**Substitution Into Expressions**

**Decode the Maths Joke**

Given that $a=8, b=3, c=-4$ and $d=1.5$, find the value of each expression for each of the letters of the alphabet.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **A** | $$a+b$$ |  |  | **N** | $$a^{2}÷2$$ |  |
| **B** | $$2a-b$$ |  |  | **O** | $$a-c$$ |  |
| **C** | $$3b+7$$ |  |  | **P** | $$3cd+20$$ |  |
| **D** | $$a+b^{2}$$ |  |  | **Q** | $$4c-8$$ |  |
| **E** | $$a^{2}-d$$ |  |  | **R** | $$5c^{2}-25$$ |  |
| **F** | $$2b^{2}-3 $$ |  |  | **S** | $$5+\sqrt{2a}$$ |  |
| **G** | $$10d-b^{2}$$ |  |  | **T** | $$\sqrt{b^{2}+c^{2}}$$ |  |
| **H** | $$2ab$$ |  |  | **U** | $$c-b$$ |  |
| **I** | $$ab-4$$ |  |  | **V** | $$2a÷c$$ |  |
| **J** | $$a+c$$ |  |  | **W** | $$c+3b^{2}$$ |  |
| **K** | $$b+c+d$$ |  |  | **X** | $$c-3d$$ |  |
| **L** | $$bc-4$$ |  |  | **Y** | $$c+\sqrt{4b-c}$$ |  |
| **M** | $$a+c^{2}$$ |  |  | **Z** | $$b^{2}-4ac$$ |  |

Now decode the joke….

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| $$23$$ | $$48$$ | $$11$$ | $$5$$ |  | $$20$$ | $$9$$ |  | $$11$$ |  | $$13$$ | $$20$$ | $$55$$ | $$17$$ |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ‘ | $$9$$ |  | $$15$$ | $$11$$ | $$-4$$ | $$12$$ | $$-7$$ | $$55$$ | $$20$$ | $$5$$ | $$62.5$$ |  | $$5$$ |
| ‘ |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $$0$$ | $$2$$ | $$62.5$$ |  | $$12$$ | $$15$$ |  | $$24$$ | $$11$$ | $$5$$ | $$48$$ | $$9$$ | ? |  |
|  |  |  |  |  |  |  |  |  |  |  |  | ? |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $$12$$ | $$23$$ | $$-16$$ | - | $$6$$ | $$62.5$$ | $$13$$ | $$55$$ | $$11$$ | ! |  |  |  |  |
|  |  |  | - |  |  |  |  |  | ! |  |  |  |  |