

Looking for a Pattern

EXAMPLES

1 Find the missing numbers in the number patterns.


(a) 1, 2, 4, 8, 16, (), (), ...

(b) 1, 4, 9, 16, (), (), ...


(c) 2, 6, 12, 20, 30, (), (), ...


(d) 1, 4, 7, 10, 13, (), (), ...

Solution:

(a) 1, 2, 4, 8, 16, **32**, **64**, ...


(b) 1, 4, 9, 16, **25**, **36**, ...
 $1 = 1 \times 1$ $16 = 4 \times 4$
 $4 = 2 \times 2$ $25 = 5 \times 5$
 $9 = 3 \times 3$ $36 = 6 \times 6$

(c) 2, 6, 12, 20, 30, **42**, **56**, ...


(d) 1, 4, 7, 10, 13, **16**, **19**, ...


2 Find the missing numbers in the number patterns.

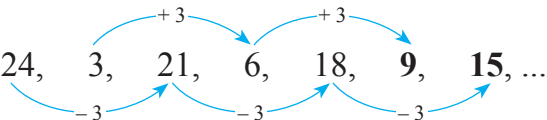
(a) 24, 3, 21, 6, 18, (), (), ...

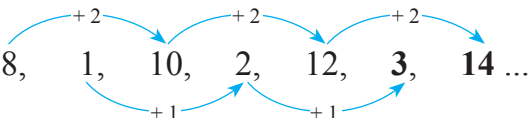
(b) 8, 1, 10, 2, 12, (), () ...

(c) 28, 2, 24, 4, 20, (), (), ...

(d) 1, 8, 3, 10, 5, 12, (), (), ...

Solution:

(a) 24, 3, 21, 6, 18, **9**, **15**, ...


(b) 8, 1, 10, 2, 12, **3**, **14** ...


Adapted:

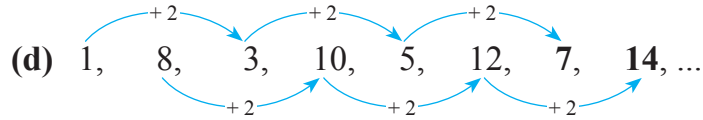
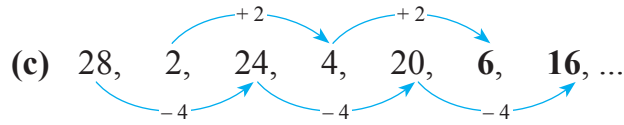
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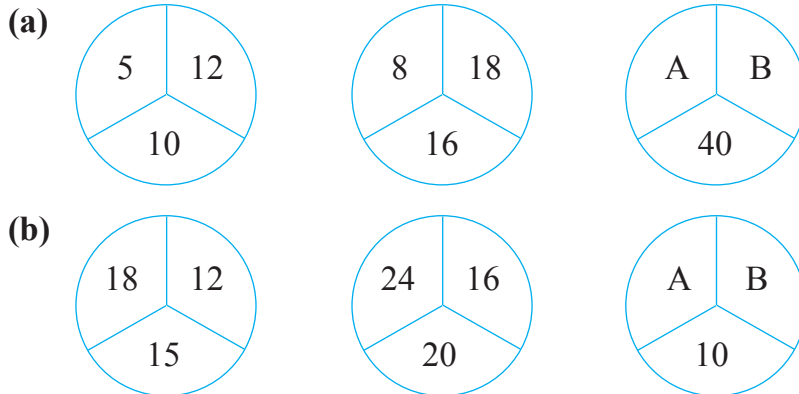
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3 Find the missing numbers in the number patterns.



Solution:

(a) $5 \times 2 = 10$
 $10 + 2 = 12$

$8 \times 2 = 16$
 $16 + 2 = 18$

$A \times 2 = 40$
 $A = 20$

$40 + 2 = B$
 $B = 42$

(b) $18 - 3 = 15$
 $15 - 3 = 12$

$24 - 4 = 20$
 $20 - 4 = 16$

$A - 5 = 10$
 $A = 15$

$10 - 5 = B$
 $B = 5$

4 Which of the following patterns is not the same as the rest?

(a) 2, 2, 4, 6, 10, 16, 26, ...

(b) 1, 1, 2, 3, 5, 8, 13, ...

(c) 1, 4, 7, 10, 13, 16, 19, ...

Solution:

Pattern (c) is not the same as patterns (a) and (b).

In patterns (a) and (b), each term is the sum of the two preceding terms.

In pattern (c), each term is added by 3.

PRACTICE

1 Find the missing numbers in each number pattern.

(a) 5, 6, 10, 12, 15, 18, (), (), ...

(b) 6, 9, 13, 18, 24, (), (), ...

(c) 1, 3, 9, 27, (), (), ...

(d) 1, 3, 6, 8, 16, 18, (), (), ...

2 Find the missing numbers in the Pascal Triangle.

				1					
			1		1				
		1		2		1			
	1		3		3		1		
	1		4		6		4		1
1	()	()	()	()	()	()	()	1	

Adapted:

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3 Find the missing numbers.

(a)

3	12
11	6

7	28
14	9

6	A
12	B

(b)

4	11
1	8

8	6
9	A

10	6
B	12

4 Find the missing numbers by filling in the correct answers.

(a)

1	2	3	6
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4	5	6	15
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7	8	9	
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(b)

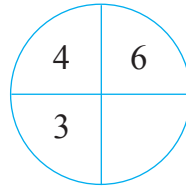
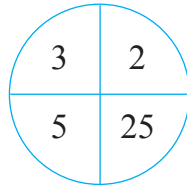
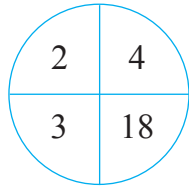
7	4	5	15
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8	6	10	20
---	---	----	----

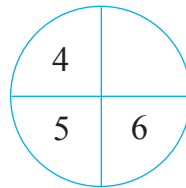
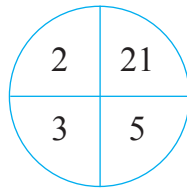
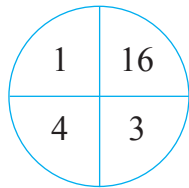
9	5	8	
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5 Find the missing numbers by filling in the correct answers.

(a)



(b)



6 Find the missing numbers in each pattern shown below.

(a) 2, 2, 4, 8, 14, (), (), ...

(b) 2, 2, 4, 6, 10, (), (), ...

(c) 2, 4, 12, 48, (), (), ...

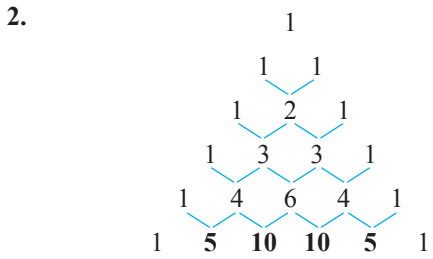
(d) 5, 3, 10, 4, 15, (), (), ...

Solutions:

Looking for a Pattern

- 1.
- (a) $5, 6, 10, 12, 15, 18, 20, 24, \dots$
- (b) $6, 9, 13, 18, 24, 31, 39, \dots$
- (c) $1, 3, 9, 27, 81, 243, \dots$
- (d) $1, 3, 6, 8, 16, 18, 36, 38, \dots$

6. (a) $2, 2, 4, 8, 14, 22, 32, \dots$
- (b) $2, 2, 4, 6, 10, 16, 26, \dots$
 Each term is the sum of the two preceding terms.
- (c) $2, 4, 12, 48, 240, 1440, \dots$
- (d) $5, 3, 10, 4, 15, 5, 20, \dots$



3. (a) $3 \times 4 = 12$ $11 - 6 = 5$
 $7 \times 4 = 28$ $14 - 9 = 5$
 $6 \times 4 = A$ $12 - B = 5$
A = 24 **B = 7**
- (b) $4 + 8 = 1 + 11 = 12$
 $8 + A = 9 + 6 = 15$ **A = 7**
 $10 + 12 = 22 = B + 6$ **B = 16**
4. (a) $1 + 2 + 3 = 6$
 $4 + 5 + 6 = 15$
 $7 + 8 + 9 = 24$
- (b) $7 - 4 = 3$ $3 \times 5 = 15$
 $8 - 6 = 2$ $2 \times 10 = 20$
 $9 - 5 = 4$ $4 \times 8 = 32$
5. (a) $2 + 4 = 6$ $3 \times 6 = 18$
 $3 + 2 = 5$ $5 \times 5 = 25$
 $4 + 6 = 10$ $3 \times 10 = 30$
- (b) $1 + 3 = 4$ $4 \times 4 = 16$
 $2 + 5 = 7$ $3 \times 7 = 21$
 $4 + 6 = 10$ $5 \times 10 = 50$