

Table of Contents

Introduction.....iii

About the Author iv

 1. Pattern Predictor 1 1

 2. Equality Explorer 1 3

 3. Sequence Sleuth 1 4

 4. Number Ninja 1 5

 5. Function Finder 1 6

 6. Pattern Predictor 2 7

 7. Equality Explorer 2 9

 8. Sequence Sleuth 2 10

 9. Number Ninja 2 11

 10. Function Finder 2 12

 11. Pattern Predictor 3 13

 12. Equality Explorer 3 15

 13. Sequence Sleuth 3 16

 14. Number Ninja 3 17

 15. Function Finder 3 18

 16. Pattern Predictor 4 19

 17. Equality Explorer 4 21

 18. Sequence Sleuth 4 22

 19. Number Ninja 4 23

 20. Function Finder 4 24

 21. Pattern Predictor 5 25

 22. Equality Explorer 5 27

 23. Sequence Sleuth 5 28

 24. Number Ninja 5 29

 25. Function Finder 5 30

 26. Pattern Predictor 6 31

 27. Equality Explorer 6 33

 28. Sequence Sleuth 6 34

 29. Number Ninja 6 35

 30. Function Finder 6 36

 31. Pattern Predictor 7 37

 32. Equality Explorer 7 39

 33. Sequence Sleuth 7 40

 34. Number Ninja 7 41

 35. Function Finder 7 42

 36. Pattern Predictor 8 43

 37. Equality Explorer 8 45

 38. Sequence Sleuth 8 46

 39. Number Ninja 8 47

 40. Function Finder 8 48

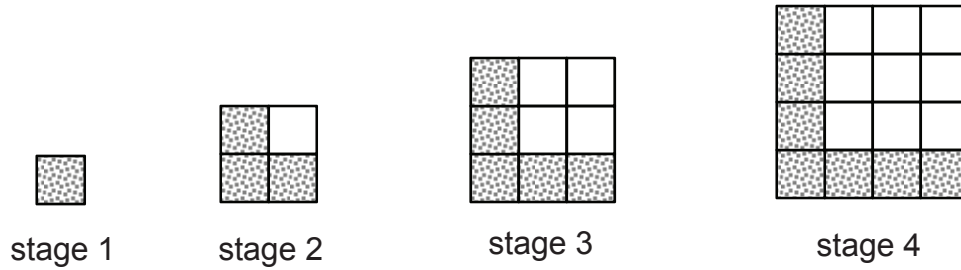
Hints..... 49

Solutions 56

Free resource from www.criticalthinking.com. Commercial redistribution prohibited

21. Pattern Predictor 5

The figures below are constructed from unit squares. Stage 2 has 4 unit squares: 3 shaded and 1 unshaded.



1. Complete the table to describe the pattern.

stage	1	2	3	4	5	6	7	8
# of unshaded unit squares	0	1						
# of shaded unit squares	1	3						
total # of unit squares	1	4						

2. How many unshaded unit squares are there at stage 11?

3. How many shaded unit squares are there at stage 14?

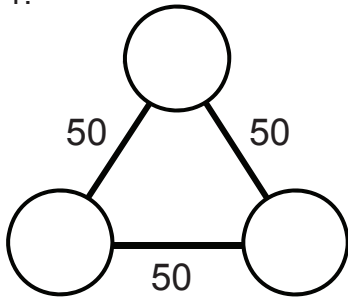
4. What is the total number of unit squares at stage 15?

5. At what stage are there 35 shaded unit squares?

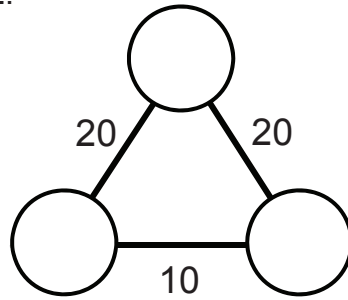
9. Number Ninja 2

Fill in each empty circle with a number so that the sum of the numbers in any two circles equals the number between them.

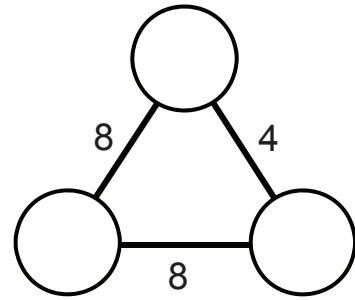
1.



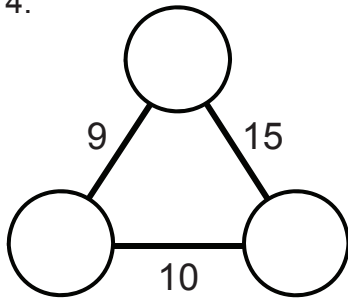
2.



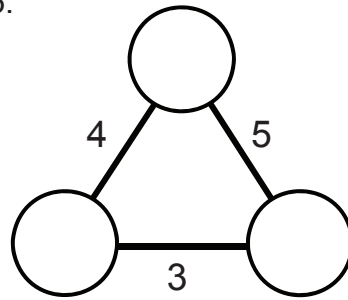
3.



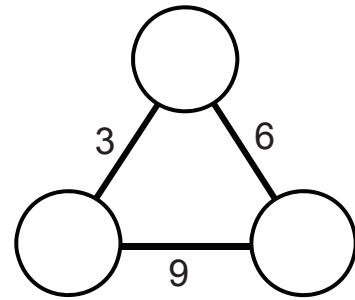
4.



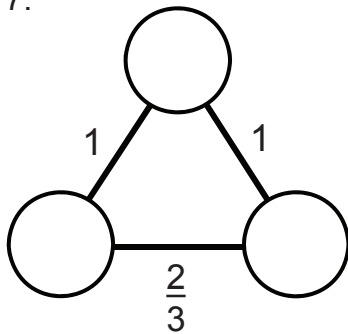
5.



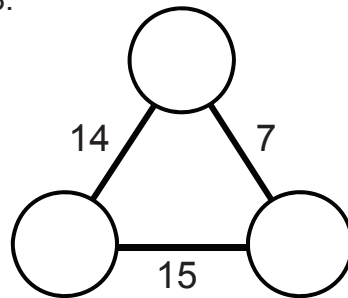
6.



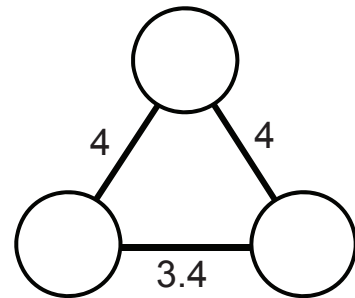
7.



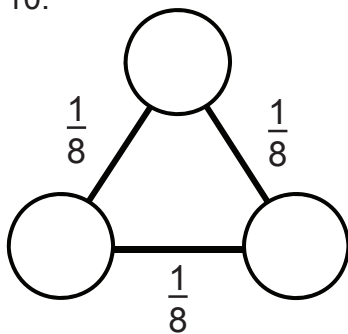
8.



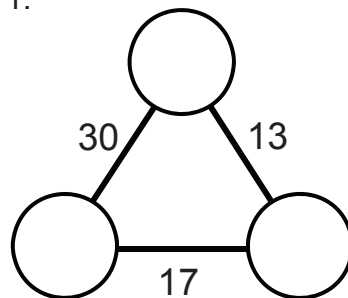
9.



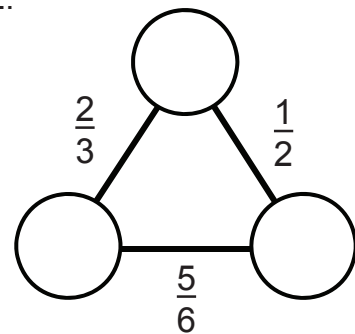
10.



11.



12.



15. Function Finder 3

Each question gives examples of a secret operation acting upon two numbers. Look for a pattern to understand how the operation works. Then fill in the blanks.

1.

Examples:	$6 \heartsuit 7 = 43$	$9 \heartsuit 10 = 91$	$7 \heartsuit 4 = 29$
	$8 \heartsuit 3 = 25$	$2 \heartsuit 5 = 11$	$3 \heartsuit 10 = 31$

a. $5 \heartsuit 9 = \underline{\hspace{2cm}}$ b. $16 \heartsuit 3 = \underline{\hspace{2cm}}$ c. $4 \heartsuit 8 = \underline{\hspace{2cm}}$

d. $\underline{\hspace{2cm}} \heartsuit 20 = 101$ e. $6 \heartsuit \underline{\hspace{2cm}} = 19$ f. $\underline{\hspace{2cm}} \heartsuit 11 = 78$

2.

Examples:	$10 \spadesuit 20 = 15$	$13 \spadesuit 1 = 7$	$25 \spadesuit 75 = 50$
	$14 \spadesuit 6 = 10$	$12 \spadesuit 14 = 13$	$5 \spadesuit 9 = 7$

a. $8 \spadesuit 12 = \underline{\hspace{2cm}}$ b. $3 \spadesuit 21 = \underline{\hspace{2cm}}$ c. $17 \spadesuit 33 = \underline{\hspace{2cm}}$

d. $\underline{\hspace{2cm}} \spadesuit 8 = 5$ e. $15 \spadesuit \underline{\hspace{2cm}} = 10$ f. $\underline{\hspace{2cm}} \spadesuit 30 = 27$

3.

Examples:	$3 \clubsuit 2 = 10$	$2 \clubsuit 7 = 18$	$10 \clubsuit 1 = 22$
	$0 \clubsuit 8 = 16$	$13 \clubsuit 2 = 30$	$5 \clubsuit 4 = 18$

a. $3 \clubsuit 7 = \underline{\hspace{2cm}}$ b. $9 \clubsuit 5 = \underline{\hspace{2cm}}$ c. $10 \clubsuit 6 = \underline{\hspace{2cm}}$

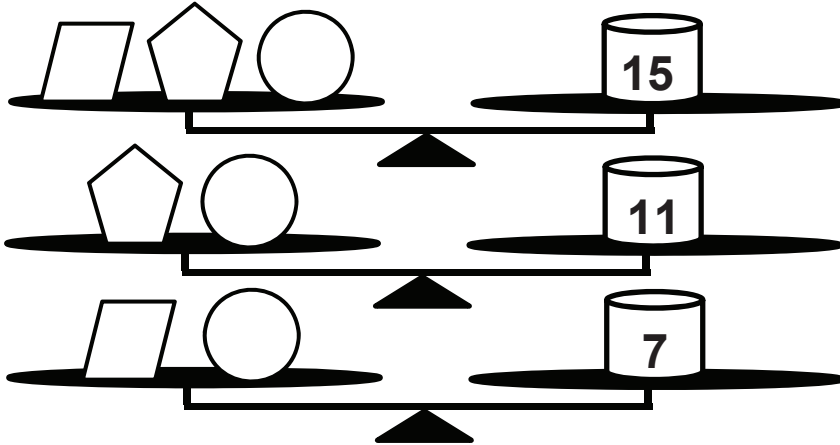
d. $\underline{\hspace{2cm}} \clubsuit 4 = 12$ e. $8 \clubsuit \underline{\hspace{2cm}} = 30$ f. $\underline{\hspace{2cm}} \clubsuit 10 = 26$

Free resource from www.criticalthinking.com. Commercial redistribution prohibited

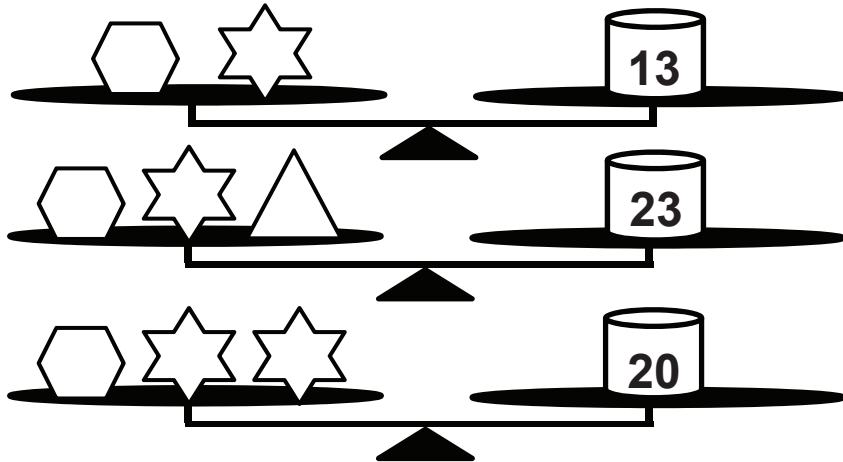
17. Equality Explorer 4

Each 2D shape represents a different whole number. Use the balance scales to find their value.

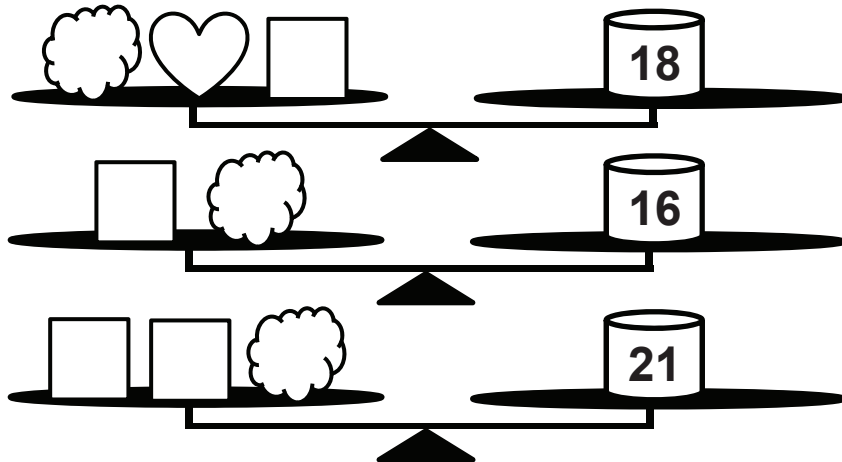
1.



2.



3.



Free resource from www.criticalthinking.com. Commercial redistribution prohibited