

## Patterns and Algebra: Patterns and Equations – AP Book 3.2: Unit 11

## AP Book PA3-13

page 31

1.    a)    Pattern A:  
             gap: +2  
             6, 8, 10, 12  
             Pattern B:  
             gap: +3  
             3, 6, 9, 12, 15  
      b)    A: 4, 6, 8, 10, 12  
             Start at 4 and add 2  
             each time.  
             B: 3, 6, 9, 12, 15  
             Start at 3 and add 3  
             each time.  
      c)    A: yes; B: no
2.    a)    Pattern A:  
             gap: -4  
             24, 20, 16  
             Pattern B:  
             gap: -1  
             10, 9, 8  
      b)    A: 24, 20, 16  
             Start at 24 and  
             subtract 4 each time.  
             B: 10, 9, 8  
             Start at 10 and  
             subtract 1 each time.  
      c)    A: 12, 8, 4  
             B: 7, 6, 5
3.    a)    gap: -2  
             10 and subtract 2  
             each time.  
      b)    gap: +3  
             2 and add 3 each  
             time.
4.    a)    Start at 3 and add 2  
             each time.  
      b)    Start at 16 and  
             subtract 3 each time.  
      c)    Start at 1 and add 4  
             each time.
5.    Explanations may vary.  
      Teacher to check.  
      a)    24  
      b)    13  
      c)    26

6. a) 

Step Number	Number of Toothpicks
1	4
2	7
3	10

b) 6 squares or  
6 toothpicks

7. a) 

Step Number	Number of Toothpicks
1	7
2	12
3	17

b) 5 squares or  
5 toothpicks

**BONUS**

14

8. Answers will vary. Teacher to check.

**AP Book PA3-14**

*page 34*

1. b) 30, 32, 34, 36, 38  
c) 49, 47, 45  
d) 80, 77, 74, 71

2. Teacher to check dots on number lines.

b) Start at 61. Add 2 each time.

c) Start at 90. Subtract 10 each time.

d) Start at 105. Add 10 each time.

e) Start at 525. Add 15 each time.

f) Start at 775. Subtract 25 each time.

**BONUS**

Start at 225. Add 25 each time.

3. Teacher to check.

4. Teacher to check number lines.

a) 31, 33, 35 37  
b) 90, 87, 84, 81  
c) 105, 110, 115, 120  
d) 325, 320, 315, 310  
e) 100. 96. 92. 88

- f) 99, 94, 89, 84
- g) 73, 68, 63, 58

## BONUS

yes

5. Answers will vary. Teacher to check.
6. a) A: 3, 5, 7  
B: 1, 4, 7  
b) Teacher to check.
7. Teacher to check number line.
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## AP Book PA3-15

page 37

1. a) 11, 1  
b) Start at 5 and add 10 each time  
c) Answers will vary. Teacher to check.  
d) Teacher to check.
2. a) Start at 10 and add 9 each time.  
b) Start at 3 and add 11 each time.  
c) 9, 18, 27, 36, 45, 54, 63, 72, 81  
d) Teacher to check.  
e) diagonal
3. a) Teacher to check.  
b) column 4 and column 9  
c) 4, 9, 4, 9, 4, 9, 4, 9, 4, 9, 4, 9, 4, 9, 4, 9, 4, 9, 4, 9  
d) 4, 9, then repeat.  
e) yes, no
4. a) 2, 7, 12, 17, 22, 27  
b) 2, 7, 2, 7, 2, 7  
c) 2, 7, then repeat.  
d) 0, 0, 1, 1, 2, 2  
e) 32, 37, 42, 47  
f) column 2 and column 7  
g) Teacher to check.

5. a) 93, 88, 83, 78, 73, 68  
b) no  
yes  
Every number in the pattern has either a 3 or an 8 in the one's place.
6. a) 7  
14  
21  
28  
b) Teacher to check.  
c) They are all in the Wednesday column.  
d) Answers will vary.  
Teacher to check.  
e) Answers will vary.  
Teacher to check.
7. a) 6  
12  
18  
24  
30  
b) Teacher to check.  
c) On a diagonal starting at 6 and ending at 30.

## AP Book PA3-16

page 40

1.    b)     $3 = 3$   
      c)     $5 = 5$   
      d)     $3 \neq 5$
2.    a)     $=$   
      b)     $2 + 3 = 5$   
      c)     $6 \neq 2 + 3$   
      d)     $7 \neq 3 + 5$   
      e)     $3 + 4 = 7$   
      f)     $2 + 5 \neq 5$   
      g)     $4 + 4 \neq 9$   
      h)     $6 = 4 + 2$
3.    The following equations  
      should be circled.  
      c)     $8 = 6 + 2$   
      d)     $5 \neq 3 + 1$   
      e)     $11 + 5 = 16$   
      f)     $12 + 3 = 15$
4.    C and D should be circled.
5.    c)    F

# Patterns and Algebra:











## Patterns and Equations – AP Book 3.2: Unit 11

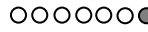


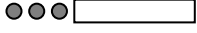


(continued)

- d) T  
e) T  
f) F  
g) T  
h) T  
i) F  
j) F  
k) T  
l) F  
m) T  
n) F  
o) T  
p) F  
q) F  
r) T
- BONUS**
- s) T  
t) F  
u) T

### AP Book PA3-17








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1. b)   
c)   
d)   
e)   
f)   
2. b)   
c)   
d)   
e)   
f)   
3. Teacher to check pictures.  
a) 1

- b) 5  
c) 5  
d) 8
4. a) 1  
b) 7  
c) 5  
d) 4  
e) 12  
f) 13  
g) 6  
h) 8
5. a)  $2 + 5 = 7$   
 $5 + 2 = 7$   
 $7 - 5 = 2$   
 $7 - 2 = 5$   
b)  $3 + 5 = 8$   
 $5 + 3 = 8$   
 $8 - 5 = 3$   
 $8 - 3 = 5$   
c)  $7 + 1 = 8$   
 $1 + 7 = 8$   
 $8 - 1 = 7$   
 $8 - 7 = 1$
6. b)   
 $1 + 6 = 7, 7 - 6 = 1,$   
 $7 - 1 = 6$   
c)   
 $6 - 5 = 1, 1 + 5 = 6,$   
 $5 + 1 = 6$   
d)   
 $9 - 5 = 4, 5 + 4 = 9,$   
 $4 + 5 = 9$
7. b)   
 $10 - 3 = 7$   
c)   
 $8 - 4 = 4$   
d)   
 $5 - 1 = 4$
8. b)  $10 - 3 = 7$   
c)  $11 - 6 = 5$   
d)  $19 - 10 = 9$   
e)  $32 - 21 = 11$   
f)  $95 - 42 = 53$   
g)  $69 - 14 = 55$   
h)  $80 - 36 = 44$

### AP Book PA3-18

page 45

1. b)   
c)   
d)   
2. a)   
b)   
c)   
d)   
3. Teacher to check pictures.  
a) 5  
b) 9  
4. a) 4  
b) 7  
c) 5  
d) 8  
e) 7  
f) 7  
g) 10  
h) 8  
i) 18  
j) 17  
k) 15  
l) 16  
m) 8  
n) 7  
o) 14  
p) 0  
5. b)  $8 + 1 = 9$   
c)  $3 + 10 = 13$   
d)  $4 + 6 = 10$   
e)  $6 + 6 = 12$   
f)  $9 + 4 = 13$   
g)  $7 + 9 = 16$   
h)  $10 + 9 = 19$

- i)  $16 + 6 = 22$   
j)  $23 + 14 = 37$   
k)  $27 + 19 = 46$   
l)  $10 + 75 = 85$   
m)  $21 + 32 = 53$   
n)  $42 + 40 = 82$   
o)  $11 + 61 = 72$   
p)  $50 + 80 = 130$
6. a)  $6 - 4 = 2, 2 + 4 = 6,$   
 $4 + 2 = 6$   
b)  $10 - 3 = 7,$   
 $3 + 7 = 10,$   
 $7 + 3 = 10$
7. b)  $12 - 5 = 7$   
c)  $17 - 8 = 9$
8. b)  $9 - 4 = 5$   
c)  $10 - 2 = 8$   
d)  $12 - 5 = 7$   
e)  $14 - 6 = 8$   
f)  $17 - 10 = 7$   
g)  $32 - 25 = 7$   
h)  $54 - 26 = 28$   
i)  $97 - 17 = 80$
9. a) 55  
b) 2  
c) 85  
d) 10  
e) 8  
f) 49  
g) 41  
h) 55  
i) 28
- BONUS**
- j) 49  
k) 100  
l) 100

### AP Book PA3-19

page 48

1. a)  $x + 35 = 70$   
b)  $24 = x - 6$   
c)  $x = 7 + 59$
2. a)  $45 = 90 - y$   
b)  $102 = y + 6$   
c)  $97 - 69 = y$
3. b)  $24 - 6 = 18$   
18

# Patterns and Algebra:

## Patterns and Equations – AP Book 3.2: Unit 11

(continued)

- c)  $15 - 7 = 8$   
8
- d)  $28 + 10 = 38$   
38
- e)  $24 - 6 = 18$   
18
- f)  $35 + 7 = 42$   
42

4. 1 number, because  
 $12 - 5 = 7$ .

5. b)  $28 + n = 70$   
 $70 - 28 = 42$   
 $n = 42$
- c)  $x - 10 = 39$   
 $39 + 10 = 49$   
 $x = 49$
- d)  $25 = b - 15$   
 $25 + 15 = 40$   
 $b = 40$
- e)  $p + 12 = 28$   
 $28 - 12 = 16$   
 $p = 16$

### BONUS

- $40 - a = 20$   
 $40 - 20 = 20$   
 $a = 20$
6. a)  $44 - \text{☺} = 20$
- b)  $25 - 6 = \text{☺}$
- c)  $35 = 7 + \text{☺}$
7. a)  $? = 8 + 10$   
18
- b)  $\text{☆} = 13 - 8$   
5
- c)  $\text{☺} = 11 + 7$   
18
- d)  $? = 29 - 19$   
10
- e)  $\text{☾} = 50 - 25$   
25

### BONUS

$$\text{▽} = 75 - 75$$
$$0$$

### BONUS

Yes. Any number plus zero  
is equal to that number.