

Astrophysics Terminal Decryption

Solve the system of equations represented by astronomical symbols to calculate the correct frequency and unlock the emergency distress transmitter.

Name: _____ Date: _____

1 THE KEY

$$\begin{array}{l} \heartsuit = \boxed{} \quad \hexagon = \boxed{} \quad \text{☾} = 18 \quad \blacklozenge = 2 \quad \boxed{?} = \boxed{} \\ \star = \boxed{} \end{array}$$

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: 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.

$$\begin{array}{l} \blacklozenge + 3\heartsuit = 106 \\ 3\blacklozenge - 2\heartsuit = 21 \end{array}$$

$$\star \times \heartsuit - \blacklozenge = 79$$

$$\blacksquare \times \heartsuit - \blacklozenge = 542$$

3 CRACK THESE

$$1. \quad 2\blacksquare^2 + \blacklozenge = \boxed{}$$

$$2. \quad \text{sqrt}(\blacklozenge) + \star = \boxed{}$$

CODE 1

$$3. \quad \text{☾}^2 - \heartsuit = \boxed{}$$

$$4. \quad \heartsuit^2 + \blacksquare^2 = \boxed{}$$

CODE 2

$$5. \quad \text{sqrt}(\blacklozenge) \times \text{☾} = \boxed{}$$

$$6. \quad \blacklozenge^2 - \blacklozenge = \boxed{}$$

CODE 3

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

$$8. \quad (\blacklozenge + \text{☾})^2 = \boxed{}$$

CODE 4

$$9. \quad \blacklozenge^2 + \text{☾}^2 = \boxed{}$$

$$10. \quad 2\blacklozenge^2 + \text{☾} = \boxed{}$$

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 emergency distress transmitter.

Answer Key

Astrophysics Terminal Decryption · Grade 8 Crack the Code

The key

♥ heart = 27 (hidden) ⬡ hexagon = 25 (hidden) ☾ moon = 18 ⬠ pentagon = 2
 ■ square = 21 (hidden) ★ star = 3 (hidden)

Every symbol is a whole number from 1 to 30.

- | | | |
|-----|---|------|
| 1. | $2\blacksquare^2 + \blacklozenge$ (2 x square ² + pentagon) | 884 |
| 2. | $\sqrt{\blacklozenge} + \star$ (sqrt(hexagon) + star) | 8 |
| 3. | $\text{☾}^2 - \heartsuit$ (moon ² - heart) | 297 |
| 4. | $\heartsuit^2 + \blacksquare^2$ (heart ² + square ²) | 1170 |
| 5. | $\sqrt{\blacklozenge} \times \text{☾}$ (sqrt(hexagon) x moon) | 90 |
| 6. | $\blacklozenge^2 - \blacklozenge$ (hexagon ² - pentagon) | 623 |
| 7. | $(\blacklozenge + \blacklozenge)^2$ ((hexagon + pentagon) ²) | 729 |
| 8. | $(\blacklozenge + \text{☾})^2$ ((hexagon + moon) ²) | 1849 |
| 9. | $\blacklozenge^2 + \text{☾}^2$ (hexagon ² + moon ²) | 949 |
| 10. | $2\blacklozenge^2 + \text{☾}$ (2 x pentagon ² + moon) | 26 |

Vault code: **8039**