Chapter 4. Graphing Relations and Functions

Ex. 4.7

Answer 1CU.

If *d* is the common difference of an arithmetic sequence, then the sequence can be written as

$a_1, a_1 + d, a_2 + d, a_3 + d, \ldots$,

where a_1 is the first term, a_2 is the second term, a_3 is the third term, and so on.

The object is to write an arithmetic sequence, whose common difference is $-10.$

Take $a_1 = 4 \text{ and } d = -10$, then the second term is

$$a_2 = a_1 + d$$
$$a_2 = 4 + (-10)$$
$$a_2 = -6$$

The third term of the sequence is

$$a_3 = a_2 + d$$
$$a_3 = -6 + (-10)$$
$$a_3 = -16$$

The fourth term of the sequence is

$$a_4 = a_3 + d$$
$$a_4 = -16 + (-10)$$
$$a_4 = -26$$

Therefore, an arithmetic sequence, with common difference -10 is

$$\boxed{4, -6, -16, -26, \ldots}$$

Answer 1RM.

The inductive reasoning involves going from a series of specific cases to a general statement. The conclusion in an inductive argument is never guaranteed. Whereas deductive reasoning is a type of logic in which one goes from a general statement to a specific instance.

The example of deductive reasoning is

All postgraduate students are over 6 feet tall.

Mrs. S is a postgraduate.

Therefore,

Mrs. S is over 6 feet tall.

The example of inductive reasoning is

What is the next term of the sequence $2, 4, 6, \dots$

There are more than one correct answer to the above statement.

Answer 2CU.

If *d* is the common difference of an arithmetic sequence, then the sequence can be written as

$a_1, a_1 + d, a_2 + d, a_3 + d, \dots$,

where a_1 is the first term, a_2 is the second term, a_3 is the third term, and so on.

Consider a sequence defined by

$a_n = 5n + 12$

The first term of the sequence can be obtained by substituting $n = 1$ in $a_n = 5n + 12$.

$$\begin{aligned} a_1 &= 5(1) + 12 && \text{Replace } n \text{ by } 1 \\ a_1 &= 17 && \text{Simplify} \end{aligned}$$

Thus, the first term of the sequence is $\boxed{17}$.

The second term of the sequence can be obtained by substituting $n = 2$ in $a_n = 5n + 12$.

$$\begin{aligned} a_2 &= 5(2) + 12 && \text{Replace } n \text{ by } 2 \\ a_2 &= 22 && \text{Simplify} \\ a_1 + d &= 22 && a_2 = a_1 + d \\ 17 + d &= 22 && a_1 = 17 \\ d &= 5 && \text{Solve for } d \end{aligned}$$

Therefore, the common difference of given arithmetic sequence is $\boxed{5}$

Answer 2RM.

Mr. S came to a conclusion about a murderer's height by applying a general rule of the relationship between a man's height and the distance between his footprints.

Since Mr. S is applying a general rule about men's heights to a specific case, so the type of reasoning use by Mr. S is $\boxed{\text{Deductive reasoning}}$.

Answer 3CU.

In an arithmetic sequence the common difference is defined by the difference between two consecutive terms.

Consider an arithmetic sequence

$$-44, -32, -20, -8$$

The differences between two consecutive numbers in the sequence

$$-32-(-44)=12$$
$$-20-(-32)=12$$
$$-8-(-20)=12$$

It can be observed that the differences are constant and equal to 12.

Therefore, the calculation done by Marisela is correct and the error made by Richard was **that the he was taken the difference in the reverse order.**

Answer 3RM.

In an arithmetic sequence the common difference is defined by the difference between two consecutive terms. That is, if $a_1, a_2, a_3, \ldots, a_n$ is an arithmetic sequence then the difference $a_2 - a_1, a_3 - a_2, \ldots, a_n - a_{n-1}$ is equal to a same number *d*.

So, to examine whether a sequence of numbers is arithmetic or not find the common difference. If the common difference is equal to a same number, then the sequence is arithmetic.

Answer 4CU.

A sequence $a_1, a_2, a_3, \ldots, a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2 - a_1, a_3 - a_2, \ldots, a_n - a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Consider a sequence

$$24, 16, 8, 0, \ldots$$

The differences between two consecutive numbers in the sequence

$$16-24=-8$$
$$8-16=-8$$
$$0-8=-8$$

It can be observed that the differences are constant and equal to -8.

Therefore, the sequence $24, 16, 8, 0, \ldots$ is $\boxed{\text{an arithmetic sequence}}$.

Answer 4RM.

In an arithmetic sequence the common difference is defined by the difference between two consecutive terms. That is, if $a_1, a_2, a_3, \ldots, a_n$ is an arithmetic sequence then the difference $a_2 - a_1, a_3 - a_2, \ldots, a_n - a_{n-1}$ is equal to a same number *d*.

In the arithmetic sequence, after finding the common difference the *n*th term can be obtained by using the following formula.

$$a_n = a_1 + (n-1)d$$

where a_1 is the first term and d is the common difference.

Replacing *n* by 100, the 100th term can be found.

Answer 5CU.

A sequence $a_1, a_2, a_3, \ldots, a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2 - a_1, a_3 - a_2, \ldots, a_n - a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Consider a sequence

$$3, 6, 12, 24, \ldots$$

The differences between two consecutive numbers in the sequence

$$6 - 3 = 3$$
$$12 - 6 = 6$$
$$24 - 12 = 12$$

It can be observed that the difference between the terms is not constant.

Therefore, the sequence $3, 6, 12, 24, \ldots$ is $\boxed{\text{not an arithmetic sequence}}$.

Answer 5RM.

(a)

Consider the following table

3^1	3^2	3^3	3^4	3^5	3^6	3^7	3^8	3^9
3	9	27						

The object is to complete the table.

It can be observed that in the second row of the table consists of powers of 3.

The values of 3^x for $x = 1, 2, \ldots, 9$ are

$3^1 = 3$ $\quad$ $3^5 = 243$ $\quad$ $3^9 = 19,683$

$3^2 = 9$ $\quad$ $3^6 = 729$

$3^3 = 27$ $\quad$ $3^7 = 2187$

$3^4 = 81$ $\quad$ $3^8 = 6561$

The complete table is

3^1	3^2	3^3	3^4	3^5	3^6	3^7	3^8	3^9
3	9	27	81	243	729	2187	6561	19,683

(b)

Consider the numbers

$3.9, 27, 81, 243, 729, 2187, 6561, 19683$

The sequence of numbers representing the numbers in the ones place is

$\boxed{3, 9, 7, 1, 3, 9, 7, 1, 3, \ldots}$

(c)

Consider the sequence of numbers in ones place of $3^1, 3^2, 3^3, \ldots$

$3, 9, 7, 1, 3, 9, 7, 1, 3, \ldots$

The number 1 is in the ones place of $3^4, 3^8, \ldots$.

Thus in the pattern $3^1, 3^2, 3^3, \ldots$ all the powers exponents divisible by 4 have 1 in the ones place.

Since 100 is divisible by 4, so the number in the ones place for the value of 3^{100} is $\boxed{1}$.

The type of reasoning that used here is $\boxed{\text{Inductive reasoning}}$, because here the conclusion was based on a given pattern.

Answer 6CU.

Consider an arithmetic sequence

$7, 14, 21, 28, \ldots$

The object is to find the next three terms of the sequence.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$14 - 7 = 7$$
$$21 - 14 = 7$$
$$28 - 21 = 7$$

It can be observed that the difference between the terms is constant and equal to 7.

Therefore, the common difference is 7.

The next three term of the sequence $7,14,21,28,\ldots$ can be obtained by adding the common difference 7 to the last term 28 and continue adding 7 until the next terms are found.

$$28+7=35$$
$$35+7=42$$
$$42+7=49$$

Hence, the next three terms of the given arithmetic sequence are $\boxed{35,42,49}$

Answer 6RM.

The inductive reasoning involves going from a series of specific cases to a general statement. The conclusion in an inductive argument is never guaranteed. Whereas deductive reasoning is a type of logic in which one goes from a general statement to a specific instance.

Consider a statement

"A sequence contains all numbers less than 50 that are divisible by 5"

The conclusion is

"35 is in the sequence"

The above statement is example of $\boxed{\text{deductive reasoning}}$, because this statement goes from a general statement to a specific instance.

Consider a statement

"A sequence contains all numbers less than 50 that are divisible by 5"

The conclusion is

"35 is in the sequence"

The above statement is example of $\boxed{\text{deductive reasoning}}$, because this statement goes from a general statement to a specific instance.

Answer 7CU.

Consider an arithmetic sequence

$$34,29,24,19,\ldots$$

The object is to find the next three terms of the sequence.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$29-34=-5$$
$$24-29=-5$$
$$19-24=-5$$

It can be observed that the difference between the terms is constant and equal to -5.

Therefore, the common difference is -5.

The next three term of the sequence $34, 29, 24, 19, \ldots$ can be obtained by adding the common difference -5 to the last term 19 and continue adding -5 until the next terms are found.

$$19 + (-5) = 14$$
$$14 + (-5) = 9$$
$$9 + (-5) = 4$$

Hence, the next three terms of the given arithmetic sequence are $\boxed{14, 9, 4}$

Answer 8CU.

Consider an arithmetic sequence

$$a_1 = 3, d = 4, n = 8$$

The object is to find the 8th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_8 = 3 + (8-1)4$	$a_1 = 3, d = 4, n = 8$
$a_8 = 3 + 28$	Simplify
$a_8 = 31$	Add

Hence, the 8th term of the sequence is $\boxed{31}$

Answer 9CU.

Consider an arithmetic sequence

$$a_1 = 10, d = -5, n = 21$$

The object is to find the 21st term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{21} = 10 + (21-1)(-5)$	$a_1 = 10, d = -5, n = 21$
$a_{21} = 10 - 100$	Simplify
$a_{21} = -90$	Add

Hence, the 21st term of the sequence is $\boxed{-90}$

Answer 10CU.

Consider an arithmetic sequence

$$23, 25, 27, 29, \ldots$$

The object is to find the 12th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$25 - 23 = 2$$
$$27 - 25 = 2$$
$$29 - 27 = 2$$

It can be observed that the difference between the terms is constant and equal to 2.

Therefore, the common difference is 2.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{12} = 23 + (12-1)2$	$a_1 = 23, d = 2, n = 12$
$a_{12} = 23 + 22$	Simplify
$a_{12} = 45$	Add

Hence, the 12th term of the sequence is $\boxed{45}$

Answer 11CU.

Consider an arithmetic sequence

$$-27, -19, -11, -3, \ldots$$

The object is to find the 17th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$-19 - (-27) = 8$$
$$-11 - (-19) = 8$$
$$-3 - (-11) = 8$$

It can be observed that the difference between the terms is constant and equal to 8.

Therefore, the common difference is 8.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{17} = -27 + (17-1)8$	$a_1 = -27, d = 8, n = 17$
$a_{17} = -27 + 128$	Simplify
$a_{17} = 101$	Add

Hence, the 17th term of the sequence is $\boxed{101}$

Answer 12CU.

Consider an arithmetic sequence

$$6, 12, 18, 24, \ldots$$

The object is to find the *n*th term of the sequence and graphing the first five terms of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$12 - 6 = 6$$
$$18 - 12 = 6$$
$$24 - 18 = 6$$

It can be observed that the difference between the terms is constant and equal to 6.

Therefore, the common difference is 6 and the first term is $a_1 = 6$

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_n = 6 + (n-1)6$	$a_1 = 6, d = 6$
$a_n = 6 + 6n - 6$	Distributive Property
$a_n = 6n$	Simplify

Hence, the *n*th term of the sequence is $\boxed{6n}$

The first five terms of the sequence $a_n = 6n, d = 6$ are given in the following table.

n	$6n$	a n	(n, an)
1	6(1)	6	$(1,6)$
2	6(2)	12	$(2,12)$
3	6(3)	18	$(3,18)$
4	6(4)	24	$(4,24)$
5	6(5)	30	$(5,30)$

Answer 13CU.

Consider an arithmetic sequence

$12, 17, 22, 27, \ldots$

The object is to find the nth term of the sequence and graphing the first five terms of the sequence.

The nth term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where n is the number of the term you want to find, a_1 is the first, and d is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$17 - 12 = 5$$
$$22 - 17 = 5$$
$$27 - 22 = 5$$

It can be observed that the difference between the terms is constant and equal to 5.

Therefore, the common difference is 5 and the first term is $a_1 = 12.$

Using the formula for the nth term of an arithmetic sequence

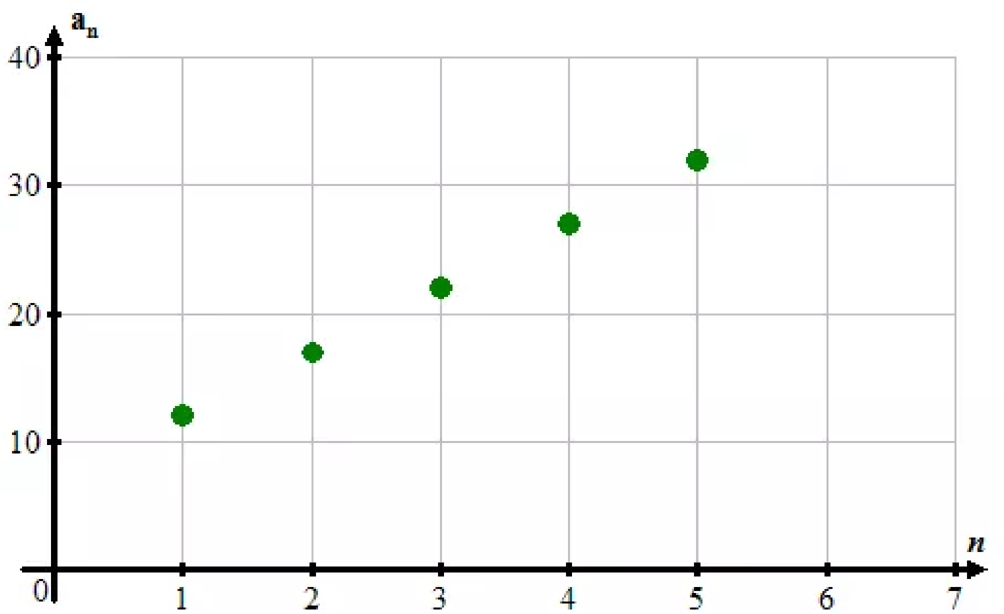
$a_n = a_1 + (n-1)d$	Formula for nth term
$a_n = 12 + (n-1)5$	$a_1 = 12, d = 5$
$a_n = 12 + 5n - 5$	Distributive Property
$a_n = 5n + 7$	Simplify

Hence, the nth term of the sequence is $\boxed{5n+7}$

The first five terms of the sequence $a_n = 5n + 7, d = 5$ are given in the following table.

n	$5n+7$	a n	(n, an)
1	5(1)+7	12	$(1,12)$
2	5(2)+7	17	$(2,17)$
3	5(3)+7	22	$(3,22)$
4	5(4)+7	27	$(4,27)$
5	5(5)+7	32	$(5,32)$

The graph of the first five terms of the sequence is



Answer 14CU.

The time spent by L for walking each day of the first week is 20 minutes.

Each week thereafter, she has increased her walking by 7 minutes a day.

The sequence of time spent by L for walking is an arithmetic sequence with $a_1 = 20, d = 7$.

Using the formula for the nth term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_n = 20 + (n-1)7$	$a_1 = 20, d = 7$
$a_n = 20 + 7n - 7$	Distributive Property
$a_n = 7n + 13$	Simplify

Hence, the nth term of the sequence is $7n + 13$

The first seven terms of the sequence are given in the following table.

n	$7n+13$	a_n
1	7(1)+13	20
2	7(2)+13	27
3	7(3)+13	34
4	7(4)+13	41
5	7(5)+13	48
6	7(6)+13	55
7	7(7)+13	62

Hence, in the $\boxed{\text{7th week}}$ L will spend more than 1 hour (60 minutes) a day.

Answer 15PA.

A sequence $a_1, a_2, a_3, \ldots, a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2 - a_1, a_3 - a_2, \ldots, a_n - a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Consider a sequence

$$7, 6, 5, 4, \ldots$$

The differences between two consecutive numbers in the sequence

$$6 - 7 = -1$$
$$5 - 6 = -1$$
$$4 - 5 = -1$$

It can be observed that the differences are constant and equal to -1.

Therefore, the sequence $7, 6, 5, 4, \ldots$ is $\boxed{\text{an arithmetic sequence}}$.

Answer 16PA.

A sequence $a_1, a_2, a_3, \ldots, a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2 - a_1, a_3 - a_2, \ldots, a_n - a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Consider a sequence

$$10, 12, 15, 18, \ldots$$

The differences between two consecutive numbers in the sequence

$$12 - 10 = 2$$
$$15 - 12 = 3$$
$$18 - 15 = 3$$

It can be observed that the difference between the terms is not constant.

Therefore, the sequence $10, 12, 15, 18, \ldots$ is $\boxed{\text{not an arithmetic sequence}}$.

Answer 17PA.

A sequence $a_1, a_2, a_3, \ldots, a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2 - a_1, a_3 - a_2, \ldots, a_n - a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Consider a sequence

$$9, 5, -1, -5, \ldots$$

The differences between two consecutive numbers in the sequence

$$5 - 9 = -4$$
$$-1 - 5 = -6$$
$$-5 - (-1) = -4$$

It can be observed that the difference between the terms is not constant.

Therefore, the sequence $9, 5, -1, -5, \ldots$ is $\boxed{\text{not an arithmetic sequence}}$.

Answer 18PA.

A sequence $a_1, a_2, a_3, \ldots, a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2 - a_1, a_3 - a_2, \ldots, a_n - a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Consider a sequence

$$-15,-11,-7,-3,\ldots$$

The differences between two consecutive numbers in the sequence

$$-11-(-15)=4$$
$$-7-(-11)=4$$
$$-3-(-7)=4$$

It can be observed that the differences are constant and equal to 4.

Therefore, the sequence $-15,-11,-7,-3,\ldots$ is $\boxed{\text{an arithmetic sequence}}$.

Answer 19PA.

A sequence $a_1,a_2,a_3,\ldots,a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2-a_1,a_3-a_2,\ldots,a_n-a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Answer 20PA.

A sequence $a_1,a_2,a_3,\ldots,a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2-a_1,a_3-a_2,\ldots,a_n-a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Consider a sequence

$$2.1,4.2,8.4,17.6,\ldots$$

The differences between two consecutive numbers in the sequence

$$4.2-2.1=2.1$$
$$8.4-4.2=4.2$$
$$17.6-8.4=9.2$$

It can be observed that the difference between the terms is not constant.

Therefore, the sequence $2.1,4.2,8.4,17.6,\ldots$ is $\boxed{\text{not an arithmetic sequence}}$.

Answer 21PA.

Consider an arithmetic sequence

$$4,7,10,13,\ldots$$

The object is to find the next three terms of the sequence.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$7-4=3$$
$$10-7=3$$
$$13-10=3$$

It can be observed that the difference between the terms is constant and equal to 3.

Therefore, the common difference is 3.

The next three term of the sequence $4, 7, 10, 13, \ldots$ can be obtained by adding the common difference 3 to the last term 13 and continue adding 3 until the next terms are found.

$$13 + 3 = 16$$
$$16 + 3 = 19$$
$$19 + 3 = 22$$

Hence, the next three terms of the given arithmetic sequence are $\boxed{16, 19, 22}$.

Answer 22PA.

Consider an arithmetic sequence

$$18, 24, 30, 36, \ldots$$

The object is to find the next three terms of the sequence.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$24 - 18 = 6$$
$$30 - 24 = 6$$
$$36 - 30 = 6$$

It can be observed that the difference between the terms is constant and equal to 6.

Therefore, the common difference is 6.

The next three term of the sequence $18, 24, 30, 36, \ldots$ can be obtained by adding the common difference 6 to the last term 36 and continue adding 6 until the next terms are found.

$$36 + 6 = 42$$
$$42 + 6 = 48$$
$$48 + 6 = 54$$

Hence, the next three terms of the given arithmetic sequence are $\boxed{42, 48, 54}$.

Answer 23PA.

Consider an arithmetic sequence

$$-66, -70, -74, -78, \ldots$$

The object is to find the next three terms of the sequence.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$-70 - (-66) = -4$$
$$-74 - (-70) = -4$$
$$-78 - (-74) = -4$$

It can be observed that the difference between the terms is constant and equal to -4.

Therefore, the common difference is -4.

The next three term of the sequence $-66,-70,-74,-78,\ldots$ can be obtained by adding the common difference -4 to the last term -78 and continue adding -4 until the next terms are found.

$$-78+(-4)=-82$$
$$-82+(-4)=-86$$
$$-86+(-4)=-90$$

Hence, the next three terms of the given arithmetic sequence are $\boxed{-82,-86,-90}$.

Answer 24PA.

Consider an arithmetic sequence

$$-31,-22,-13,-4,\ldots$$

The object is to find the next three terms of the sequence.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$-22-(-31)=9$$
$$-13-(-22)=9$$
$$-4-(-13)=9$$

It can be observed that the difference between the terms is constant and equal to 9.

Therefore, the common difference is 9.

The next three term of the sequence $-31,-22,-13,-4,\ldots$ can be obtained by adding the common difference 9 to the last term -4 and continue adding 9 until the next terms are found.

$$-4+9=5$$
$$5+9=14$$
$$14+9=23$$

Hence, the next three terms of the given arithmetic sequence are $\boxed{5,14,23}$.

Answer 25PA.

Consider an arithmetic sequence

$$2\frac{1}{3},2\frac{2}{3},3,3\frac{1}{3},\ldots$$

The object is to find the next three terms of the sequence.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$2\frac{2}{3}-2\frac{1}{3}=\frac{1}{3}$$
$$3-2\frac{2}{3}=\frac{1}{3}$$
$$3\frac{1}{3}-3=\frac{1}{3}$$

It can be observed that the difference between the terms is constant and equal to $\frac{1}{3}$.

Therefore, the common difference is $\frac{1}{3}$.

The next three term of the sequence $2\frac{1}{3}, 2\frac{2}{3}, 3, 3\frac{1}{3}, \ldots$ can be obtained by adding the common difference $\frac{1}{3}$ to the last term $3\frac{1}{3}$ and continue adding $\frac{1}{3}$ until the next terms are found.

$$3\frac{1}{3} + \frac{1}{3} = 3\frac{2}{3}$$
$$3\frac{2}{3} + \frac{1}{3} = 4$$
$$4 + \frac{1}{3} = 4\frac{1}{3}$$

Hence, the next three terms of the given arithmetic sequence are $\boxed{3\frac{2}{3}, 4, 4\frac{1}{3}}$.

Answer 26PA.

Consider an arithmetic sequence

$$2\frac{1}{3}, 2\frac{2}{3}, 3, 3\frac{1}{3}, \ldots$$

The object is to find the next three terms of the sequence.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$2\frac{2}{3} - 2\frac{1}{3} = \frac{1}{3}$$
$$3 - 2\frac{2}{3} = \frac{1}{3}$$
$$3\frac{1}{3} - 3 = \frac{1}{3}$$

It can be observed that the difference between the terms is constant and equal to $\frac{1}{3}$.

Therefore, the common difference is $\frac{1}{3}$.

The next three term of the sequence $2\frac{1}{3}, 2\frac{2}{3}, 3, 3\frac{1}{3}, \ldots$ can be obtained by adding the common difference $\frac{1}{3}$ to the last term $3\frac{1}{3}$ and continue adding $\frac{1}{3}$ until the next terms are found.

$$3\frac{1}{3} + \frac{1}{3} = 3\frac{2}{3}$$
$$3\frac{2}{3} + \frac{1}{3} = 4$$
$$4 + \frac{1}{3} = 4\frac{1}{3}$$

Hence, the next three terms of the given arithmetic sequence are $\boxed{3\frac{2}{3}, 4, 4\frac{1}{3}}$.

Answer 27PA.

Consider an arithmetic sequence

$a_1 = 5, d = 5, n = 25$

The object is to find the 25th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$a_n = a_1 + (n-1)d$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{25} = 5 + (25-1)5$	$a_1 = 5, d = 5, n = 25$
$a_{25} = 5 + 120$	Simplify
$a_{25} = 125$	Add

Hence, the 25th term of the sequence is $\boxed{125}$

Answer 28PA.

Consider an arithmetic sequence

$a_1 = 8, d = 3, n = 16$

The object is to find the 16th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$a_n = a_1 + (n-1)d$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{16} = 8 + (16-1)3$	$a_1 = 8, d = 3, n = 16$
$a_{16} = 8 + 45$	Simplify
$a_{16} = 53$	Add

Hence, the 16th term of the sequence is $\boxed{53}$

Answer 29PA.

Consider an arithmetic sequence

$a_1 = 52, d = 12, n = 102$

The object is to find the 102th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$a_n = a_1 + (n-1)d$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{102} = 52 + (102-1)12$	$a_1 = 52, d = 12, n = 102$
$a_{102} = 52 + 1212$	Simplify
$a_{102} = 1264$	Add

Hence, the 102th term of the sequence is $\boxed{1264}$

Answer 30PA.

Consider an arithmetic sequence

$a_1 = 34, d = 15, n = 200$

The object is to find the 200th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$a_n = a_1 + (n-1)d$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{200} = 34 + (200-1)15$	$a_1 = 34, d = 15, n = 200$
$a_{200} = 34 + 2985$	Simplify
$a_{200} = 3019$	Add

Hence, the 200th term of the sequence is $\boxed{3019}$

Answer 31PA.

Consider an arithmetic sequence

$a_1 = \frac{5}{8}, d = \frac{1}{8}, n = 22$

The object is to find the 22nd term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$a_n = a_1 + (n-1)d$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{22} = \frac{5}{8} + (22-1)\frac{1}{8}$	$a_1 = \frac{5}{8}, d = \frac{1}{8}, n = 22$
$a_{22} = \frac{5}{8} + \frac{21}{8}$	Simplify
$a_{22} = \frac{13}{4}$	Add

Hence, the 22nd term of the sequence is $\boxed{\frac{13}{4}}$

Answer 32PA.

Consider an arithmetic sequence

$$a_1 = 1\frac{1}{2}, d = 2\frac{1}{4}, n = 39$$

The object is to find the 39th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{39} = 1\frac{1}{2} + (39-1)2\frac{1}{4}$	$a_1 = 1\frac{1}{2}, d = 2\frac{1}{4}, n = 39$
$a_{39} = \frac{3}{2} + \frac{171}{2}$	Simplify
$a_{39} = 87$	Add

Hence, the 39th term of the sequence is $\boxed{87}$

Answer 33PA.

Consider an arithmetic sequence

$$-9, -7, -5, -3, \ldots$$

The object is to find the 18th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$-7-(-9)=2$$
$$-5-(-7)=2$$
$$-3-(-5)=2$$

It can be observed that the difference between the terms is constant and equal to 2.

Therefore, the common difference is 2.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{18} = -9 + (18-1)2$	$a_1 = -9, d = 2, n = 18$
$a_{18} = -9 + 34$	Simplify
$a_{18} = 25$	Add

Hence, the 18th term of the sequence is $\boxed{25}$

Answer 34PA.

Consider an arithmetic sequence

$$-7, -3, 1, 5, \ldots$$

The object is to find the 35th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$-3-(-7)=4$$
$$1-(-3)=4$$
$$5-1=4$$

It can be observed that the difference between the terms is constant and equal to 4.

Therefore, the common difference is 4.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{35} = -7 + (35-1)4$	$a_1 = -7, d = 4, n = 35$
$a_{35} = -7 + 136$	Simplify
$a_{35} = 129$	Add

Hence, the 35th term of the sequence is $\boxed{129}$

Answer 35PA.

Consider an arithmetic sequence

$0.5, 1, 1.5, 2, \ldots$

The object is to find the 50th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$a_n = a_1 + (n-1)d$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$1 - 0.5 = 0.5$
$1.5 - 1 = 0.5$
$2 - 1.5 = 0.5$

It can be observed that the difference between the terms is constant and equal to 0.5.

Therefore, the common difference is 0.5.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{50} = 0.5 + (50-1)0.5$	$a_1 = 0.5, d = 0.5, n = 50$
$a_{50} = 0.5 + 24.5$	Simplify
$a_{50} = 25$	Add

Hence, the 50th term of the sequence is $\boxed{25}$

Answer 36PA.

Consider an arithmetic sequence

$5.3, 5.9, 6.5, 7.1, \ldots$

The object is to find the 12th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$a_n = a_1 + (n-1)d$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$5.9 - 5.3 = 0.6$
$6.5 - 5.9 = 0.6$
$7.1 - 6.5 = 0.6$

It can be observed that the difference between the terms is constant and equal to 0.6.

Therefore, the common difference is 0.6.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{12} = 5.3 + (12-1)0.6$	$a_1 = 5.3, d = 0.6, n = 12$
$a_{12} = 5.3 + 6.6$	Simplify
$a_{12} = 11.9$	Add

Hence, the 12th term of the sequence is $\boxed{11.9}$

Answer 37PA.

Consider an arithmetic sequence

$$24, 35, 46, 57, \ldots$$

The object is to find the *n*, where $a_n = 200$

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$35 - 24 = 11$$
$$46 - 35 = 11$$
$$57 - 46 = 11$$

It can be observed that the difference between the terms is constant and equal to 11.

Therefore, the common difference is 11.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$200 = 24 + (n-1)11$	$a_n = 200, d = 11, a_1 = 24$
$200 = 24 + 11n - 11$	Simplify
$200 = 13 + 11n$	Add
$200 - 13 = 11n$	Add -13 each side
$187 = 11n$	Add
$17 = n$	Divide each side with 11

Hence, the 200 is $\boxed{11\text{th}}$ term of the sequence.

Answer 38PA.

Consider an arithmetic sequence

$30, 22, 14, 6, \ldots$

The object is to find the *n*, where $a_n = -34$

The *n*th term of an arithmetic sequence can be found using the formula

$a_n = a_1 + (n-1)d$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$22 - 30 = -8$$
$$14 - 22 = -8$$
$$6 - 14 = -8$$

It can be observed that the difference between the terms is constant and equal to -8.

Therefore, the common difference is -8.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$-34 = 30 + (n-1)(-8)$	$a_n = -34, d = -8, a_1 = 30$
$-34 = 30 - 8n + 8$	Simplify
$-34 = 38 - 8n$	Add
$-34 - 38 = -8n$	Add -38 each side
$-72 = -8n$	Add
$9 = n$	Divide each side with -8

Hence, -34 is $\boxed{9\text{th}}$ term of the sequence $30, 22, 14, 6, \ldots$

Answer 39PA.

Consider an arithmetic sequence

$-3, -6, -9, -12, \ldots$

The object is to find the *n*th term of the sequence and graphing the first five terms of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$a_n = a_1 + (n-1)d$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$-6-(-3)=-3$$
$$-9-(-6)=-3$$
$$-12-(-9)=-3$$

It can be observed that the difference between the terms is constant and equal to -3.

Therefore, the common difference is -3 and the first term is $a_1=-3$

Using the formula for the *n*th term of an arithmetic sequence

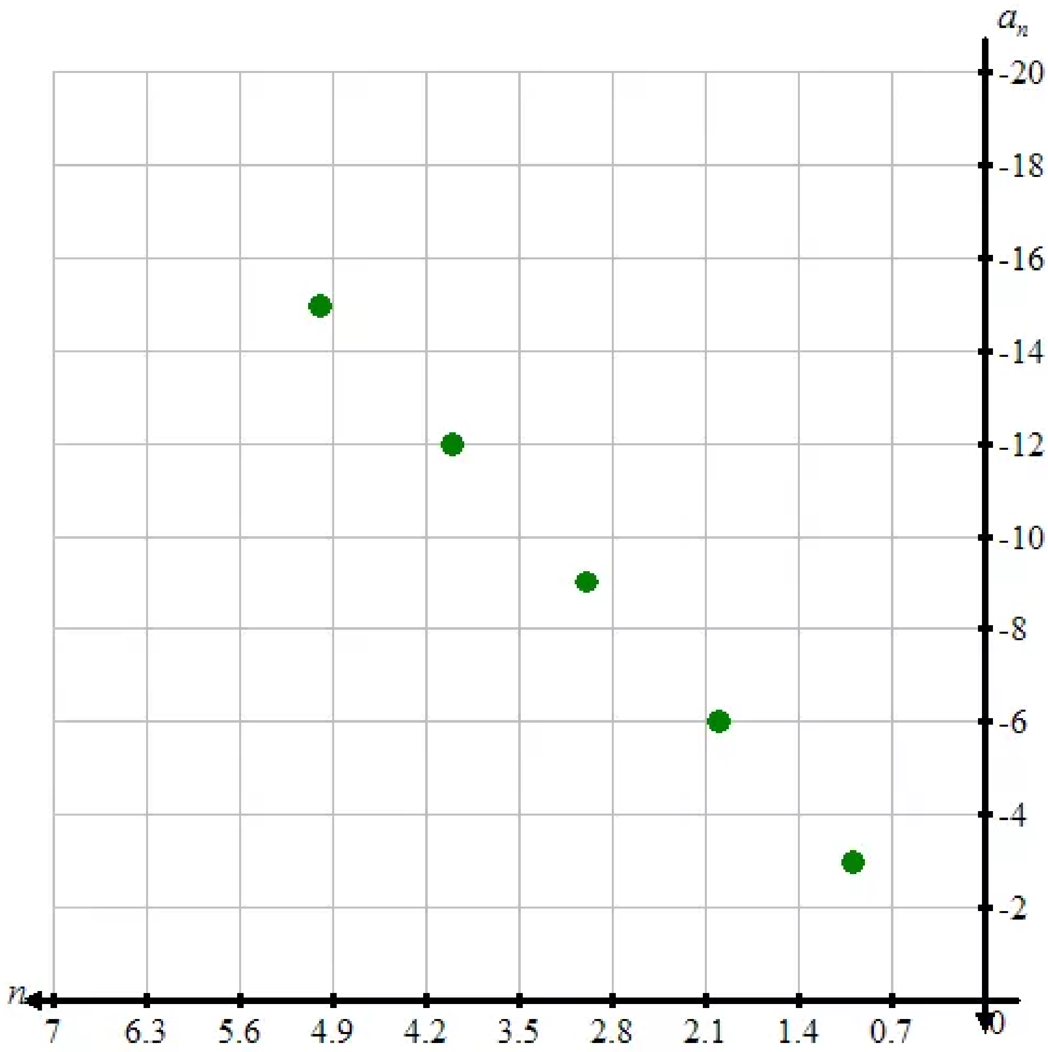
$a_n=a_1+(n-1)d$	Formula for nth term
$a_n=-3+(n-1)(-3)$	$a_1=-3, d=-3$
$a_n=-3-3n+3$	Distributive Property
$a_n=-3n$	Simplify

Hence, the *n*th term of the sequence is $\boxed{-3n}$

The first five terms of the sequence $a_n=-3n, d=-3$ are given in the following table.

n	$a_n=-3n$	a n	(*n*, an)
1	$-3(1)$	-3	$(1,-3)$
2	$-3(2)$	-6	$(2,-6)$
3	$-3(3)$	-9	$(3,-9)$
4	$-3(4)$	-12	$(4,-12)$
5	$-3(5)$	-15	$(5,-15)$

The graph of the first five terms of the sequence is



Answer 40PA.

Consider an arithmetic sequence

$$8, 9, 10, 11, \ldots$$

The object is to find the *n*th term of the sequence and graphing the first five terms of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$9 - 8 = 1$$
$$10 - 9 = 1$$
$$11 - 10 = 1$$

It can be observed that the difference between the terms is constant and equal to 1.

Therefore, the common difference is 1and the first term is $a_1 = 8$

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$ Formula for nth term

$a_n = 8 + (n-1)1$ $a_1 = 8, d = 1$

$a_n = 8 + n - 1$ Distributive Property

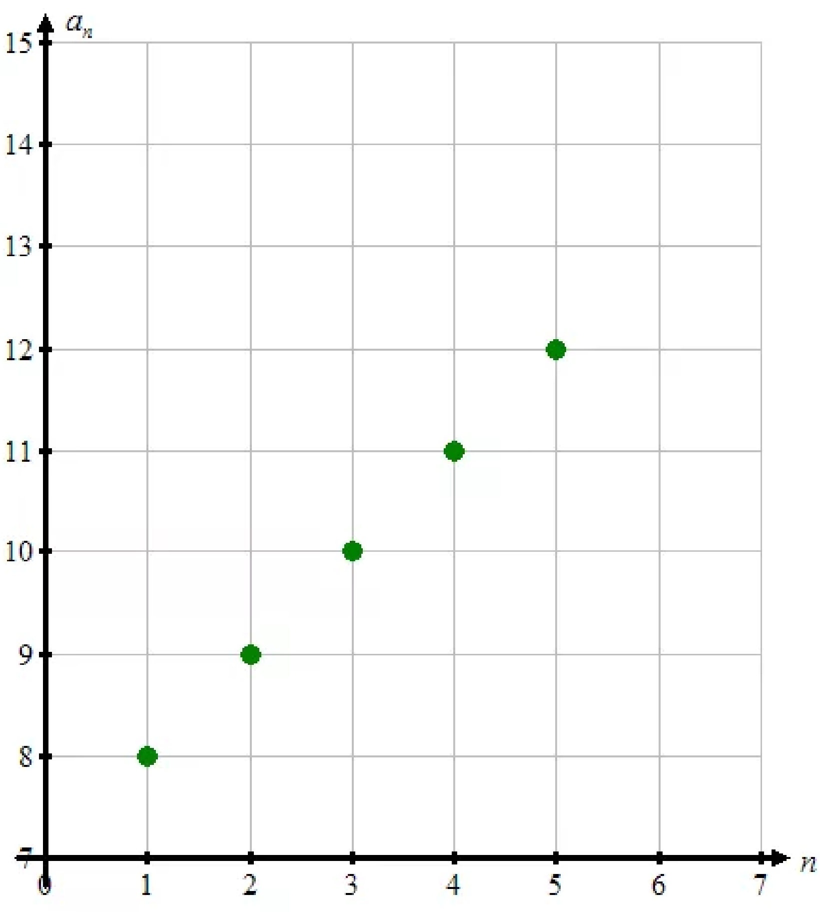
$a_n = n + 7$ Simplify

Hence, the *n*th term of the sequence is $\boxed{n+7}$

The first five terms of the sequence $a_n = 8, d = 1$ are given in the following table.

n	$n+7$	a n	(*n*, an)
1	$1+7$	8	$(1,8)$
2	$2+7$	9	$(2,9)$
3	$3+7$	10	$(3,10)$
4	$4+7$	11	$(4,11)$
5	$5+7$	12	$(5,12)$

The graph of the first five terms of the sequence is



Answer 41PA.

Consider an arithmetic sequence

$2, 8, 14, 20, \ldots$

The object is to find the *n*th term of the sequence and graphing the first five terms of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$a_n = a_1 + (n-1)d$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$8 - 2 = 6$$
$$14 - 8 = 6$$
$$20 - 14 = 6$$

It can be observed that the difference between the terms is constant and equal to 6.

Therefore, the common difference is 6 and the first term is $a_1 = 2$

Using the formula for the *n*th term of an arithmetic sequence

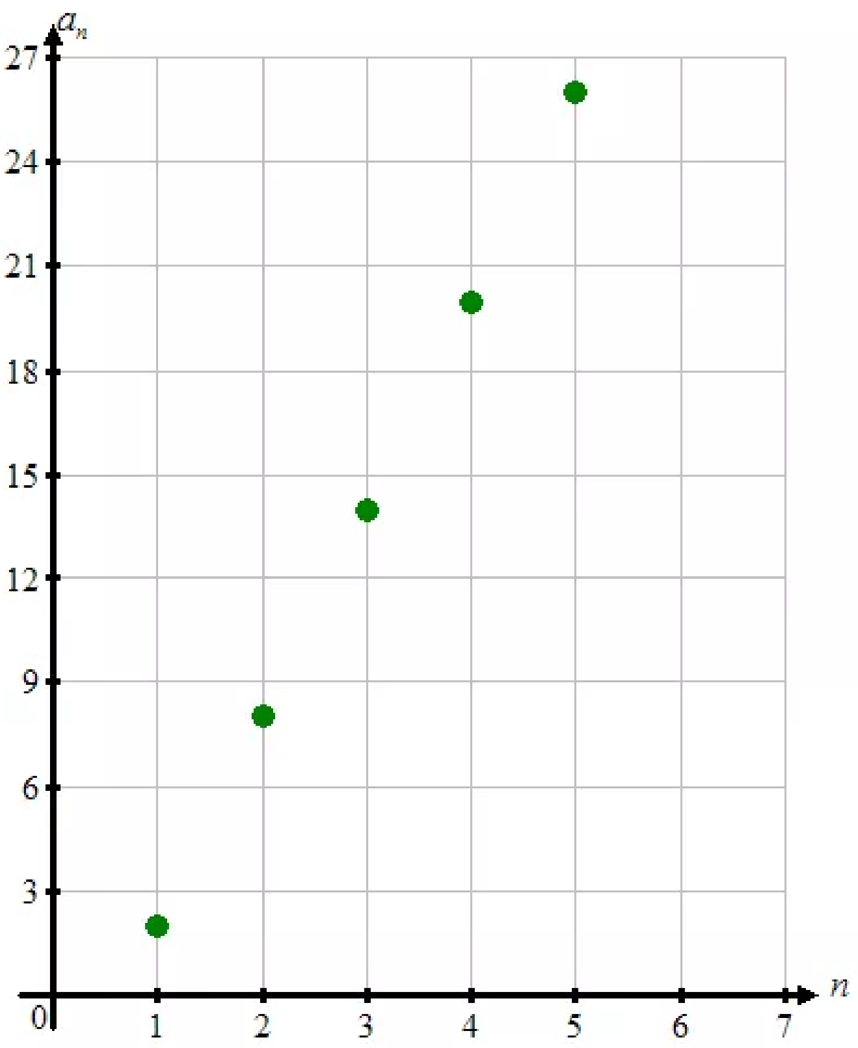
$a_n = a_1 + (n-1)d$	Formula for nth term
$a_n = 2 + (n-1)6$	$a_1 = 2, d = 6$
$a_n = 2 + 6n - 6$	Distributive Property
$a_n = 6n - 4$	Simplify

Hence, the *n*th term of the sequence is $\boxed{6n-4}$

The first five terms of the sequence $a_n = 8, d = 1$ are given in the following table.

n	$6n-4$	a n	(*n*, an)
1	$6(1)-4$	2	$(1,2)$
2	$6(2)-4$	8	$(2,8)$
3	$6(3)-4$	14	$(3,14)$
4	$6(4)-4$	20	$(4,20)$
5	$6(5)-4$	26	$(5,26)$

The graph of the first five terms of the sequence is



Answer 42PA.

Consider an arithmetic sequence

$$-18, -16, -14, -12, \ldots$$

The object is to find the *n*th term of the sequence and graphing the first five terms of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$-16-(-18)=2$$
$$-14-(-16)=2$$
$$-12-(-14)=2$$

It can be observed that the difference between the terms is constant and equal to 2.

Therefore, the common difference is 2 and the first term is $a_1 = -18$

Using the formula for the *n*th term of an arithmetic sequence

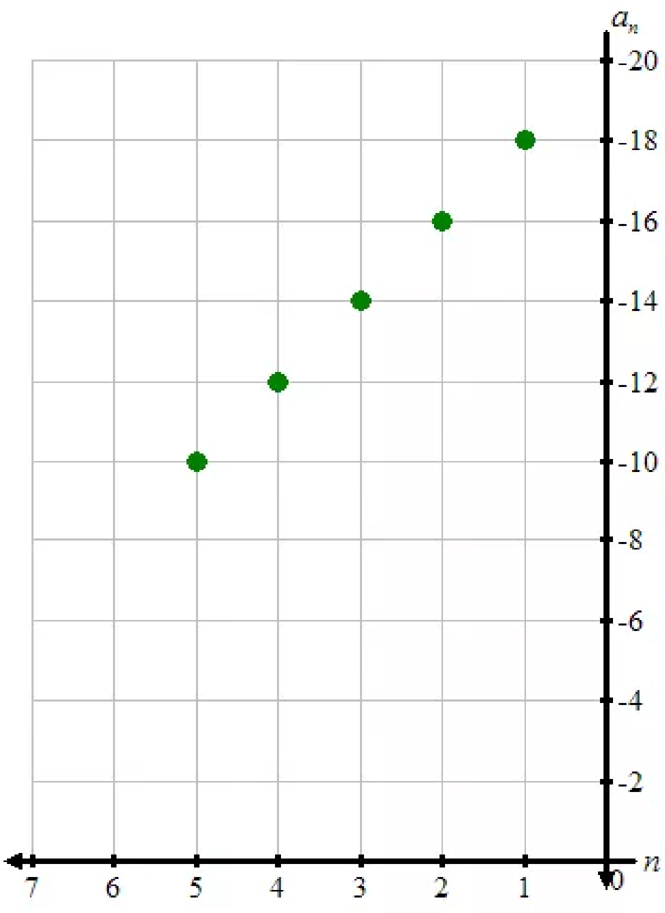
$a_n = a_1 + (n-1)d$	Formula for nth term
$a_n = -18 + (n-1)2$	$a_1 = -18, d = 2$
$a_n = -18 + 2n - 2$	Distributive Property
$a_n = 2n - 20$	Simplify

Hence, the *n*th term of the sequence is $\boxed{2n-20}$

The first five terms of the sequence $a_n = -3n, d = -3$ are given in the following table.

n	$a_n = 2n - 20$	a n	(*n*, an)
1	$2(1)-20$	-18	$(1,-18)$
2	$2(2)-20$	-16	$(2,-16)$
3	$2(3)-20$	-14	$(3,-14)$
4	$2(4)-20$	-12	$(4,-12)$
5	$2(5)-20$	-10	$(5,-10)$

The graph of the first five terms of the sequence is



Answer 43PA.

A sequence $a_1, a_2, a_3, \ldots, a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2 - a_1, a_3 - a_2, \ldots, a_n - a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Consider a sequence

$$y+4, 6, y, \ldots$$

The differences between first two consecutive numbers in the sequence

$$6-(y+4)=2-y$$

The differences between second and third term in the sequence is

$$y-6$$

The sequence will become arithmetic if the difference between consecutive numbers is equal.

$$y-6=2-y$$
$$2y=8$$
$$y=4$$

Therefore, the sequence $y+4, 6, y, \ldots$ is $\boxed{\text{an arithmetic sequence if } y=4}$.

Answer 44PA.

A sequence $a_1, a_2, a_3, \ldots, a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2 - a_1, a_3 - a_2, \ldots, a_n - a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Consider a sequence

$$y+8, 4y+6, 3y, \ldots$$

The differences between first two consecutive numbers in the sequence

$$4y+6-(y+8)=3y-2$$

The differences between second and third term in the sequence is

$$3y-(4y+6)=-y-6$$

The sequence will become arithmetic if the difference between consecutive numbers is equal.

$$3y-2=-y-6$$
$$4y=-6+2$$
$$4y=-4$$
$$y=-1$$

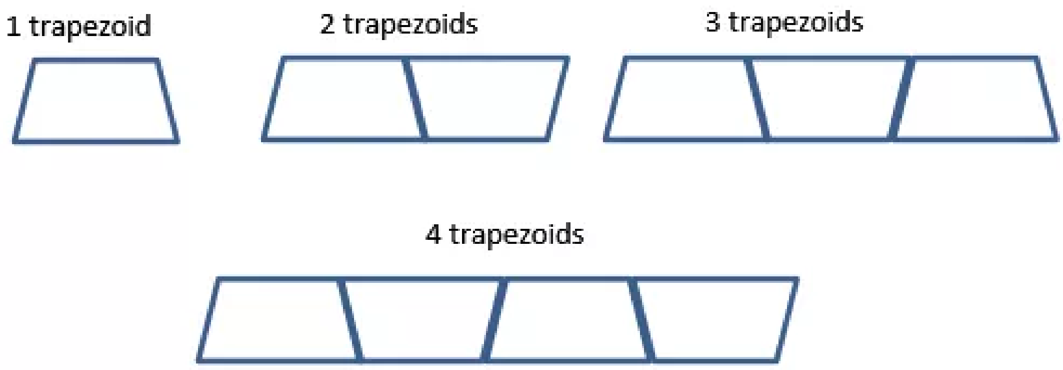
Therefore, the sequence $y+8, 4y+6, 3y, \ldots$ is $\boxed{\text{an arithmetic sequence if } y=-1}$.

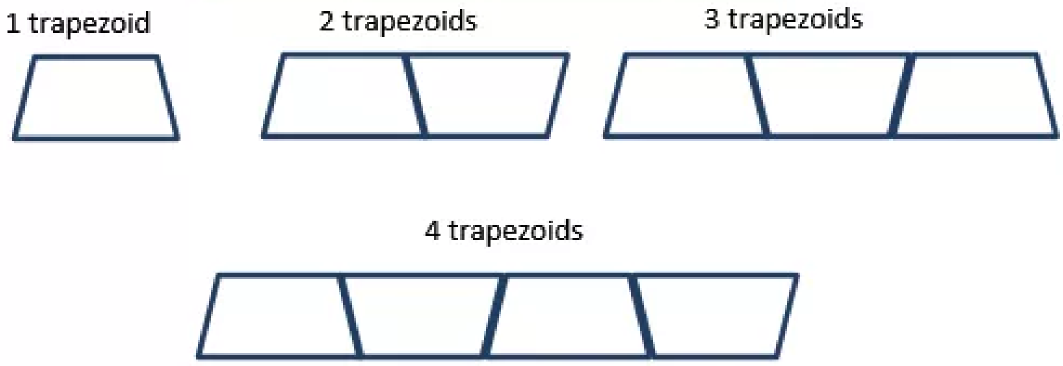
Answer 45PA.

A sequence $a_1, a_2, a_3, \ldots, a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2-a_1, a_3-a_2, \ldots, a_n-a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Consider the following trapezoids





The perimeters of the above trapezoids are 5 units, 8 units, 11 units, and 14 units respectively.

Consider an arithmetic sequence

$$5, 8, 11, 14, \ldots$$

The object is to find the *n*th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$8-5=3$$
$$11-8=3$$
$$14-11=3$$

It can be observed that the difference between the terms is constant and equal to 3.

Therefore, the common difference is 3 and the first term is $a_1 = 5$

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_n = 5 + (n-1)3$	$a_1 = 5, d = 3$
$a_n = 5 + 3n - 3$	Distributive Property
$a_n = 3n + 2$	Simplify

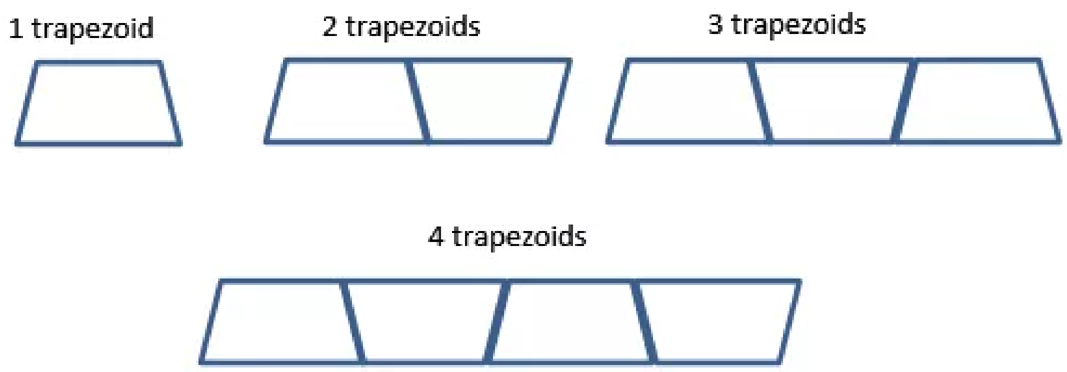
Hence, the *n*th term of the sequence is $\boxed{3n+2}$

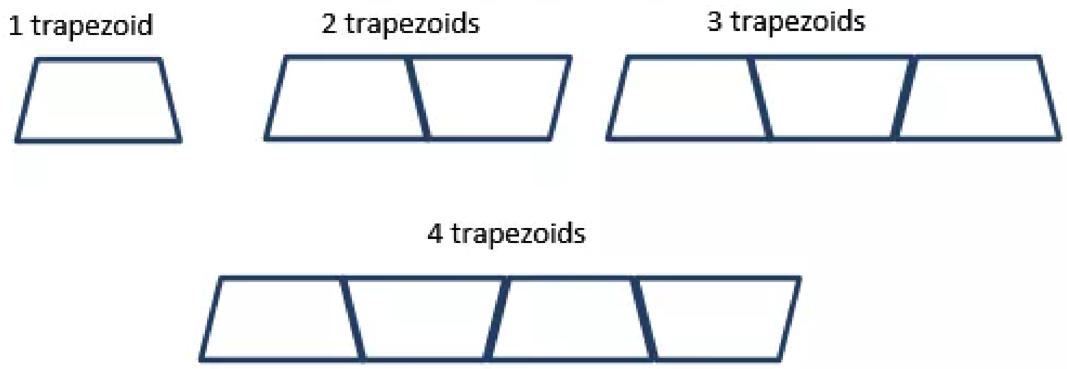
Answer 46PA.

A sequence $a_1, a_2, a_3, \ldots, a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2 - a_1, a_3 - a_2, \ldots, a_n - a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Consider the following trapezoids





The perimeters of the above trapezoids are 5 units, 8 units, 11 units, and 14 units respectively.

Consider an arithmetic sequence

$$5, 8, 11, 14, \ldots$$

The object is to find the perimeter of the pattern containing 12 trapezoids. That is to find the 12th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$8-5=3$$
$$11-8=3$$
$$14-11=3$$

It can be observed that the difference between the terms is constant and equal to 3.

Therefore, the common difference is 3 and the first term is $a_1=5$

Using the formula for the *n*th term of an arithmetic sequence

$a_n=a_1+(n-1)d$	Formula for nth term
$a_n=5+(n-1)3$	$a_1=5, d=3$
$a_n=5+3n-3$	Distributive Property
$a_n=3n+2$	Simplify

Hence, the *n*th term of the sequence is $3n+2$

Replace *n* by 12 in the *n*th term formula.

$a_n=3n+2$	*n*th term
$a_{12}=3(12)+2$	Replace *n* with 12
$a_{12}=36+2$	Multiply
$a_{12}=38$	Add

The perimeter of the pattern containing 12 trapezoids is $\boxed{38 \text{ units}}$.

Answer 47PA.

The number of seats in a Playhouse in each row from last row is

$$76, 68, 60, \ldots$$

The total number of rows in the Playhouse is 7.

The object is to find the *n*th term of the sequence $76, 68, 60, \ldots$

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n=a_1+(n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$68-76=-8$$
$$60-68=-8$$

It can be observed that the difference between the terms is constant and equal to -8.

Therefore, the common difference is -8 and the first term is $a_1=76$

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_n = 76 + (n-1)(-8)$	$a_1 = 76, d = -8$
$a_n = 76 - 8n + 8$	Distributive Property
$a_n = 84 - 6n$	Simplify

Hence, the *n*th term of the sequence is $\boxed{84-6n}$

Answer 48PA.

The number of seats in a Playhouse in each row from last row is

$76, 68, 60, \ldots$

The total number of rows in the Playhouse is 7.

The object is to find the number of seats in first row. That is to find the 7th term of the sequence $76, 68, 60, \ldots$

First let us find the *n*th term of an arithmetic sequence $76, 68, 60, \ldots$

The *n*th term of an arithmetic sequence can be found using the formula

$a_n = a_1 + (n-1)d$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$68 - 76 = -8$

$60 - 68 = -8$

It can be observed that the difference between the terms is constant and equal to -8.

Therefore, the common difference is -8 and the first term is $a_1 = 76$

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_n = 76 + (n-1)(-8)$	$a_1 = 76, d = -8$
$a_n = 76 - 8n + 8$	Distributive Property
$a_n = 84 - 8n$	Simplify

Hence, the *n*th term of the sequence is $84 - 8n$

Replace *n* with 7 in the *n*th term of the sequence is $84 - 8n$

$$\begin{aligned} 84 - 8n &= 84 - 8(7) \\ &= 84 - 56 \\ &= 28 \end{aligned}$$

Hence, the number of seats in the first row of the Playhouse is $\boxed{28}$

Answer 49PA.

The number of seats in a Playhouse in each row from last row is

$76, 68, 60, \ldots$

The total number of rows in the Playhouse is 7.

The total number of tickets sold for the orchestra section on opening night of the Playhouse is 368.

The object is to check whether the opening night section is oversold or not.

First let us find the *n*th term of an arithmetic sequence $76, 68, 60, \ldots$

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

First find the common difference of the sequence.

The differences between two consecutive numbers in the sequence

$$68 - 76 = -8$$
$$60 - 68 = -8$$

It can be observed that the difference between the terms is constant and equal to -8.

Therefore, the common difference is -8 and the first term is $a_1 = 76$

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_n = 76 + (n-1)(-8)$	$a_1 = 76, d = -8$
$a_n = 76 - 8n + 8$	Distributive Property
$a_n = 84 - 8n$	Simplify

Hence, the *n*th term of the sequence is $84 - 8n$

Replace *n* with 7 in the *n*th term of the sequence is $84 - 8n$

$$\begin{aligned} 84 - 8n &= 84 - 8(7) \\ &= 84 - 56 \\ &= 28 \end{aligned}$$

Hence, the number of seats in the first row of the Playhouse is 28.

The number of seats in the second row of the Playhouse is $28 + 8 = 36$.

The number of seats in the third row of the Playhouse is $36 + 8 = 44$.

The number of seats in the fourth row of the Playhouse is $44 + 8 = 52$.

The number of seats in the fifth row of the Playhouse is $52 + 8 = 60$.

The number of seats in the sixth row of the Playhouse is $60 + 8 = 68$.

The number of seats in the seventh row of the Playhouse is $68 + 8 = 76$.

The total number of seats in the Playhouse is

$$28+36+44+52+60+68+76=364$$

Since the number of tickets sold is 368 so, on opening night section the tickets **were oversold.**

Answer 50PA.

Consider the following table of distance traveled by a ball during each second.

Time(s)	Distance traveled(cm)
1	9
2	13
3	17
4	21
5	25
6	29

Consider a sequence of distance traveled by ball

$$9,13,17,\ldots,29$$

The differences between two consecutive numbers in the sequence

$$13-9=4$$
$$17-13=4$$
$$21-17=4$$

It can be observed that the differences are constant and equal to 4.

Therefore, the sequence $9,13,17,\ldots,29$ is $\boxed{\text{an arithmetic sequence}}$.

Answer 51PA.

Consider the following table of distance traveled by a ball during each second.

Time(s)	Distance traveled(cm)
1	9
2	13
3	17
4	21
5	25
6	29

Consider a sequence of distance traveled by ball

$9, 13, 17, \ldots, 29$

The differences between two consecutive numbers in the sequence

$13 - 9 = 4$

$17 - 13 = 4$

$21 - 17 = 4$

It can be observed that the differences are constant and equal to 4.

Therefore, the sequence $9, 13, 17, \ldots, 29$ is an arithmetic sequence.

The object is to find the *n*th term of the sequence $9, 13, 17, \ldots, 29$

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_n = 9 + (n-1)4$	$a_1 = 9, d = 4$
$a_n = 9 + 4n - 4$	Distributive Property
$a_n = 4n + 5$	Simplify

Hence, the *n*th term of the sequence is $\boxed{4n+5}$

Answer 52PA.

Consider the following table of distance traveled by a ball during each second.

Time(s)	Distance traveled(cm)
1	9
2	13
3	17
4	21
5	25
6	29

Consider a sequence of distance traveled by ball

$$9,13,17,\ldots,29$$

The differences between two consecutive numbers in the sequence

$$13-9=4$$
$$17-13=4$$
$$21-17=4$$

It can be observed that the differences are constant and equal to 4.

Therefore, the sequence $9,13,17,\ldots,29$ is an arithmetic sequence.

The object is to find the distance traveled by the ball in 35th second.

First find the *n*th term of the arithmetic sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$ Formula for nth term

$a_n = 9 + (n-1)4$ $a_1 = 9, d = 4$

$a_n = 9 + 4n - 4$ Distributive Property

$a_n = 4n + 5$ Simplify

Hence, the *n*th term of the sequence is $4n + 5$

Replace *n* by 35 in $a_n = 4n + 5$, then

$a_{35} = 4(35) + 5$

$a_{35} = 140 + 5$ Simplify

$a_{35} = 145$ Add

Therefore, the ball will travel $\boxed{145\text{cms}}$ in the 34th second.

Answer 53PA.

Consider the following table of distance traveled by a ball during each second.

Time(s)	Distance traveled(cm)
1	9
2	13
3	17
4	21
5	25
6	29

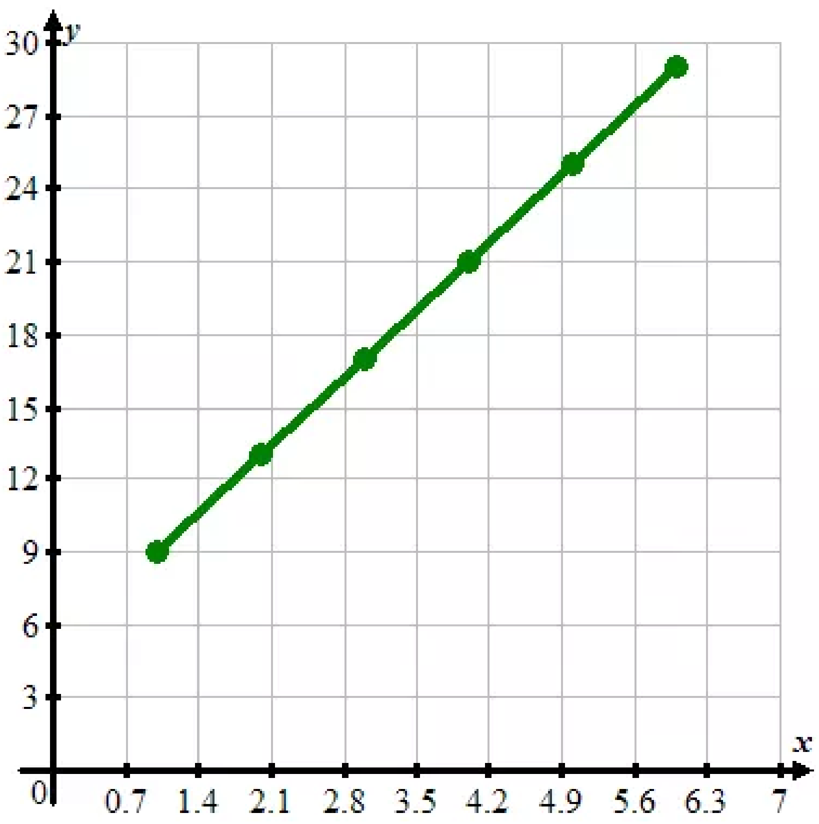
The graph of the above sequence is

Distance travelled

Time

Distance t...

Time



Answer 54PA.

The value of each question in game show is increasing by \$1500. This means the sequence of value of questions is in arithmetic sequence with 1500 as common difference.

The object is to find the value of the 10th question, if the first question is worth \$2500.

Suppose a_1 be the value of first question, then $a_1 = 2500$.

To find the value of the 10th question, first find the *n*th term of the sequence.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$$\begin{aligned} a_n &= a_1 + (n-1)d && \text{Formula for nth term} \\ a_n &= 2500 + (n-1)1500 && a_1 = 2500, d = 1500 \\ a_n &= 2500 + 1500n - 1500 && \text{Distributive Property} \\ a_n &= 1500n + 1000 && \text{Simplify} \end{aligned}$$

Hence, the *n*th term of the sequence is $1500n + 1000$

Replace *n* by 10 in $a_n = 1500n + 1000$, then

$$\begin{aligned} a_{10} &= 1500(10) + 1000 && \\ a_{10} &= 15000 + 1000 && \text{Simplify} \\ a_{10} &= 16000 && \text{Add} \end{aligned}$$

Therefore, the value of the 10th question is $\boxed{\$160,00}$

Answer 55PA..

The value of each question in game show is increasing by \$1500. This means the sequence of value of questions is in arithmetic sequence with 1500 as common difference.

The object is to find the total amount won by contestant if he or she answers all ten questions.

Suppose a_1 be the value of first question, then $a_1 = 2500$.

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_n = 2500 + (n-1)1500$	$a_1 = 2500, d = 1500$
$a_n = 2500 + 1500n - 1500$	Distributive Property
$a_n = 1500n + 1000$	Simplify

Hence, the *n*th term of the sequence is $1500n + 1000$

The value of each question in the game show is given in the following table.

n	1500*n*+*1000*	a n
1	1500(1)+1000	2500
2	1500(2)+1000	4000
3	1500(3)+1000	5500
4	1500(4)+1000	7000
5	1500(5)+1000	8500
6	1500(6)+1000	10000
7	1500(7)+1000	11500
8	1500(8)+1000	13000
9	1500(9)+1000	14500
10	1500(10)+1000	16000

Adding the values in last column of above table, then

$$\$2500+\$4000+\$5500+\$7000+\$8500+\$10000+\$11500+\$13000+$$
$$\$14500+\$16000=\$92500$$

Therefore, if the contestant answers all 10 questions correctly, then he or she will get $\boxed{\$925,00}$

Answer 56PA.

A sequence $a_1, a_2, a_3, \ldots, a_n$ is said to be an arithmetic sequence if the successive terms differ by the same number, say *d*. That is each difference $a_2 - a_1, a_3 - a_2, \ldots, a_n - a_{n-1}$ is equal to a same number *d*.

This constant number is called common difference of the arithmetic sequence.

Consider a sequence

$$2x+5, 4x+5, 6x+5, 8x+5, \ldots$$

The object is to check whether the sequence is arithmetic or not.

The differences between two consecutive numbers in the sequence

$$(4x+5)-(2x+5)=2x$$
$$(6x+5)-(4x+5)=2x$$
$$(8x+5)-(6x+5)=2x$$

It can be observed that the differences are constant and equal to $2x$.

Therefore, the sequence $2x+5, 4x+5, 6x+5, 8x+5, \ldots$ is $\boxed{\text{an arithmetic sequence}}$.

Answer 57PA.

Consider a set of numbers from 29 to 344.

The object is to find the number of multiples of 7 between 29 and 344 using arithmetic sequence.

The first multiple of 7 between 29 and 344 is 35.

Thus, consider an arithmetic sequence with $a_1 = 35, d = 7, \text{and } a_n = 344$. Then *n* represents the number of multiples of 7 between 29 and 344.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$344 = 35 + (n-1)7$	$a_1 = 35, d = 7, a_n = 344$
$344 = 35 + 7n - 7$	Distributive Property
$344 = 28 + 7n$	Simplify
$344 - 28 = 7n$	Add -28 on both sides
$316 = 7n$	Simplify
$n = 45.1$	Dividing both sides by 7

Hence, there are $\boxed{45}$ numbers which are multiples of 7 between 29 and 344.

Answer 58PA.

Consider the following table of the altitude of the probe after each second.

Time(s)	Altitude(ft)
3	22.7
4	30.9
5	39.1
6	47.3
7	55.5
8	63.7

The object is to find the *n*th term of the sequence $6.14.5, 22.7, 30.9, \ldots, 63.7$

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Consider a sequence of the altitude

$$6.3, 14.5, 22.7, 30.9, \ldots, 63.7$$

The differences between two consecutive numbers in the sequence

$$14.5 - 6.3 = 8.2$$
$$22.7 - 14.5 = 8.2$$
$$30.9 - 22.7 = 8.2$$
$$\vdots$$
$$63.7 - 55.5 = 8.2$$

It can be observed that the differences are constant and equal to 8.2.

Therefore, the sequence $6.3, 14.5, 22.7, 30.9, \ldots, 63.7$ is an arithmetic sequence.

The object is to find the *n*th term of the sequence $6.14.5, 22.7, 30.9, \ldots, 63.7$

The *n*th term of an arithmetic sequence can be found using the formula

$$a_n = a_1 + (n-1)d$$

where *n* is the number of the term you want to find, a_1 is the first, and *d* is the common difference.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$ Formula for nth term

$a_n = 6.3 + (n-1)8.2$ $a_1 = 6.3, d = 8.2$

$a_n = 6.3 + 8.2n - 8.2$ Distributive Property

$a_n = 8.2n - 1.9$ Simplify

Hence, the formula for arithmetic that represents the altitude of the probe after each second is $\boxed{8.2n - 1.9}$

To predict the altitude of the probe after 15 seconds, replace *n* by 15 in $a_n = 8.2n - 1.9$.

$a_{15} = 8.2(15) - 1.9$

$a_{15} = 123 - 1.9$ Simplify

$a_{15} = 121.1$ Add

Therefore, the altitude of the probe after 15 seconds is $\boxed{121.1\text{ft}}$ in the 34th second.

Answer 59PA.

Mr. L deposits $25 every week into his saving account. The present balance of his saving account is $350.

The object is to find amount he deposited in his saving account after 12 weeks.

The deposits of Mr. L is in arithmetic sequence with $a_1 = 25$ and $d = 25$

First find the 12th term of the sequence.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$ Formula for nth term

$a_{12} = 25 + (12-1)25$ $a_1 = 25, d = 25, n = 12$

$a_{12} = 25 + (11)25$ Simplify

$a_{12} = 300$ Add

Therefore, the savings of Mr. L 12 weeks from now is

$\$350 + \$300 = \$650$

Since, the option **A** is $600, so **A** is not correct answer. Also since option **B** and **D** are $625 and $675 respective, so **B** and **D** are not correct answers.

Hence, the correct option is $\boxed{\text{C}}$

Answer 60PA.

Consider a arithmetic sequence a_n with $a_1 = 2$ and $a_4 = 11$.

The object is to find 20th term of the sequence.

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_2 = 2 + (2-1)d$	$a_1 = 2, n = 2$
$a_2 = 2 + d$	Simplify

Thus, the second term of the sequence is $2 + d$

Again use the formula for the *n*th term of an arithmetic sequence to find the third term of the sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_3 = 2 + (3-1)d$	$a_1 = 2, n = 3$
$a_2 = 2 + 2d$	Simplify

Thus, the third term of the sequence is $2 + 2d$

The fourth term of the sequence is $2 + 3d$.

But, given that the fourth term is $a_4 = 11$

Therefore,

$$2 + 3d = 11$$
$$3d = 11 - 2$$
$$3d = 9$$
$$d = 3$$

Using the formula for the *n*th term of an arithmetic sequence

$a_n = a_1 + (n-1)d$	Formula for nth term
$a_{20} = 2 + (20-1)3$	$a_1 = 2, n = 2, d = 3$
$a_{20} = 2 + 57$	Simplify
$a_{20} = 59$	Add

Therefore, the 20th term of the sequence is 59.

Since, the option **A** is 40, so **A** is not correct answer. Also since option **C** and **D** are 78 and 97 respective, so **C** and **D** are not correct answers.

Hence, the correct option is $\boxed{\textbf{B}}$

Answer 61MYS.

Consider the function

$f(x) = 3x - 2$

The objective is to find the value of $f(4)$

$$\begin{aligned} f(4) &= 3(4) - 2 && \text{Replace } x \text{ with } 4 \\ &= 12 - 2 && \text{Simplify} \\ &= 10 && \text{Add} \end{aligned}$$

Therefore,

$f(4) = \boxed{10}$

Answer 62MYS.

Consider the function

$g(x) = x^2 - 5$

The objective is to find the value of $f(-3)$

$$\begin{aligned} g(-3) &= (-3)^2 - 5 && \text{Replace } x \text{ with } -3 \\ &= 9 - 5 && \text{Simplify} \\ &= 4 && \text{Add} \end{aligned}$$

Therefore,

$g(-3) = \boxed{4}$

Answer 63MYS.

Consider the function,

$f(x) = 3x - 2$

The objective is to find the value of $2[f(6)]$

First, find $f(6)$

$$\begin{aligned} f(6) &= 3(6) - 2 && \text{Replace } x \text{ with } 6 \\ &= 18 - 2 && \text{Simplify} \\ &= 16 && \text{Add} \end{aligned}$$

Now, the value of $2[f(6)]$ is

$$\begin{aligned} f(6) &= 16 \\ 2[f(6)] &= 32 && \text{Multiply with 2 on both sides} \end{aligned}$$

Therefore,

$2[f(6)] = \boxed{32}$

Answer 64MYS.

Consider the equation

$$x^2 + 3x - y = 8$$

The equation has a term x^2 which is not linear, so the equation cannot be written in standard form $Ax + By = C$.

Therefore, the equation $x^2 + 3x - y = 8$ is **not a linear equation.**

Answer 65MYS.

Consider the equation

$$y - 8 = 10 - x$$

The equation has no term with two variables, so the equation can be written in standard form. To write the equations into standard form first rewrite the equation so that both variables are on the same side of the equation.

$y - 8 = 10 - x$	Original equation
$y - 8 + 8 = 10 + 8 - x$	Add 8 to each side
$y = 18 - x$	Simplify
$x + y = 18 - x + x$	Add x to each side
$x + y = 18$	Simplify

The equation is now in standard form $Ax + By = C$, where $A = 1, B = 1,$ and $C = 18$.

Therefore, the equation $y - 8 = 10 - x$ is **in standard form** and the standard form is

$$\boxed{x + y = 18}$$

Answer 66MYS.

Consider the equation

$$2y = y + 2x - 3$$

The equation has no term with two variables, so the equation can be written in standard form. To write the equations into standard form first rewrite the equation so that both variables are on the same side of the equation.

$2y = y + 2x - 3$	Original equation
$2y - y = y - y + 2x - 3$	Subtract y from each side
$y = 2x - 3$	Simplify
$-2x + y = 2x - 2x - 3$	Subtract $2x$ from each side
$-2x + y = -3$	Simplify
$-(-2x + y) = 3$	Multiply each side by -1
$2x - y = 3$	Simplify

The equation is now in standard form $Ax + By = C$, where $A = 2, B = -1,$ and $C = 3$.

Therefore, the equation $2y = y + 2x - 3$ is **in standard form** and the standard form is

$$\boxed{2x - y = 3}$$

Answer 67MYS.

The objective is to translate the following sentence into an algebraic equation.

"Two hundred minus three times *x* is equal to nine"

Translate the words of the problem as follows:

Two hundred	minus	3 times x	is equal to	nine
↓	↓	↓	↓	↓
200	$-$	$3\times x$	$=$	9

Therefore, the required algebraic equation is $\boxed{200-3x=9}$.

Answer 68MYS.

The objective is to translate the following sentence into an algebraic equation.

"The sum of twice *r* and three times *s* is identical to thirteen"

Translate the words of the problem as follows:

Twice of *r* means 2*r*.

Three times *s* means 3*s*.

The sum of twice r and three times x	is identical to	thirteen
↓	↓	↓
$2r+3s$	$=$	13

Therefore, the required algebraic equation is $\boxed{2r+3s=13}$.

Answer 69MYS.

The objective is to find the given product.

To multiply a positive number and a negative number, multiply their absolute values. The product is negative.

$7(3)=21$ Multiply the absolute values of the number

$7(-3)=-21$ The product of a positive and a negative number is negative

Therefore, $7(-3)=\boxed{-21}$.

Answer 70MYS.

The objective is to find the given product.

To multiply a positive number and a negative number, multiply their absolute values. The product is negative.

$11\cdot 15=165$ Multiply the absolute values of the number

$-11\cdot 15=-165$ The product of a positive and a negative number is negative

Therefore, $-11\cdot 15=\boxed{-165}$.

Answer 71MYS.

The objective is to find the given product.

To multiply a two negative numbers, multiply their absolute values. The product is positive.

$8(15)=120$ Multiply the absolute values of the number

$-8(-15)=120$ The product of two negative numbers is positive

Therefore, $-8(-15)=\boxed{120}$.

Answer 72MYS.

The objective is to find the given product.

To multiply a two positive numbers, multiply their absolute values. The product is positive.

Apply the identity property $a=\frac{a}{1}$ to 6 and rewrite the expression as follows:

$$6\left(\frac{2}{3}\right)=\left(\frac{6}{1}\right)\left(\frac{2}{3}\right)$$

Apply the rule for multiplying fractions $\frac{a}{b}\cdot\frac{c}{d}=\frac{ac}{bd}$

$\left(\frac{6}{1}\right)\left(\frac{2}{3}\right)=\frac{12}{3}$ Multiply the absolute values of the number

$\left(\frac{6}{1}\right)\left(\frac{2}{3}\right)=4$ Rewrite in lowest terms

Therefore, $\left(\frac{6}{1}\right)\left(\frac{2}{3}\right)=\boxed{4}$.

Answer 73MYS.

The objective is to find the given product.

To multiply a positive number and a negative number, multiply their absolute values. The product is negative.

Apply the rule for multiplying fractions $\left(\frac{a}{b}\right)\left(\frac{c}{d}\right)=\frac{ac}{bd}$

$\left(\frac{5}{8}\right)\left(\frac{4}{7}\right)=\frac{20}{56}$ Multiply the absolute values of the number

$\left(\frac{5}{8}\right)\left(\frac{4}{7}\right)=\frac{5}{14}$ Rewrite in lowest terms

$\left(-\frac{5}{8}\right)\left(\frac{4}{7}\right)=-\frac{5}{14}$ The product of a positive and a negative number is negative

Therefore, $\left(-\frac{5}{8}\right)\left(\frac{4}{7}\right)=\boxed{-\frac{5}{14}}$.

Answer 74MYS.

The objective is to find the given product.

To multiply a two positive numbers, multiply their absolute values. The product is positive.

First write the mixed fraction as a single fraction.

$$3\frac{1}{2}=\frac{7}{2}$$

Apply the identity property $a=\frac{a}{1}$ to 5 and rewrite the expression as follows:

$$5=\frac{5}{1}$$

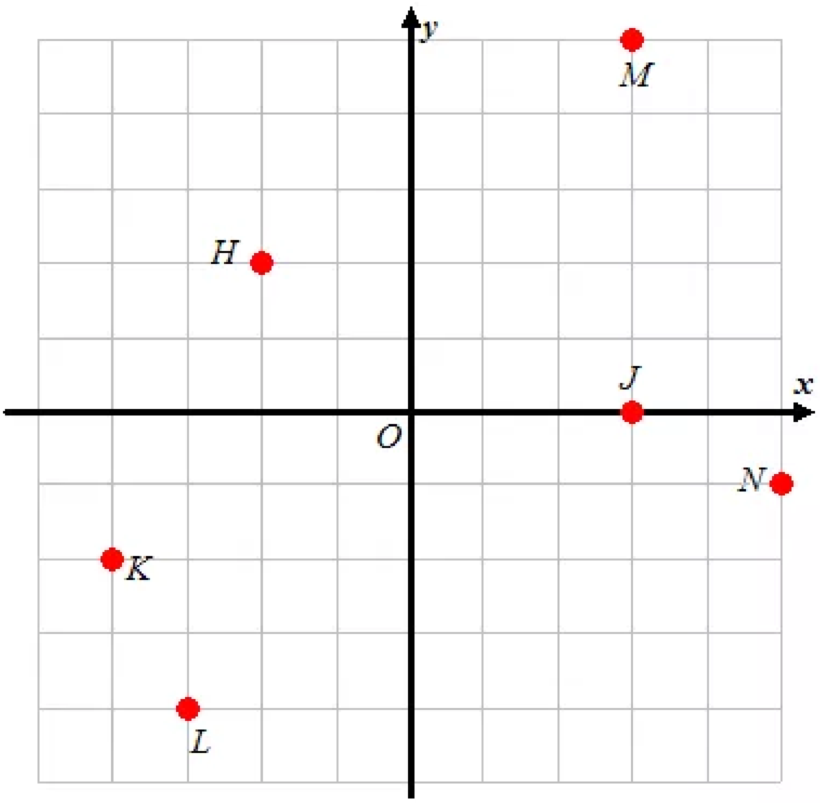
Apply the rule for multiplying fractions $\frac{a}{b}\cdot\frac{c}{d}=\frac{ac}{bd}$

$\left(\frac{5}{1}\right)\left(\frac{7}{2}\right)=\frac{35}{2}$ Multiply the absolute values of the number

Therefore, $\left(\frac{5}{1}\right)\left(\frac{7}{2}\right)=\boxed{\frac{35}{2}}$.

Answer 75MYS.

Consider the graph of the ordered pairs



Write the ordered pair for point *H*.

Step 1: Begin at point *H*.

Step 2: Follow along a vertical line through the point to find the *x*-coordinate on the *x*-axis. The *x*-coordinate is -2.

Step 3: Follow along a horizontal line through the point to find the *y*-coordinate on the *y*-axis. The *y*-coordinate is 2.

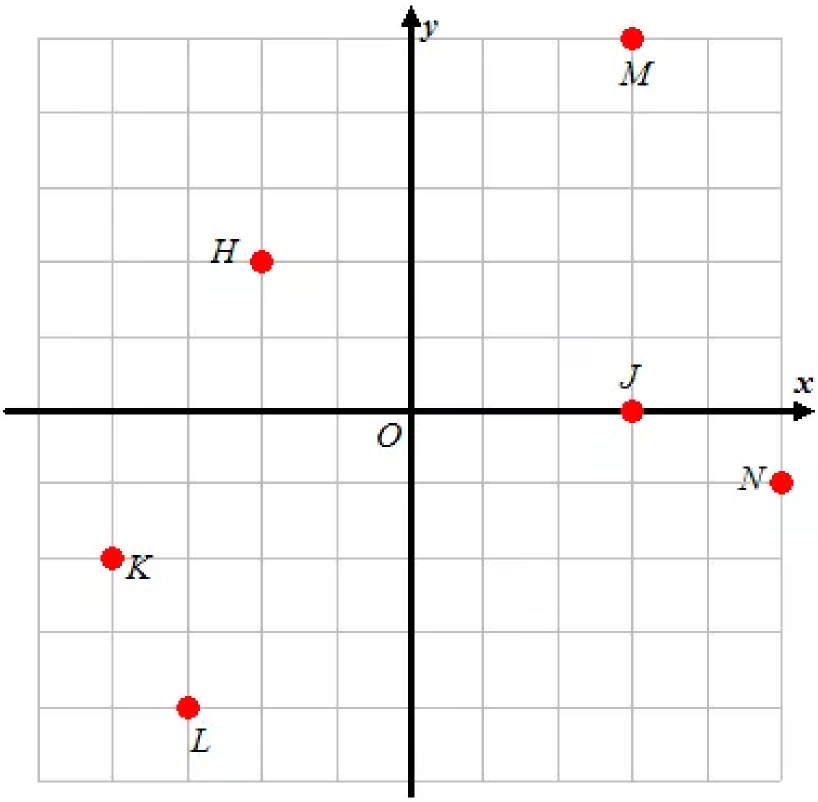
Step 4: So, the ordered pair for point *H* is $(-2,2)$. This can also be written as $H(-2,2)$.

Since *x*-coordinate is negative and *y*-coordinate is positive, the point *N* is in II quadrant.

Therefore, the ordered pair is $\boxed{H(-2,2)}$ and the point is located in the $\boxed{\text{Quadrant II}}$.

Answer 76MYS.

Consider the graph of the ordered pairs



Write the ordered pair for point *J*.

Step 1: Begin at point *J*.

Step 2: Follow along a vertical line through the point to find the *x*-coordinate on the *x*-axis. The *x*-coordinate is 3.

Step 3: Follow along a horizontal line through the point to find the *y*-coordinate on the *y*-axis. The *y*-coordinate is 0.

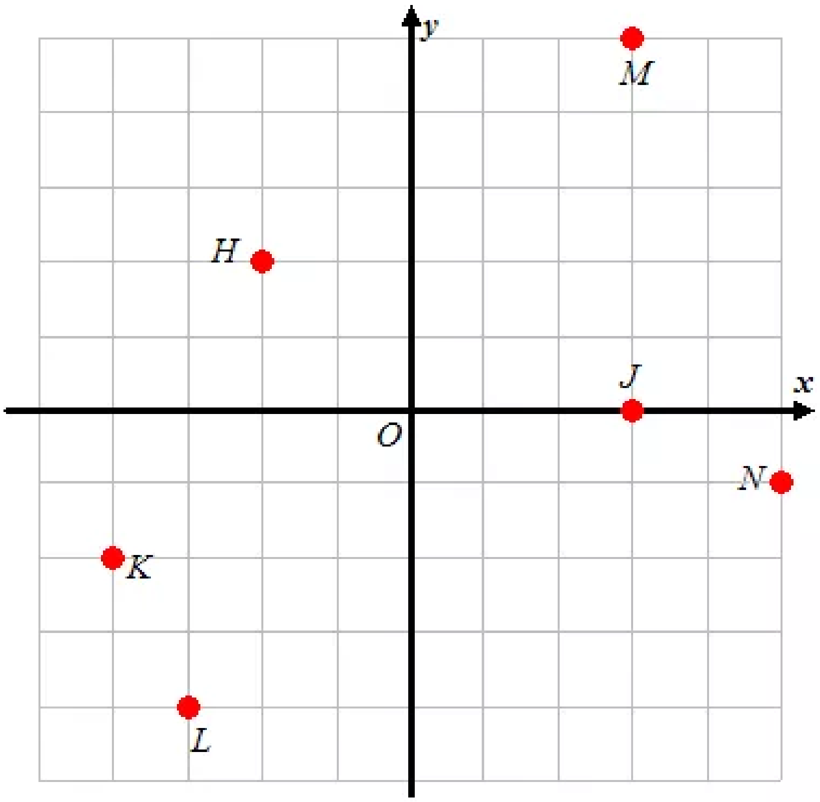
Step 4: So, the ordered pair for point *J* is $(3,0)$. This can also be written as $J(3,0)$.

Since both *x* and *y*-coordinates are positive, the point *J* is in I quadrant.

Therefore, the ordered pair is $\boxed{J(3,0)}$ and the point is located in the $\boxed{\text{Quadrant I}}$.

Answer 77MYS.

Consider the graph of the ordered pairs



Write the ordered pair for point *K*.

Step 1: Begin at point *K*.

Step 2: Follow along a vertical line through the point to find the *x*-coordinate on the *x*-axis. The *x*-coordinate is -4.

Step 3: Follow along a horizontal line through the point to find the *y*-coordinate on the *y*-axis. The *y*-coordinate is -2

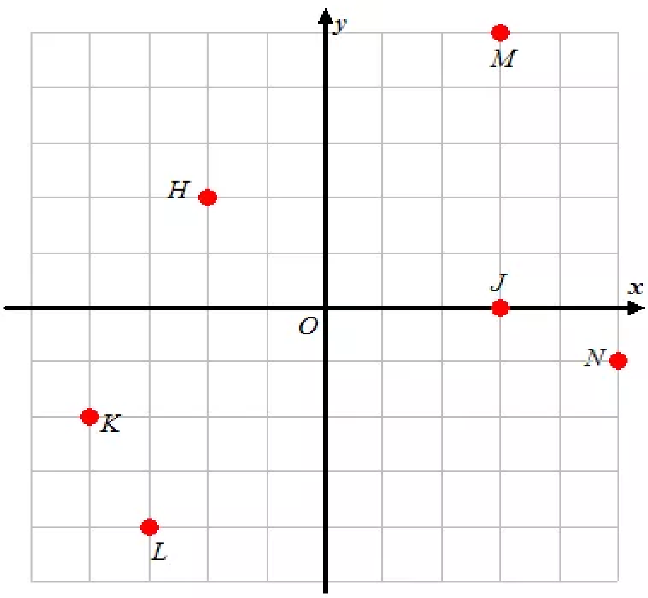
Step 4: So, the ordered pair for point *K* is $(-4,-2)$. This can also be written as $K(-4,-2)$.

Since both *x* and *y*-coordinates are negative, the point *K* is in III quadrant.

Therefore, the ordered pair is $\boxed{K(-4,-2)}$ and the point is located in the $\boxed{\text{Quadrant III}}$.

Answer 78MYS.

Consider the graph of the ordered pairs



Write the ordered pair for point *L*.

Step 1: Begin at point *L*

Step 2: Follow along a vertical line through the point to find the *x*-coordinate on the *x*-axis. The *x*-coordinate is -3.

Step 3: Follow along a horizontal line through the point to find the *y*-coordinate on the *y*-axis. The *y*-coordinate is -4

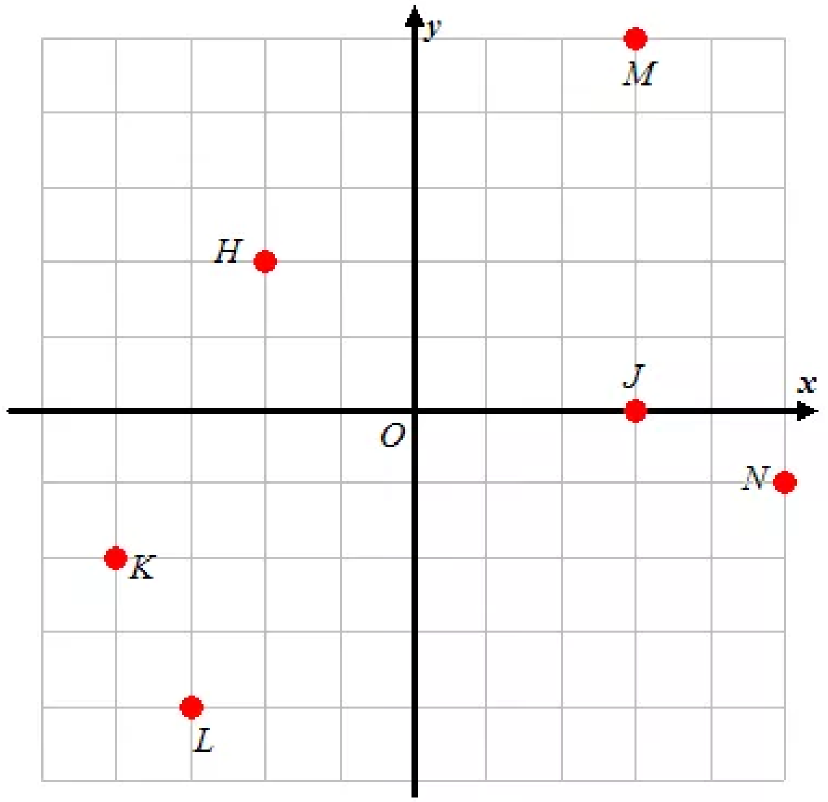
Step 4: So, the ordered pair for point *L* is $(-3,-4)$. This can also be written as $L(-3,-4)$.

Since both *x* and *y*-coordinates are negative, the point *L* is in III quadrant.

Therefore, the ordered pair is $\boxed{L(-3,-4)}$ and the point is located in the $\boxed{\text{Quadrant III}}$.

Answer 79MYS.

Consider the graph of the ordered pairs



Write the ordered pair for point *M*.

Step 1: Begin at point *M*.

Step 2: Follow along a vertical line through the point to find the *x*-coordinate on the *x*-axis. The *x*-coordinate is 3.

Step 3: Follow along a horizontal line through the point to find the *y*-coordinate on the *y*-axis. The *y*-coordinate Is 5.

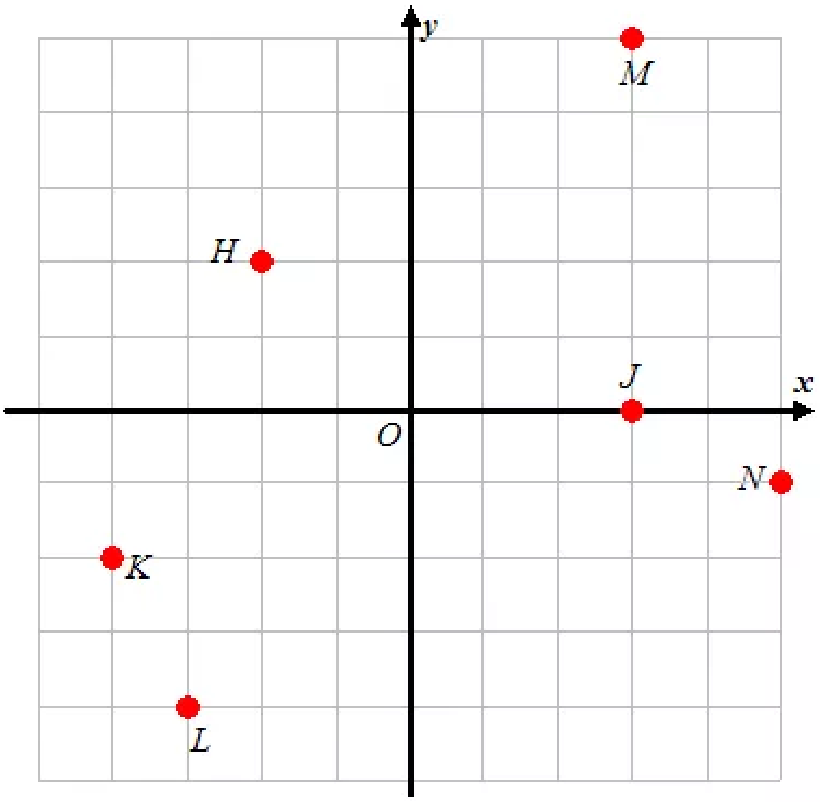
Step 4: So, the ordered pair for point *M* is $(3,5)$. This can also be written as $M(3,5)$.

Since both *x* and *y*-coordinates are positive, the point *M* is in I quadrant.

Therefore, the ordered pair is $\boxed{M(3,5)}$ and the point is located in the $\boxed{\text{Quadrant I}}$.

Answer 80MYS.

Consider the graph of the ordered pairs



Write the ordered pair for point *N*

Step 1: Begin at point *N*.

Step 2: Follow along a vertical line through the point to find the *x*-coordinate on the *x*-axis. The *x*-coordinate is 5.

Step 3: Follow along a horizontal line through the point to find the *y*-coordinate on the *y*-axis. The *y*-coordinate is -1.

Step 4: So, the ordered pair for point *N* is $(5,-1)$. This can also be written as $N(5,-1)$.

Since *x*-coordinate is positive and *y*-coordinate is negative, the point *N* is in IV quadrant.

Therefore, the ordered pair is $\boxed{N(5,-1)}$ and the point is located in the $\boxed{\text{Quadrant IV}}$.