

Decrypting the Corsair Cargo Lock

Use your algebraic skills to determine the numerical values of the stellar navigation symbols and crack the security matrix of the orbital treasure vault.

Name: _____ Date: _____

1 THE KEY

$$\begin{aligned} \star &= \boxed{} & \text{?} &= \boxed{} & \blacklozenge &= 21 & \text{?} &= \boxed{} & \text{⚡} &= \boxed{} \\ \text{?} &= \boxed{} \end{aligned}$$

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: star² = star x star. sqrt(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.

$$\blacklozenge \times \text{?} = 108$$

$$\blacklozenge - \text{?} = 23$$

$$2\bullet + \star = 25$$

$$2\bullet - 2\star = -20$$

$$\text{⚡} \times \bullet - \star = 85$$

3 CRACK THESE

$$1. \sqrt{\star^2 + \text{⚡}^2} = \boxed{}$$

$$2. (\blacklozenge - \text{⚡}) \times (\blacklozenge + \text{⚡}) = \boxed{}$$

CODE 1

$$3. (2\blacklozenge - \bullet)^2 = \boxed{}$$

$$4. (\blacklozenge + \bullet)^2 - (\blacklozenge - \bullet)^2 = \boxed{}$$

CODE 2

$$5. \blacklozenge^2 + \blacklozenge^2 + \text{⚡}^2 = \boxed{}$$

$$6. (2\bullet - \blacklozenge)^2 = \boxed{}$$

CODE 3

$$7. (\blacklozenge + \blacklozenge)^2 - (\blacklozenge - \blacklozenge)^2 = \boxed{}$$

$$8. 3\bullet^2 - 2\text{?}^2 = \boxed{}$$

CODE 4

$$9. \blacklozenge^2 + \star^2 + \blacklozenge^2 = \boxed{}$$

$$10. (\blacklozenge^2 - \bullet^2) \div (\blacklozenge - \bullet) = \boxed{}$$

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 titanium cryo-chest containing.

Answer Key

Decrypting the Corsair Cargo Lock · Grade 10 Crack the Code

The key

★ star = **15** (hidden) ⬡ hexagon = **27** (hidden) ⬠ diamond = **21** ☾ moon = **4** (hidden)
 ⚡ lightning bolt = **20** (hidden) ● circle = **5** (hidden)

Every symbol is a whole number from 1 to 30.

1. $\text{sqrt}(\star^2 + \text{lightning bolt}^2)$ (sqrt(star^2 + lightning bolt^2)) **25**
2. $(\text{diamond} - \text{lightning bolt}) \times (\text{diamond} + \text{lightning bolt})$ **41**
3. $(2 \times \text{hexagon} - \text{circle})^2$ ((2 x hexagon - circle)^2) **2401**
4. $(\text{hexagon} + \text{circle})^2 - (\text{hexagon} - \text{circle})^2$ ((hexagon + circle)^2 - (hexagon - circle)^2) **540**
5. $\text{hexagon}^2 + \text{diamond}^2 + \text{lightning bolt}^2$ (hexagon^2 + diamond^2 + lightning bolt^2) **1570**
6. $(2 \times \text{circle} - \text{diamond})^2$ ((2 x circle - diamond)^2) **121**
7. $(\text{hexagon} + \text{diamond})^2 - (\text{hexagon} - \text{diamond})^2$ ((hexagon + diamond)^2 - (hexagon - diamond)^2) **2268**
8. $3 \times \text{circle}^2 - 2 \times \text{moon}^2$ (3 x circle^2 - 2 x moon^2) **43**
9. $\text{hexagon}^2 + \star^2 + \text{diamond}^2$ (hexagon^2 + star^2 + diamond^2) **1395**
10. $(\text{hexagon}^2 - \text{circle}^2) \div (\text{hexagon} - \text{circle})$ ((hexagon^2 - circle^2) / (hexagon - circle)) **32**

Vault code: **1 0 1 3**