

1. (a) Calculate the mean and standard deviation of the following set of numbers.

17 19 23 24 26

- (b) Another set had mean 31.7 and standard deviation 1.8.
Make two valid comparisons between the two sets.

2. Tom looked at the cost of 10 different flights to New York.
He calculated that the mean cost was £360 and that the standard deviation was £74.
A tax of £12 is added to each flight.

Write down the new mean and standard deviation.

3. The weight, W kilograms, of a young giraffe is related to its age, M months, by the formula

$$W = \frac{1}{4} M^2 - 4M + 272$$

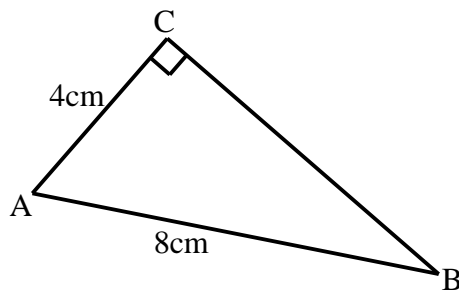
At what age will the giraffe weigh 83 kilograms?

4. One atom of gold weighs 3.27×10^{-22} grams.
How many atoms will there be in one kilogram of gold?
Give your answer in scientific notation correct to 2 significant figures.

5. Given that $f(x) = x^2 + 3$,

- (a) Evaluate $f(-4)$
(b) Given that $f(t) = 52$, find the value(s) of t .

6. In triangle ABC, angle $ACB = 90^\circ$, $AB = 8$ centimetres and $AC = 4$ centimetres.



Calculate the length of BC, giving your answer as a surd in its simplest form.

7. Two functions are defined by $f(x) = x^2 - 4x$ and $g(x) = 2x + 7$.

If $f(x) = g(x)$, find the values of x .

8. Evaluate, without a calculator

(a) $846 \div 30 - 1.09$ (b) $4\frac{1}{3} - 1\frac{1}{2}$ (c) $\frac{2}{5} \div 1\frac{1}{10}$

9. A company makes large bags of crisps which contain 90 grams of fat.
The company aims to reduce the fat content of the crisps by 50%.
They decide to reduce the fat content by 20% each year.
Will they have achieved their aim by the end of the 3rd year?
Justify your answer.

10. On a certain day, the depth, D metres, of water in a fishing port t hours after midnight, is given by the formula

$$D = 12.5 + \sin(30t)^\circ.$$

- (a) Find the depth of water at 1.30 p.m.
(b) The depth is recorded each hour.
What is the maximum difference in the depths during the 24-hour period?

11. Two variables x and y are connected by the relationship $y = ax + b$.
Sketch a possible graph of y against x to illustrate this relationship when a and b are each less than zero.

12.

ABCD, V is a pyramid with rectangular base ABCD.

$$\overrightarrow{AB} = \begin{pmatrix} 8 \\ 2 \\ 2 \end{pmatrix}, \overrightarrow{AD} = \begin{pmatrix} -2 \\ 10 \\ -2 \end{pmatrix} \text{ and } \overrightarrow{AV} = \begin{pmatrix} 1 \\ 7 \\ 7 \end{pmatrix}.$$

- (a) Express \overrightarrow{CV} in component form.
(b) Find $|\overrightarrow{CV}|$.

13. Solve, for $0 \leq x \leq 360$

(a) $7 \cos x^\circ - 4 = 0$ (b) $3 \tan x^\circ + 1 = 2 \sin 15^\circ$