



Crack the Vault Code

Someone locked the vault with a 4-digit code. Work out what each shape is worth and crack it.

Name: _____ Date: _____

1 THE KEY

$$\begin{array}{ccccccc} \text{?} = \square & \bigcirc = 5 & \heartsuit = \square & \blacklozenge = 28 & \star = \square \\ \text{?} = \square & & & & \end{array}$$

Every symbol is a whole number from 1 to 30. A number in front of a shape means multiply: 2 stars = 2 x star. A small 2 after a shape means square it: $\text{star}^2 = \text{star} \times \text{star}$. $\text{sqrt}(\text{shape})$ is the square root of that shape's value.

2 FIND THE MISSING VALUES

Some shapes in the key are missing. Use these to work them out, in order, and write them into the key.

$$\begin{array}{l} \text{?} + \blacklozenge = 42 \\ 3\text{?} - 2\blacklozenge = 41 \end{array}$$

$$\heartsuit^2 = 484$$

$$2\star + \text{?} = 61$$

3 CRACK THESE

$$1. \text{?}^2 - \bigcirc = \square$$

$$2. (\heartsuit + \blacklozenge)^2 = \square$$

CODE 1

$$3. 3\text{?} - 2\bigcirc + \blacklozenge = \square$$

$$4. \blacklozenge^2 - \blacklozenge = \square$$

CODE 2

$$5. 2\star^2 + \text{?} = \square$$

$$6. \blacklozenge^3 - \text{?} = \square$$

CODE 3

$$7. \text{sqrt}(\text{?}) + \text{?} = \square$$

$$8. \text{sqrt}(\text{?}) + \blacklozenge = \square$$

CODE 4

$$9. \blacklozenge^3 - \bigcirc = \square$$

$$10. 3\blacklozenge - 2\text{?} + \heartsuit = \square$$

4 THE VAULT CODE

Write the ONES digit of your answers to problems 2, 4, 6, 8 (the ones tagged CODE 1-4), in that order. That opens the vault.

Answer Key

Crack the Vault Code · Grade 8 Crack the Code

The key

 hexagon = **17** (hidden)
  ring = **5**
  heart = **22** (hidden)
  pentagon = **28**
  star = **18** (hidden)
 moon = **25** (hidden)

Every symbol is a whole number from 1 to 30.

1. $\text{moon}^2 - \text{ring}$ **620**
2. $(\text{heart} + \text{hexagon})^2$ **1521**
3. $3\text{moon} - 2\text{ring} + \text{hexagon}$ **82**
4. $\text{hexagon}^2 - \text{pentagon}$ **261**
5. $2\text{star}^2 + \text{moon}$ **673**
6. $\text{hexagon}^3 - \text{moon}$ **4888**
7. $\sqrt{\text{moon}} + \text{moon}$ **30**
8. $\sqrt{\text{moon}} + \text{hexagon}$ **22**
9. $\text{hexagon}^3 - \text{ring}$ **4908**
10. $3\text{pentagon} - 2\text{moon} + \text{heart}$ **56**

Vault code: **1 1 8 2**