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so many fake sites. this is the first one which worked! Many thanks

10.  $\frac{3}{4} = 0.75$ , and expressing it in standard form gives  $0.75 \times 10^2 = 75$ .

(a)  $192 = 19.2 = 1.92 \times 10$  in standard form, correct to 3 significant figures.

(b)  $74 \frac{9}{10} = 74.925 = 7.4925 \times 10^1$  in standard form, correct to 3 significant figures.

**Problem 17.** Express the following numbers, given in standard form, as fractions or mixed numbers: (a)  $2.5 \times 10^{-1}$  (b)  $6.25 \times 10^{-2}$  (c)  $1.354 \times 10^2$

(a)  $2.5 \times 10^{-1} = \frac{2.5}{10} = \frac{25}{100} = \frac{1}{4}$

(b)  $6.25 \times 10^{-2} = \frac{6.25}{100} = \frac{625}{10000} = \frac{25}{400} = \frac{1}{16}$

(c)  $1.354 \times 10^2 = 135.4 = 135 \frac{4}{10} = 135 \frac{2}{5}$

**New try the following exercise**

**Exercise 7 Further problems on standard form**

1. Problem 1 to 6, express in standard form:

(a) 73.9 (b) 28.4 (c) 197.72  
 [(a)  $7.39 \times 10$  (b)  $2.84 \times 10$  (c)  $1.9772 \times 10^2$ ]

2. (a) 2788 (b) 10170 (c) 294216  
 [(a)  $2.788 \times 10^3$  (b)  $1.017 \times 10^4$  (c)  $2.94216 \times 10^5$ ]

3. (a) 0.2602 (b) 0.00174 (c) 0.00023  
 [(a)  $2.602 \times 10^{-2}$  (b)  $1.74 \times 10^{-3}$  (c)  $2.3 \times 10^{-4}$ ]

4. (a)  $\frac{1}{2}$  (b)  $11 \frac{1}{2}$  (c)  $130 \frac{1}{2}$  (d)  $\frac{1}{5}$   
 [(a)  $5 \times 10^{-1}$  (b)  $1.125 \times 10^1$  (c)  $1.305 \times 10^2$  (d)  $2 \times 10^{-1}$ ]

5. Problem 5 and 6, express the numbers given as integers or decimal fractions:

(a)  $5.41 \times 10^2$  (b)  $7 \times 10^3$   
 [(a) 541 (b) 7000 (c) 54 100 (d) 7]

6. (a)  $3.80 \times 10^{-2}$  (b)  $6.741 \times 10^{-1}$   
 [(a)  $3.8 \times 10^{-1}$  (b)  $6.741 \times 10^0$ ]

**2.6 Further worked problem on standard form**

**Problem 18.** Find the value of:

(a)  $7.9 \times 10^{-2} - 5.4 \times 10^{-2}$   
 (b)  $8.3 \times 10^2 + 5.415 \times 10^2$  and  
 (c)  $9.293 \times 10^2 + 1.3 \times 10^3$  expressing the answers in standard form.

Numbers having the same exponent can be added or subtracted by adding or subtracting the mantissae and keeping the exponent the same. Thus:

(a)  $7.9 \times 10^{-2} - 5.4 \times 10^{-2}$   
 $= (7.9 - 5.4) \times 10^{-2} = 2.5 \times 10^{-2}$

(b)  $8.3 \times 10^2 + 5.415 \times 10^2$   
 $= (8.3 + 5.415) \times 10^2 = 13.715 \times 10^2$   
 $= 1.3715 \times 10^3$  in standard form

(c) Since only numbers having the same exponent can be added by an arithmetical addition of the mantissae, the numbers are converted to this form before adding. Thus:

$9.293 \times 10^2 + 1.3 \times 10^3$   
 $= 9.293 \times 10^2 + 13 \times 10^2$   
 $= (9.293 + 13) \times 10^2$   
 $= 22.293 \times 10^2 = 2.2293 \times 10^3$  in standard form.

Alternatively, the numbers can be expressed as decimal fractions, giving:

$9.293 \times 10^2 + 1.3 \times 10^3$   
 $= 929.3 + 1300 = 2229.3$   
 $= 2.2293 \times 10^3$  in standard form as obtained previously. This method is often the 'safest' way of doing this type of problem.

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