

Christmas Revision Number 2

Year 9

You may use a calculator

Question 1

- (i) Write out the five factors of 16

- (ii) Explain why 51 is NOT prime

- (iii) What is the square root of 49 ?

- (iv) When an ODD number multiplies an EVEN number, is the answer always ODD or always EVEN ?

Question 2

Write 108 as a product of primes.

Question 3

Find the value of

- | | | | | |
|--------------------|--------|---------|--------|---------------------|
| (i) | (ii) | (iii) | (iv) | (v) |
| $16^{\frac{1}{2}}$ | 16^0 | 16^1 | 16^2 | $16^{-\frac{1}{2}}$ |

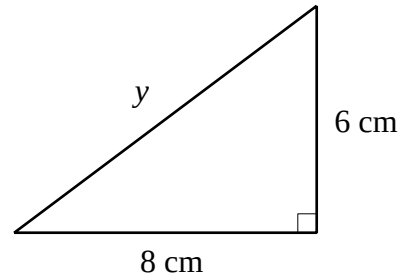
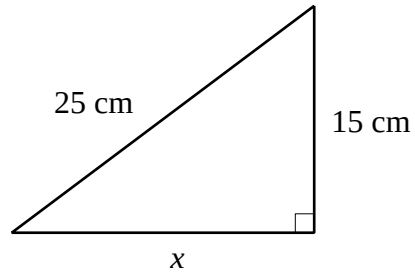
Question 4

Find the missing side on each of these two triangles.

For one you'll have to use the version of Pythagoras' Theorem in which you add, for the other, the version involving a subtract.

But which is which ?

Good luck !

**Question 5**

Add without using a calculator, showing the working involved.

$$\frac{2}{7} + \frac{5}{14} =$$

Question 6

Subtract without using a calculator, showing the working involved.

$$\frac{3}{4} - \frac{2}{3} =$$

Question 7

Multiply without using a calculator, showing the working involved.

$$\frac{4}{7} \times \frac{5}{12} =$$

Question 8

Divide without using a calculator, showing the working involved.

$$\frac{5}{11} \div \frac{10}{13} =$$

Question 9

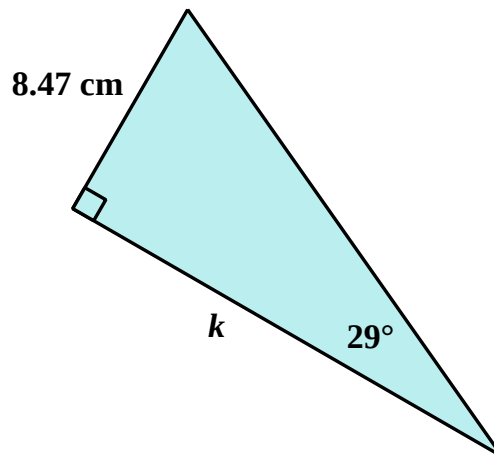
Let x be the number

$$0.\dot{5}$$

- (i) Write down the value of $10x$

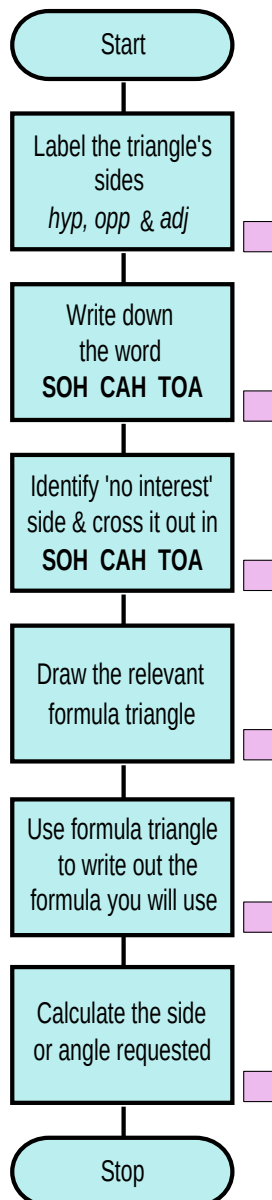
- (ii) Showing clear working, write x as a vulgar fraction in its simplest form;

Question 10



Calculate the length marked k .

Give your answer correct to 3 significant figures



Question 11

If $a = 4$, $f = 2$, $r = 9$ and $t = -5$ calculate the value of

(i) $r + a + f + t$

(ii) $r a f t$

(iii) $\frac{r + a + t}{f}$

Question 12

Simplify these algebraic expressions

(i) $4x + 3y + 9x - 7y$

(ii) $18z + 23z - 23x + 4w$

(iii) $5 (2x + 3) + 7$

(iv) $8 + 7 (2w + 3)$

Question 13

Solve these equations

(i) $5x + 8 = 38$

(ii) $6x - 5 = 4$

(iii) $7x + 2 = 2x + 12$

(iv) $9 + 5x = 3x + 16$

Question 14

Determine

(i) The SUM of 5 and 7

(ii) The DIFFERENCE of 17 and 9

(iii) The PRODUCT of 15 and 5

(iv) The RECIPROCAL of 4

Question 15

Let x be the number

$$0.\dot{5}1\ddot{7}$$

- (i) Write down the value of $1000x$
- (ii) Showing clear working, write x as a vulgar fraction in its simplest form

Question 16

Let x be the number

$$0.3\dot{4}$$

- (i) Write down the value of $100x$
- (ii) Write down the value of $10x$
- (iii) Using your answers to part (i) and (ii) write x as a vulgar fraction in its simplest form;

Question 17

Without using a calculator show that

$$5\frac{1}{3} + 2\frac{1}{2} = 7\frac{5}{6}$$

Question 18

For each of the following numbers, state either PRIME or NOT PRIME.

For those that are not prime, give a divisor other than 1 or the number itself.

You may use a calculator in this question.

(i) 25

(ii) 13

(iii) 54

(iv) 10345

(v) 91

(vi) 101

Question 19

One of Fermat's famous theorems says that :

*If a prime has remainder 1 when divided by 4,
then that prime can be written as a sum of two squares.*

Example

Consider the prime 41.

When divided by four this has remainder 1.

Thus 41 can be written as the sum of two squares.

After a bit of thought... $41 = 5^2 + 4^2$

Each of the following primes has remainder 1 when divided by 4.

Therefore they can be written as the sum of two squares.

In each case, find the two squares.

$$5 =$$

$$13 =$$

$$17 =$$

$$29 =$$

$$37 =$$

$$53 =$$

$$61 =$$

$$73 =$$

$$89 =$$

$$97 =$$