Facts and Reminders

Simple Codes

This is a simple code because 43 + 32 = 75.

$$\begin{array}{r} 43 \\ + 32 \\ \hline AC \end{array} \quad A = 7 \quad C = 5$$

Using Reverse Operations

In the problem below, to crack the code you must subtract 98 from 123. The answer is 25.

Problem	Step	Check	Solution
98		98	
+ DF	123 – 98 = 25	+ 25	D = 2 F = 5
123		123	

In this next problem, to crack the code, you must divide 1,428 by 42. The answer is 34.

Problem	Step	Check	Solution
42		42	
x AF		x 34	
168	1428 ÷ 42 = 34	168	A = 3 F = 4
1260		1260	
1428		1428	

Using Number Sense

In the problem below, you can try two ways to crack the code. One way is to try each digit 1 through 9. Another way is knowing that 6 = 2 x 3 and trying 2 first.

Problem	Check	Solution
31	31	
x AA	x 22	
6A	62	A = 2
6A0	620	
68A	682	

In the next problem, you know that the only number that added to itself and equals 2 is 1.

Problem	Check	Solution
BBB	111	
+ BBB	+ 111	B = 1
2 2 2	222	

In the problem below, ask yourself the question, "Which number times itself equals 9?" The answer is 3.

Problem	Check	Solution
FFF	333	
x F	x 3	F = 3
999	999	

Code Cracking

Codes with Addition and Subtraction

Directions: Study the Facts and Reminders page for this unit. Use your knowledge of addition and subtraction to break these codes. Use a calculator if you have one.

1.
```
  54
+ 29
  JA
```

2.
```
  67
+ 99
 F I I
```

3.
```
  145
+ 366
  BFF
```

4.
```
   98
+ FG
  110
```

5.
```
   87
+ C J
  165
```

6.
```
  247
+ ACD
  626
```

7.
```
   HF
+ 76
  117
```

8.
```
   BI
+ 99
  155
```

9.
```
  DGA
+ 7 5 6
 1 6 7 9
```

10.
```
  CJ2
+ 44B
 1227
```

11.
```
  B82
+ B11
 1093
```

12.
```
  G9E
+ 245
  535
```

13.
```
   FF
+ FF
   22
```

14.
```
  AAA
+  AA
  366
```

15.
```
  HHHH
+ HHHH
  8888
```

16.
```
  9 8
- 3 8
  RM
```

17.
```
  484
- 149
  UUN
```

18.
```
  976
- 286
  RZM
```

19.
```
  567
- WUX
  333
```

20.
```
  974
- PZQ
  176
```

21.
```
  765
- VNV
  614
```

22.
```
  QWU
- 134
  689
```

23.
```
  PZMV
- 1236
  6665
```

24.
```
  ZWUX
- 4265
  4969
```

25.
```
  ZZZ
-  ZZ
 9MM
```

26.
```
  VVVV
-  VV
 11MM
```

27.
```
  PPZZ
-   PP
 7722
```

28.
```
  XXXX
- W00W
 W X 4 2
```

29.
```
  UVV
-  30
  281
```

30.
```
  RR0R
- UU43
  3263
```

31.
```
  WWWWWW
-  WWWW 1
  W 0 0 0 0 1
```

32.
```
  QQQQQ
- XXX4X
 4XX4X
```

23. Line segment *GH* is parallel to *EG*
parallel to *LM*
24. Line segment *XZ* is parallel to *VW*
25. function of n equals n plus 2
26. function of n equals n times 5
27. function of n equals (n times 4) plus 1
28. function of n equals (n divided by 3) plus 2
29. n is identically equal to 12
30. x is identically equal to x

Page 108
1. odd numbers
2. prime numbers
3. even numbers
4. letters of the alphabet
5. U.S. cities
6. tens
7. square numbers
8. triangular numbers
9. shapes
10. math signs and symbols
11.–16. Answers will vary. (Any part of the set is a subset.)

Page 109
1. 1, 2, 3, 4, 5, 6, 8, 10
2. 1, 2, 3, 4, 5, 7, 9, 11
3. 1, 3, 4, 6, 9, 10, 15, 16, 21, 25
4. 1, 2, 3, 4, 5, 6, 7, 9
5. a, b, c, d, e, f, g, i, o, u
6. 1, 2, 3, 5, 7, 9, 11, 13
7. 2, 4, 6
8. 1, 3, 9
9. 1
10. 1, 3, 5, 7
11. a, e
12. 3, 5, 7, 11, 13

Page 110
1. a. 1, 2, 3, 4, 5, 6, 8, 9, 10, 11
   b. 1, 2, 4, 6

c. 1, 2
d. 1, 2
2. a. 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 15, 16, 21, 25
   b. none
   c. 1
   d. none
3. a. 2, 3, 4, 6, 8, 9, 10, 12, 14, 15, 16
   b. 6, 12
   c. 4, 8, 12
   d. 12
4. a. 4, 6, 8, 12, 16, 18, 20, 24, 28, 30, 32, 36, 40
   b. 24
   c. 8, 16, 24, 32, 40
   d. 24
5. Answers will vary.

Page 112
1. a. 1, 2, 3, 4, 5, 7, 9, 11, 16, 25
   b. 1, 4, 9, 16, 25
   c. 2, 3, 5, 7, 11
2. a. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
   b. 2, 3, 5, 7, 11
   c. 4, 6, 8, 9, 10
3. a. a, c, d, e, f, g, h, i, o, u
   b. a, e, i, o, u
   c. c, d, f, g, h
4. a. 1, 3, 4, 6, 9, 10, 15, 16, 21, 25, 36
   b. 1, 3, 6, 10, 15, 21
   c. 1, 4, 9, 16, 25, 36
5. a. Empty set: J
   b. Universal set: I and J.
6. a. Empty set: K
   b. Universal set: K and L.
7.–8. Answers will vary.

Page 113
1. 1, 4, 8, 9, 16, 25, 27, 36, 49, 64, 125
1, 64
2. a, b, c, d, e, f, g, h, i, o, u, y
y

3. –12, –10, –8, –6, –4, 2, 4, 6, 8, 10, 12, 14, 16
none
4. 1/2, 1/3, 1/4, 1/5, 1/6, 1/8, 1/9, 1/10, 1/12, 1/15, 1/20
1/6
5. 2, 3, 4, 5, 6, 7, 8, 9, 10, 12
6, 12
6. 2, 4, 8, 12, 16, 20, 24, 28, 32, 36
2, 4
7.–8. Answers will vary.

Page 114
1. a. 2, 3, 4, 5, 6, 8, 9, 12, 13, 14, 15, 17, 19, 28
   b. 3, 5, 6, 8, 9, 14, 15, 17, 19, 25, 36
   c. 2, 3, 4, 5, 6, 8, 9, 12, 13, 14, 15, 17, 19, 25, 28, 36
   d. 3, 9
   e. 3, 5, 9
   f. 3, 9
2. a. 1, 5, 7, 9, 10, 13, 15, 17, 18, 19, 20, 25, 28
   b. 1, 5, 7, 9, 10, 13, 14, 17, 18, 19, 25, 32
   c. 1, 5, 7, 9, 10, 13, 14, 15, 17, 18, 19, 20, 25, 28, 32
   d. 5, 7
   e. 5, 7, 19
   f. 5, 7
3. a. 5, 10, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110
   b. 5, 10, 15, 25, 35, 45, 50, 55, 80, 90, 100, 110
   c. 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70, 80, 90, 100, 110
   d. 5, 10, 15
   e. 5, 15, 35
   f. 5, 15

4. a. 6, 12, 24, 30, 42, 48, 54, 66, 72, 96
   b. 6, 12, 24, 30, 36, 42, 48, 60, 72, 84, 96, 108
   c. 6, 12, 24, 30, 36, 42, 48, 54, 60, 66, 72, 84, 96, 108
   d. 6, 12, 30
   e. 6, 12
   f. 6, 12

Pages 116–118
Answers will vary.

Pages 120–122
Answers will vary.

Page 124
1. J = 8, A = 3
2. F = 1, I = 6
3. B = 5, F = 1
4. F = 1, G = 2
5. C = 7, J = 8
6. A = 3, C = 7, D = 9
7. H = 4, F = 1
8. B = 5, I = 6
9. D = 9, G = 2, A = 3
10. C = 7, J = 8, B = 5
11. B = 5
12. G = 2, E = 0
13. F = 1
14. A = 3
15. H = 4
16. R = 6, M = 0
17. U = 3, N = 5
18. R = 6, Z = 9, M = 0
19. W = 2, U = 3, X = 4
20. P = 7, Z = 9, Q = 8
21. V = 1, N = 5
22. Q = 8, W = 2, U = 3
23. P = 7, Z = 9, M = 0, V = 1
24. Z = 9, W = 2, U = 3, X = 4
25. Z = 9, M = 0
26. V = 1, M = 0
27. P = 7, Z = 9
28. X = 4, W = 2
29. U = 3, V = 1
30. R = 6, U = 3
31. W = 2
32. Q = 8, X = 4