$\frac{4 \times 8}{2} = d$

so $\frac{32}{2} = 16$ which equals d

but if $\frac{ab}{c} = d$ then $ab = cd$

or $4 \times 8 = 16 \times 2 = 32$ again correct

but if $\frac{ab}{c} = \frac{ab}{d} = c$ or $\frac{4 \times 8}{16} = 2$

again we have a correct answer.

The algebraic forms needed to be understood for the exam are as follows

1) If $a = \frac{1}{d\sqrt{bc}}$ then $a^2 = \frac{1}{d^2bc}$

and $b = \frac{1}{d^2a^2c}$ and $c = \frac{1}{d^2a^2b}$

and $d = \frac{1}{a\sqrt{bc}}$

This is the form of the resonant circuit formula, $f = \frac{1}{2\pi\sqrt{LC}}$ and we have substituted a for f, d for 2π and b and c for L and C.

2) If $a = b^2 + c^2$ then $a^2 = b^2 + c^2$

and $b = a^2 - c^2$ and $c = a^2 - b^2$

This is our impedance formula

where $Z = \sqrt{X^2 + R^2}$ (See later)

From **Fig. 3** which introduces pi we can see that **R** is the radius of the circle, ie it is one half of the diameter so **2R = D**. If π**D =** the circumference then **2πR** = circumference.

One other relationship requires explanation and this time you can blame the Greeks again. The fellow concerned is a chap called Pythagorus, but don't get too upset. He's been dead for 2000 years or so.

Old Pythagorus said that in any right angle triangle, the sum of the squares on the two shorter sides was equal to the square of the longer side as in **Fig. 4.** In our case this is the impedance triangle and we can find that the second triangle in **Fig. 4** shows the relationship. This is always true and can be proved mathematically. If you want to check it, make up a triangle as in the third triangle in **Fig. 4** and measure the length of the dotted line. You will find it to be 5.

$3^2 + 4^2 = 5^2$ $(9 + 16 = 25)$

Situations where we may use the subjects discussed so far!

Indices
In calculating the resonant frequency of a circuit and reactance calculations.

Decibels
The logarithmic method of establishing ratios of one level to another.

Pythagorus
In calculating impedance values.

Algebraic Forms
Working out Ohm's law relationships and values of power in watts.

Glossary

Various prefixes are used in radio.

giga	= One thousand million	$= 10^9$
Mega	= One million	$= 10^6$
kilo	= One thousand	$= 10^3$
deci	= One tenth	$= 10^{-1}$
milli	= One thousandth	$= 10^{-3}$
micro	= One millionth	$= 10^{-6}$
nano	= One thousand millionth	$= 10^{-9}$
pico	= One million millionth	$= 10^{-12}$

Note how easy it is to write 10^{-12} instead of writing

$$\frac{1}{1{,}000{,}000{,}000{,}000}$$