

Number Revision

Standard form:

Which of these numbers are written in standard form?
two hundred and four

~~32×10~~
 ~~4.7×10^4~~
 ~~0.76×10^7~~

~~$2.3 \times 10 = 2$~~
 ~~4702×10^6~~

$6.9 \times 10^{-2} = 0.069$

What does 10^{-2} mean?

Write these numbers in standard form...

$2600^3 = 2.6 \times 10^3$
 $740 = 7.4 \times 10^2$
 $342 = 3.42 \times 10^2$
 $0.3 = 3 \times 10^{-1}$
 $4 = 4 \times 10^0$
 $0.00456 = 4.56 \times 10^{-3}$
 $9 \text{ million} = 9 \times 10^6$

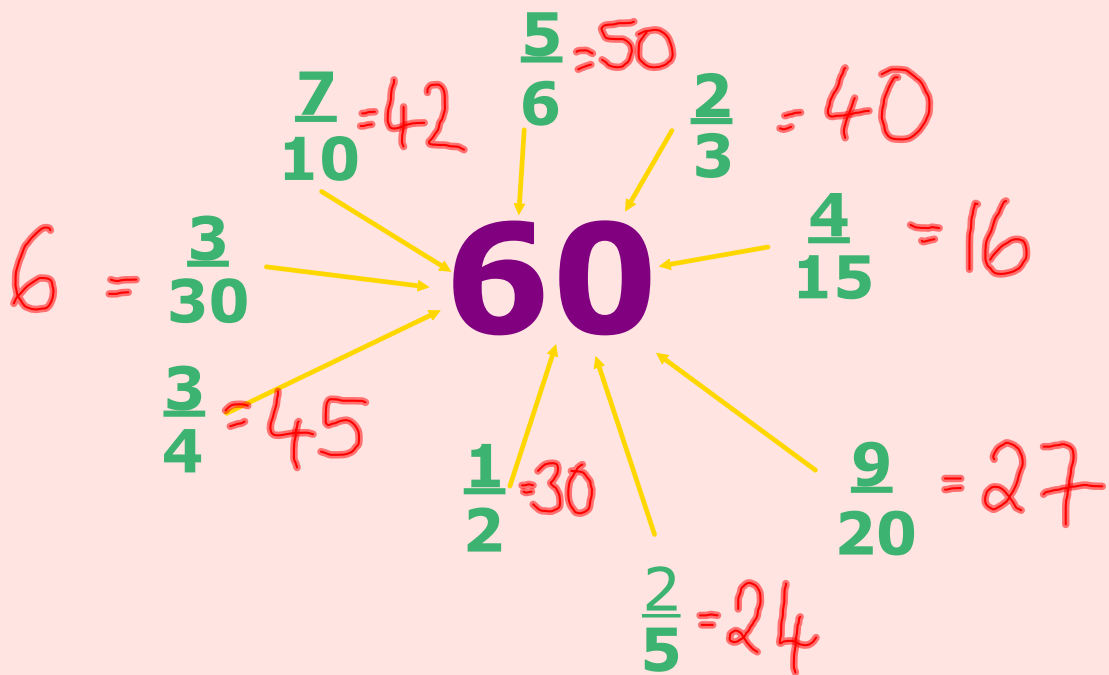
Without a calculator work out:

1) $3.6 \times 10^5 + 2.7 \times 10^3 = 3.627 \times 10^5$
 $\begin{array}{r} 360000 \\ 2700 \\ \hline 362700 \end{array}$

2) $2.4 \times 10^4 \times 5 \times 10^{-5} = 12 \times 10^{-1} = 1.2 \times 10^0$

Now work them out with a calculator and see how it displays the answers.

Work out:



$$\frac{3}{4} + \frac{6}{7} = \frac{21}{28} + \frac{24}{28} = \frac{45}{28}$$

$$= \frac{17}{28}$$

$$\frac{3}{4} \div \frac{6}{7} = \frac{3}{4} \times \frac{7}{6} = \frac{21}{24} = \frac{7}{8}$$

$$\frac{3}{4} \times \frac{6}{7} = \frac{18}{28} = \frac{9}{14}$$

$$\frac{8}{9} - \frac{6}{7} = \frac{56}{63} - \frac{54}{63} = \frac{2}{63}$$

Page 31 Test yourself

Express

$$0.7142$$

$$7 \overline{) 5.0000}$$

5 0 0 0 0
 5 0 0 0 0
 — — — — —
 0 0 0 0 0

a) $5/7$ as a decimal to 3dp

$$= 0.714$$

b) 0.67 as a fraction.

**A pair of numbers have a Lowest Common Multiple of 15.
What numbers could they be?**

3, 5

1, 15

15

**A pair of numbers have highest common factor of 15.
What numbers could they be?**

30, 75

45, 15

15, 30

30, 45

Express 105 and 63 as products of primes.

Find their HCF and LCM.

$$105 = 3 \times 5 \times 7$$

$$63 = 3^2 \times 7$$

$$\text{HCF} = 3 \times 7 = 21$$

$$\begin{aligned} \text{LCM} &= 3^2 \times 5 \times 7 \\ &= 315 \end{aligned}$$

Express $\frac{5}{7}$ as a decimal to 3dp

$$\begin{array}{r} 0.7142 \\ 7 \overline{) 5.0000} \\ \underline{49} \\ 10 \\ \underline{7} \\ 30 \\ \underline{28} \\ 20 \\ \underline{14} \\ 60 \\ \underline{56} \\ 40 \\ \underline{35} \\ 50 \\ \underline{49} \\ 10 \end{array}$$

Express $0.543543543\dots$ as a fraction

$$\begin{aligned} \text{Let } x &= 0.543543543\dots \\ 1000x &= 543.543543543\dots \\ 999x &= 543 \\ x &= \frac{543}{999} = \frac{181}{333} \end{aligned}$$

$$\frac{5}{7} = \underline{\underline{0.714}}$$

Express $0.34444444\dots$ as a fraction

$$\begin{aligned} x &= 0.3444 \\ 10x &= 3.444 \\ \underline{x} &= 0.344 \\ \hline 9x &= 3.1 \\ x &= \frac{3.1}{9} \\ x &= \frac{31}{90} \end{aligned}$$

Simplifying Surds

Express as $p\sqrt{q}$ where p and q are integers:

$$\sqrt{48} = \sqrt{16 \times 3} = 4\sqrt{3}$$

$$\sqrt{75} = \sqrt{25 \times 3} = 5\sqrt{3}$$

$$\sqrt{128} = \sqrt{64 \times 2} = 8\sqrt{2}$$

$$\sqrt{63} = \sqrt{9 \times 7} = 3\sqrt{7}$$

page 458 Odds only

Multiply out and simplify if possible:

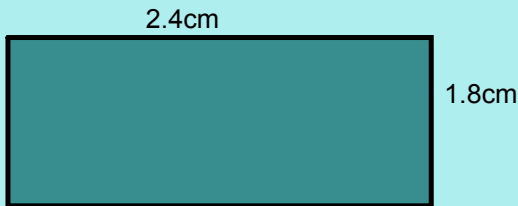
$$(3 + \sqrt{2})(3 - \sqrt{2}) = 9 + 3\sqrt{2} - 3\sqrt{2} - 2 = 7$$

$$(5 + \sqrt{7})^2 = (5 + \sqrt{7})(5 + \sqrt{7}) \\ = 25 + 5\sqrt{7} + 5\sqrt{7} + 7 \\ = 32 + 10\sqrt{7}$$

Page 459 evens, 460 odds

Page 462 Mixed questions

Upper and Lower Bounds



$$\begin{aligned} \text{max } P &= 2(2.45 + 1.85) \\ &= 8.6 \text{ cm} \\ \text{min } P &= 2(2.35 + 1.75) \\ &= 8.2 \text{ cm} \end{aligned}$$

A rectangle measured to the nearest mm has the above dimensions. Find the max^m and min^m perimeter.

If $a = 3.62$ and $b = 2.79$ to 2 dp

Find the minimum value for

$$\begin{aligned} &\swarrow \text{max} && 3.615 + 2.785 \\ & && = 6.4 \\ a-b & && ab \\ \uparrow \text{min} &&& = 10.07 \\ &&& \\ &&& \text{min} \\ &&& \downarrow \\ &&& a \div b \\ &&& \uparrow \text{max} \\ &&& = 1.29 \end{aligned}$$

$$\begin{aligned} &3.615 - 2.795 \\ &= 0.82 \end{aligned}$$

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Percentages

Fractions to decimals to percentages (no calc):

0.35

$\frac{5}{6}$

5%

$\frac{2}{3}$

Increase/decrease by a percentage (with calc):

Increase £56 by 42%

Decrease \$99 by 17%

Express one number as a percentage of another:

London has a popn of about 7million; Britain has a popn of about 65m.

What percentage of Britain are Londoners?

Fuel Price Report
February 2010

AA For the road ahead

FUEL PRICE REPORT FEBRUARY 2010

Average UK petrol and diesel prices have hit a plateau of around 112p a litre for petrol and 114p a litre for diesel over the past month. Even with a 2p drop in wholesale prices in recent days, the average petrol pump price has barely fallen while the cost of diesel has declined slightly. Barrel price is \$77.

Unleaded prices have risen by 0.3ppl from 111.8ppl to 112.1ppl. Diesel prices have also risen, by 0.1ppl, from 113.7ppl to 113.8ppl. The price difference between unleaded and diesel has fallen from 1.9ppl to 1.7ppl.

Northern Ireland recorded the highest price for unleaded at 113.5ppl. Yorkshire and Humberside recorded the lowest price for unleaded at 110.9ppl. Northern Ireland recorded the highest diesel price at 118.9ppl. Yorkshire and Humberside have the cheapest diesel at 112.8ppl.

Supermarket prices for unleaded also rose over the month by 0.8ppl to 110.8ppl. The cheapest supermarket prices and the UK average for unleaded have risen by 1.4ppl.

Find the percentage increase for diesel:

Feb 2010 114p/litre
Feb 2011 132p/litre

Find the original given a percentage change:



A pair of trainers cost £30 in the sale.
They had been reduced by 40%.
How much did they cost before the sale?

Compound interest

I invest £1000 in the bank with monthly interest rate of 0.3% interest.
How much is it worth at the end of the year.

I borrow £1000 at a monthly interest rate of 1%.
How much do I owe after 1 year?