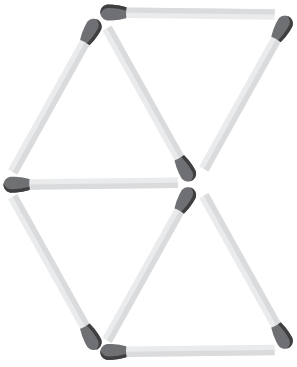
Fully-worked Solutions

Practice 1

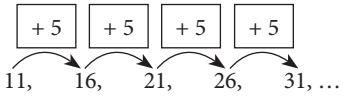
Formative Practice

1 3, 5, 7, 9, …



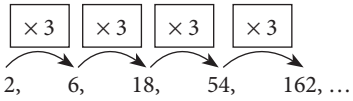
Answer: **A**

2 (a)



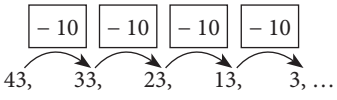
Pattern: Add 5 to its previous number.

(b)



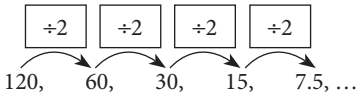
Pattern: Multiply 3 to its previous number.

(c)



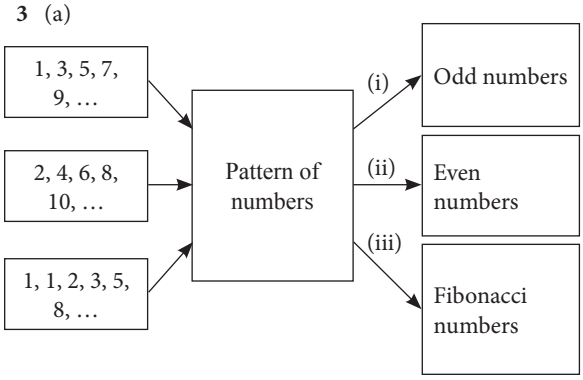
Pattern: Subtract 10 from its previous number.

(d)

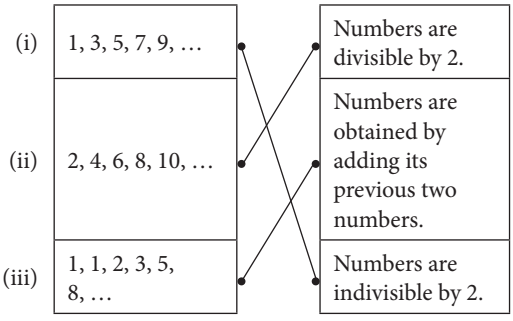


Pattern: Divide 2 to its previous number.

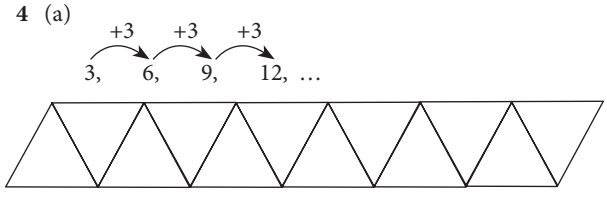
3 (a)



(b)

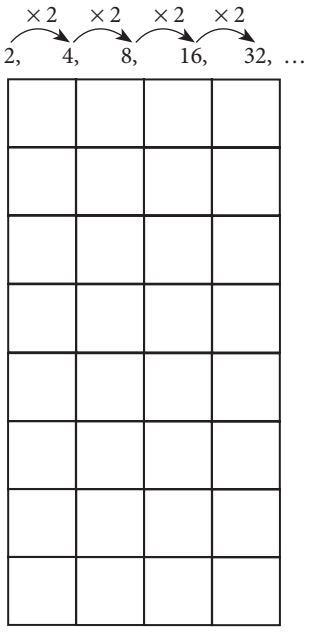


4 (a)



(i) ✓

(b)



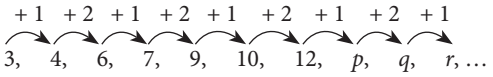
(ii) ✓

5

1 1
1 *a* 1
1 *b* *c* 1
1 *d* *e* *f* 1
1 5 10 10 5 1

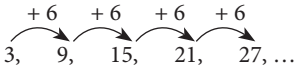
$a = 1 + 1 = 2$
$b = 1 + 2 = 3$
$c = 2 + 1 = 3$
$d = 1 + 3 = 4$
$e = 3 + 3 = 6$
$f = 3 + 1 = 4$

6



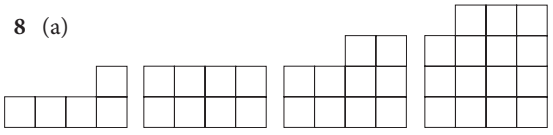
$p = 12 + 1 = 13$
$q = 13 + 2 = 15$
$r = 15 + 1 = 16$

7



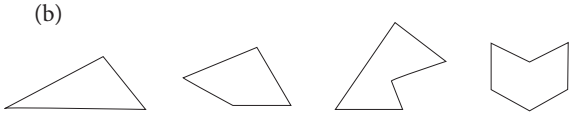
Answer: **B**

8 (a)



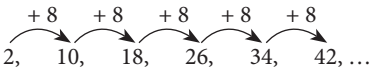
5, 8, 10, 15, … is not a sequence.
The number of squares does not vary in a certain pattern.

(b)

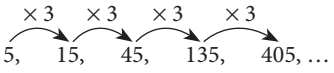


3, 4, 5, 6, … is a sequence.
The number of sides of a polygon increases by 1 to its previous polygon.

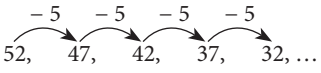
9 (a)



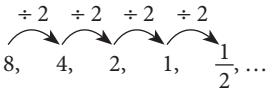
(b)



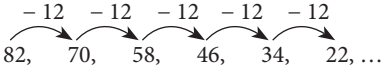
(c)



(d)

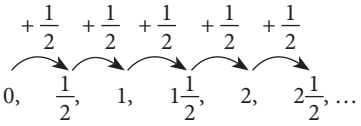


10 (a)



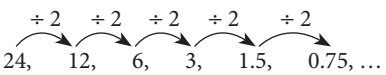
Subtract 12 from its previous number.

(b)



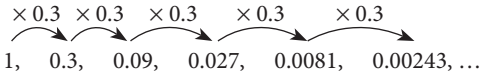
Add $\frac{1}{2}$ to its previous number.

(c)



Divide 2 to its previous number.

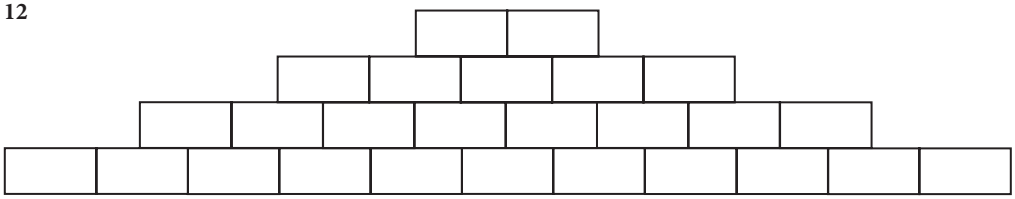
(d)



Multiply 0.3 to its previous number.

11 $22 = 13(1) + 9$
$35 = 13(2) + 9$
$48 = 13(3) + 9$
$61 = 13(4) + 9$
⋮
$T_n = 13n + 9, n = 1, 2, 3, 4, \ldots$
Answer: **B**

12



(a) $\overset{+3}{\rightarrow}\ \overset{+3}{\rightarrow}\ \overset{+3}{\rightarrow}\ \overset{+3}{\rightarrow}$

2, 5, 8, 11, 14, …

The number of bricks on the fifth row is 14.

(b) (i) 2, 5, 8, 11, …

(ii) Row 1 has 2 bricks. Its subsequent row has 3 bricks more than its previous row.

(iii) $2 = 3(1) - 1$
$5 = 3(2) - 1$
$8 = 3(3) - 1$
$11 = 3(4) - 1$
$\vdots$
$T_n = 3n - 1,\ n = 1, 2, 3, 4, \ldots$

13 (a) $3 = 5(1) - 2$
$8 = 5(2) - 2$
$13 = 5(3) - 2$
$18 = 5(4) - 2$
$23 = 5(5) - 2$

(b) $T_n = 5n - 2,\ n = 1, 2, 3, 4, \ldots$

14 (a) $T_1 = 17 = 4 \times 1 + 13$
$T_2 = 21 = 4 \times 2 + 13$
$T_3 = 25 = 4 \times 3 + 13$
$T_n = 4 \times n + 13,\ n = 1, 2, 3, 4, ...$

(b) (i) $T_{17} = 4 \times 17 + 13$
$= 68 + 13$
$= 81$

(ii) $T_{45} = 4 \times 45 + 13$
$= 180 + 13$
$= 193$

15 (a) $\overset{+24}{\rightarrow}\ \overset{+24}{\rightarrow}\ \overset{+24}{\rightarrow}\ \overset{+24}{\rightarrow}$

65, 89, 113, 137, x

$x = 137 + 24$
$= 161$

Bag 5 contains 161 marbles.

(b) $65 = 24 \times 1 + 41$
$89 = 24 \times 2 + 41$
$113 = 24 \times 3 + 41$
$137 = 24 \times 4 + 41$
$\vdots$
$T_n = 24 \times n + 41,\ n = 1, 2, 3, 4, ...$

(c) (i) $T_{16} = 24 \times 16 + 41$
$= 384 + 41$
$= 425$

(ii) $T_n = 24 \times n + 41$
$1\,313 = 24 \times n + 41$
$1\,272 = 24n$
$n = 53$

Summative Practice

1 $\overset{+4}{\rightarrow}\ \overset{+4}{\rightarrow}\ \overset{+4}{\rightarrow}\ \overset{+4}{\rightarrow}\ \overset{+4}{\rightarrow}\ \overset{+4}{\rightarrow}$

25, 29, 33, 37, m, n, 49, …

$m = 37 + 4$
$= 41$
$n = 41 + 4$
$= 45$
$m + n = 41 + 45$
$= 86$

Answer: **C**

2 $\overset{-20}{\rightarrow}\ \overset{-20}{\rightarrow}\ \overset{-20}{\rightarrow}\ \overset{-20}{\rightarrow}\ \overset{-20}{\rightarrow}$

150, 130, 110, 90, 70, 50, …

The next two numbers are 70 and 50.
$70 + 50 = 120$

Answer: **D**

3 $\overset{\times 3}{\rightarrow}\ \overset{\times 3}{\rightarrow}\ \overset{\times 3}{\rightarrow}\ \overset{\times 3}{\rightarrow}\ \overset{\times 3}{\rightarrow}$

1, 3, 9, 27, 81, p, …

$p = 81 \times 3$
$= 243$

Answer: **B**

4 $\overset{+7}{\rightarrow}\ \overset{+14}{\rightarrow}\ \overset{+21}{\rightarrow}\ \overset{+28}{\rightarrow}\ \overset{+35}{\rightarrow}$

−41, −34, −20, 1, k, 64, …

$k = 1 + 28$
$= 29$

Answer: **B**

5 7, 14, 21, 28, 35, …
$= 7(1), 7(2), 7(3), 7(4), 7(5), \ldots$
The 15^{th} term
$= 7(15)$
$= 105$

Answer: **C**

6 (a) $T_1 = 2 = 7 \times 1 - 5$
$T_2 = 9 = 7 \times 2 - 5$
$T_3 = 16 = 7 \times 3 - 5$
$T_4 = 23 = 7 \times 4 - 5$
$\vdots$
$T_n = 7 \times n - 5$, $n = 1, 2, 3, 4, \ldots$

(b) $T_{10} = 7 \times 10 - 5$
$= 65$
$T_{20} = 7 \times 20 - 5$
$= 135$
$T_{50} = 7 \times 50 - 5$
$= 345$

7 $T_1 = 74 = 82 - 8 \times 1$
$T_2 = 66 = 82 - 8 \times 2$
$T_3 = 58 = 82 - 8 \times 3$
$T_4 = 50 = 82 - 8 \times 4$
$\vdots$
$T_n = 82 - 8 \times n$, $n = 1, 2, 3, 4, \ldots$
$T_8 = 82 - 8 \times 8$
$= 18$
$T_{36} = 82 - 8 \times 36$
$= -206$

8 (a)

Number of squares	Number of circles	Pattern
1	4	$2 \times \boxed{1} + 2$
2	6	$2 \times \boxed{2} + 2$
3	8	$2 \times \boxed{3} + 2$
4	10	$2 \times \boxed{4} + 2$

(b) $T_n = 2n + 2$, $n = 1, 2, 3, 4, \ldots$

(c) (i) When $n = 25$, $T_n = 2(25) + 2$
$= 52$

(ii) $T_n = 70$
$2n + 2 = 70$
$2n = 68$
$n = 34$