×10^{12}
b.	$4.6 \times 10^8 \times 3 \times 10^9 = 13.8 \times 10^{17}$	A: 1.38×10^{18}	B: 1.38×10^{16}
c.	$2 \times 10^9 \div 8 \times 10^3 = 0.25 \times 10^6$	A: 2.5×10^5	B: 2.5×10^7
d.	$7.5 \times 10^{-4} \times 4 \times 10^{-6} = 30 \times 10^{-10}$	A: 3×10^{-11}	B: 3×10^{-9}
e.	$1 \times 10^{-7} \div 5 \times 10^{-4} = 0.2 \times 10^{-3}$	A: 2×10^{-4}	B: 2×10^{-2}

8. Calculate giving your answer in correct standard form

a. $9 \times 10^8 \times 4 \times 10^6$	**b.** $3.2 \times 10^{12} \times 4 \times 10^7$
c. $6.5 \times 10^{14} \times 2 \times 10^8$	**d.** $7.6 \times 10^4 \times 3 \times 10^9$
e. $5 \times 10^5 \times 8 \times 10^9$	**f.** $1 \times 10^{15} \div 4 \times 10^3$
g. $2 \times 10^{18} \div 5 \times 10^6$	**h.** $6 \times 10^{12} \div 8 \times 10^6$

9. Calculate giving your answer in correct standard form

a. $5 \times 10^8 + 4 \times 10^8$	**b.** $6.7 \times 10^{11} + 5.9 \times 10^{11}$
c. $6 \times 10^{12} + 8 \times 10^{11}$	**d.** $8.3 \times 10^7 + 5.1 \times 10^8$
e. $8 \times 10^5 - 2.4 \times 10^5$	**f.** $4 \times 10^{19} - 2 \times 10^{18}$
g. $5 \times 10^7 - 3.6 \times 10^6$	**h.** $6.1 \times 10^{12} - 5.9 \times 10^{11}$

10. Calculate giving your answer in correct standard form

a. $3.4 \times 10^{-3} \times 2 \times 10^{-2}$	**b.** $6 \times 10^7 \times 2 \times 10^{-11}$
c. $4 \times 10^9 \times 7 \times 10^{-4}$	**d.** $3 \times 10^{-5} \times 8 \times 10^{-9}$
e. $4 \times 10^{-5} \div 5 \times 10^2$	**f.** $1 \times 10^{-8} \div 4 \times 10^8$
g. $7 \times 10^4 \div 4 \times 10^{-7}$	**h.** $3 \times 10^5 \div 8 \times 10^{-5}$
i. $3 \times 10^{-6} + 5 \times 10^{-7}$	**j.** $2.4 \times 10^{-9} + 3.5 \times 10^{-8}$
k. $7 \times 10^{-14} + 4 \times 10^{-15}$	**l.** $9.8 \times 10^{-4} + 3.7 \times 10^{-3}$
m. $6.7 \times 10^{-5} - 1.4 \times 10^{-6}$	**n.** $2.4 \times 10^{-15} - 5.7 \times 10^{-16}$
o. $9 \times 10^{-8} - 3.5 \times 10^{-9}$	**p.** $3.25 \times 10^{-12} - 4 \times 10^{-13}$

Answers

1.

It will be written as a number between 1 and 10 multiplied by a power of 10 or
It will be written in the form a x 10^b

2.

a.	7000000 =	7×10^6 ✓	0.7×10^6	70×10^6
b.	5600 =	56×10^2	5.6×10^2	5.6×10^3 ✓
c.	439000 =	439×10^3	4.39×10^3	4.39×10^5 ✓
d.	0.000072 =	72×10^{-6}	7.2×10^{-5} ✓	72×10^{-4}
e.	0.01 =	0.1×10^{-1}	1×10^{-1}	1×10^{-2} ✓

3.

a.	6×10^4 =	A: 600	B: 6.0000	C: 60000 ✓
b.	4.3×10^5 =	A: 4300000	B: 430000 ✓	C: 4.300000
c.	7.12×10^6 =	A: 7.120000	B: 712000000	C: 7120000 ✓
d.	2.5×10^{-3} =	A: 0.025	B: 0.0025 ✓	C: 0.00025
e.	3.47×10^{-5} =	A: 0.0000347 ✓	B: 0.00347	C: 0.00000347

4.

a. $7.3 \times 10^4 = 730000$ × 73000

b. $1.45 \times 10^3 = 145000$ × 1450

c. $8 \times 10^{-3} = 0.008$ ✓

d. $2.1 \times 10^{-2} = 0.0021$ × 0.021

e. $5.04 \times 10^5 = 540000$ × 504000

f. $8.95 \times 10^7 = 89500000$ ✓

5.

a. $74 \times 10^5 = 7.4 \times 10^6$

b. $187 \times 10^3 = 1.87 \times 10^5$

c. $650 \times 10^{-4} = 6.5 \times 10^{-2}$

d. $0.381 \times 10^9 = 3.81 \times 10^8$

e. $47.8 \times 10^{-6} = 4.78 \times 10^{-5}$

f. $0.0052 \times 10^{-2} = 5.2 \times 10^{-5}$

6.

a.	5.8×10^{20}	2.64×10^{22}	2.04×10^{23}	2.9×10^{23}	8.87×10^{24}
b.	1.7×10^{-13}	2.6×10^{-12}	4.1×10^{-12}	5.3×10^{-11}	6.5×10^{-11}

7.

a.	$6 \times 10^5 \times 7 \times 10^6 = 42 \times 10^{11}$	A: 4.2×10^{10}	B: 4.2×10^{12} ✓
b.	$4.6 \times 10^8 \times 3 \times 10^9 = 13.8 \times 10^{17}$	A: 1.38×10^{18} ✓	B: 1.38×10^{16}
c.	$2 \times 10^9 \div 8 \times 10^3 = 0.25 \times 10^6$	A: 2.5×10^5 ✓	B: 2.5×10^7
d.	$7.5 \times 10^{-4} \times 4 \times 10^{-6} = 30 \times 10^{-10}$	A: 3×10^{-11}	B: 3×10^{-9} ✓
e.	$1 \times 10^{-7} \div 5 \times 10^{-4} = 0.2 \times 10^{-3}$	A: 2×10^{-4} ✓	B: 2×10^{-2}

8.

a. $9 \times 10^8 \times 4 \times 10^6$
$36 \times 10^{14} = 3.6 \times 10^{15}$

b. $3.2 \times 10^{12} \times 4 \times 10^7$
$12.8 \times 10^{19} = 1.28 \times 10^{20}$

c. $6.5 \times 10^{14} \times 2 \times 10^8$
$13 \times 10^{22} = 1.3 \times 10^{23}$

d. $7.6 \times 10^4 \times 3 \times 10^9$
$22.8 \times 10^{13} = 2.28 \times 10^{14}$

e. $5 \times 10^5 \times 8 \times 10^9$
$40 \times 10^{14} = 4 \times 10^{15}$

f. $1 \times 10^{15} \div 4 \times 10^3$
$0.25 \times 10^{12} = 2.5 \times 10^{11}$

g. $2 \times 10^{18} \div 5 \times 10^6$
$0.4 \times 10^{12} = 4 \times 10^{11}$

h. $6 \times 10^{12} \div 8 \times 10^6$
$0.75 \times 10^6 = 7.5 \times 10^5$

9.

a. $5 \times 10^8 + 4 \times 10^8$
9×10^8

b. $6.7 \times 10^{11} + 5.9 \times 10^{11}$
$12.6 \times 10^{11} = 1.26 \times 10^{12}$

c. $6 \times 10^{12} + 8 \times 10^{11}$
$6 \times 10^{12} + 0.8 \times 10^{12} = 6.8 \times 10^{12}$

d. $8.3 \times 10^7 + 5.1 \times 10^8$
$0.83 \times 10^8 + 5.1 \times 10^8 = 5.93 \times 10^8$

e. $8 \times 10^5 - 2.4 \times 10^5$
5.6×10^5

f. $4 \times 10^{19} - 2 \times 10^{18}$
$4 \times 10^{19} - 0.2 \times 10^{19} = 3.8 \times 10^{19}$

g. $5 \times 10^7 - 3.6 \times 10^6$
$5 \times 10^7 - 0.36 \times 10^7 = 4.64 \times 10^7$

h. $6.1 \times 10^{12} - 5.9 \times 10^{11}$
$6.1 \times 10^{12} - 0.59 \times 10^{12} = 5.51 \times 10^{12}$

10.

a. $3.4 \times 10^{-3} \times 2 \times 10^{-2}$
6.8×10^{-5}

b. $6 \times 10^7 \times 2 \times 10^{-11}$
$12 \times 10^{-4} = 1.2 \times 10^{-3}$

c. $4 \times 10^9 \times 7 \times 10^{-4}$
$28 \times 10^5 = 2.8 \times 10^6$

d. $3 \times 10^{-5} \times 8 \times 10^{-9}$
$24 \times 10^{-14} = 2.4 \times 10^{-13}$

e. $4 \times 10^{-5} \div 5 \times 10^2$
$0.8 \times 10^{-7} = 8 \times 10^{-8}$

f. $1 \times 10^{-8} \div 4 \times 10^8$
$0.25 \times 10^{-16} = 2.5 \times 10^{-17}$

g. $7 \times 10^4 \div 4 \times 10^{-7}$
1.75×10^{11}

h. $3 \times 10^5 \div 8 \times 10^{-5}$
$0.375 \times 10^{10} = 3.75 \times 10^9$

i. $3 \times 10^{-6} + 5 \times 10^{-7}$
$3 \times 10^{-6} + 0.5 \times 10^{-6} = 3.5 \times 10^{-6}$

j. $2.4 \times 10^{-9} + 3.5 \times 10^{-8}$
$0.24 \times 10^{-8} + 3.5 \times 10^{-8} = 3.74 \times 10^{-8}$

k. $7 \times 10^{-14} + 4 \times 10^{-15}$
$7 \times 10^{-14} + 0.4 \times 10^{-14} = 7.4 \times 10^{-14}$

l. $9.8 \times 10^{-4} + 3.7 \times 10^{-3}$
$0.98 \times 10^{-3} + 3.7 \times 10^{-3} = 4.68 \times 10^{-3}$

m. $6.7 \times 10^{-5} - 1.4 \times 10^{-6}$
$6.7 \times 10^{-5} - 0.14 \times 10^{-5} = 6.56 \times 10^{-5}$

n. $2.4 \times 10^{-15} - 5.7 \times 10^{-16}$
$2.4 \times 10^{-15} - 0.57 \times 10^{-15} = 1.83 \times 10^{-15}$

o. $9 \times 10^{-8} - 3.5 \times 10^{-9}$
$9 \times 10^{-8} - 0.35 \times 10^{-8} = 8.65 \times 10^{-8}$

p. $3.25 \times 10^{-12} - 4 \times 10^{-13}$
$3.25 \times 10^{-12} - 0.4 \times 10^{-12} = 2.85 \times 10^{-12}$