NUMBER SERIES

Q. 1) Find the missing term in the series.
18, 20, 30, 42, 110, 140, ?

Q. 2) There are 3 series, you have to find values of a, b and c and then use them to solve the following equation and find the absolute value of k.
50% of b – 14.28% of 7a + c = k
(i) 1221, 1364, 1561, 1816, a, 2540
(ii) 1160, 1329, b, 1979, 2508, 3349, 4310
(iii) 136, 154, 202, 302, 482, c

Q. 3) What will come in place of question mark (?) in the following number series?
12960, ?, 432, 108, 36, 18

Q. 4) What should come in place of the question mark '?' in the following number series?
17, 90, 273, 274, -275, 822, ?

Q. 5) Directions: In the given series A, B, C are positive integers that are given in terms of x, y and z which are also positive integers.
?, A, B, C, D
Set - 1. $x^2 – 33x + 270 = 0$ (smaller root)
$y = z = (1296)^{1/4}$
Set - 2. A = xy + z
B = x + y + (z/2)
C = yz + x – 3
D = y + z
What will come in the place of '?'

Q. 6)What will come in the place of question mark in the following number series ?
32.5 , 70 , ? , 160 , 212.5

Q. 7) Below given a series I which contains a wrong number. Find the wrong term and form a series II that will start with the wrong term of series I. Both of the series follow the same logic.
Series I : 7, 15, 35, 67, 138, 281, 568
If 3rd term of series (II) = K, then which of the following statement is correct?

Q. 8) Two series I and II following a certain pattern are given below. In both series, one of the numbers is the odd one out such that the odd one out numbers in series I and in series II are represented by 'x' and 'y' respectively.
I : 110, 66, 40, 28, 19, 12.5
II. 24, 11, 10, 14, 32, 66.5
Which of the following statement is not correct according to the given information?

Q. 9) What will come in place of question mark (?) in the following number series?
320, 162, 84, 46, 28, ?

Q. 10) In each of the following number series, the wrong number is given, find out that number.
5.5, 12, 25, 51, 103, 205

QUADRATIC EQUATIONS

Q. 1) Find the relation between x and y.
(625)1/2 /x2 - 144/12x + 729 / 81x2 = (64)1/3 / x2
19.68 - 5.28 - 1.9 = 2y2

Q. 2) In the given question, two equations numbered I and II are given. Solve both the equations and mark the appropriate answer.
I. 3X2 – 42X + 135 = 0
II. 2Y2 – 42Y + 220 = 0

Q. 3) In the given question, two equations numbered I and II are given. Solve both the equations and mark the appropriate answer.
I. x2 - 31x + 240 = 0
II. y2 - 27y + 182 = 0

Q. 4) What is the product of positive values for 'k' for both the given equations?

Q. 5) Which of the following statements is/are correct?

Q. 6) Two equations numbered I and II with variables x and y are given. Find the value of p + q, if p is the highest root of equation1 and q is the lowest root of equation 2.

I) (36)1/2x2 – (24389)1/3x + 1156/34 = 0
II) (64)1/3y2– (169)1/2y + 9 = 0

Q. 7) In the given question, two equations numbered I and II are given. Solve both the equations and mark the appropriate answer.
I. x2 – 42x + 405 = 0
II. y2 + 17y – 480 = 0

Q. 8) Find the square root sum of the higher value in Equation I and the smaller value in Equation II

Q. 9) Which of the following conditions is true?

Q. 10) In the given question, two equations numbered I and II are given. Solve both the equations and mark the appropriate answer.
I. 6x2 – 11x + 4 = 0
II. 20y2 – 13y + 2 = 0

ANSWER NUMBER SERIES

1.E

Given:

18, 20, 30, 42, 110, 140, ?

Calculation:

The pattern is as follows;

⇒ $18 + 1^2 + 1 = 20$

⇒ $20 + 2^3 + 2 = 30$

⇒ $30 + 3^2 + 3 = 42$

⇒ $42 + 4^3 + 4 = 110$

⇒ $110 + 5^2 + 5 = 140$

⇒ $140 + 6^3 + 6 = 362$

∴ The value of ? is 362.

2.E

Considering the series (i),

1221, 1364, 1561, 1816, a, 2540

The logic of series (i) can be explained as,

$1364 – 1221 = 143 ⇒ 12^2 – 1$

$1561 – 1364 = 197 ⇒ 14^2 + 1$

$1816 – 1561 = 255 ⇒ 16^2 – 1$

$a – 1816 = 18^2 + 1$

⇒ a = 2141

Con sidering the series (ii),

1160, 1329, b, 1979, 2508, 3349, 4310

The logic of series (ii) can be explained as,

$4310 – 3349 = 961 ⇒ 31^2$

$3349 – 2508 = 841 ⇒ 29^2$

$2508 – 1979 = 529 ⇒ 23^2$

$1979 – b = 19^2$

⇒ b = 1618

Considering the series (iii),

136, 154, 202, 302, 482, c

The logic of series (iii) can be explained as,

$154 – 136 = 18 = 3^3 – 3^2$

$202 – 154 = 48 = 4^3 – 4^2$

$302 – 202 = 100 = 5^3 – 5^2$

$482 – 302 = 180 = 6^3 – 6^2$

$c - 482 = 7^3 – 7^2$

⇒ c = 776

50% of b – 14.28% of 7a + c = k

50% of 1618 – 14.28% of 7(2141) + 776 = k

⇒ 1/2 of 1618 – 1/7 of 7(2141) + 776 = k

⇒ 809 – 2141 + 776 = k

⇒ k = - 556

Absolute value of k = 556

∴ a = 2141, b = 1618, c = 776, k = - 556,

Absolute value of k = 556.

Students usually choose -556 as the right answer but in the question, the Absolute value of k is asked. So, the correct answer is 556.

3.D

Calculation:

The series follows the following pattern

12960 ÷ 6 = 2160

2160 ÷ 5 = 432

432 ÷ 4 = 108

108 ÷ 3 = 36

36 ÷ 2 = 18

∴ The missing number is 2160.

4.D

Calculation:

The series follows following pattern

17 × 5 + 5 = 90

90 × 3 + 3 = 273

273 × 1 + 1 = 274

274 × (-1) - 1 = -275

-275 × (-3) - 3 = 822

822 × (-5) - 5 = -4115

∴ The value of ? is -4115

5.C

Set - 1 : Solving independently for x, y and z.

x2 – 33x + 270 = 0

⇒ x2 – 18x – 15x + 270 = 0

⇒ x(x – 18) – 15(x – 18) = 0

⇒ (x – 18) (x – 15) = 0

⇒ x = 18, 15

∴ x = 15 (smaller root)

y = z = (1296)1/4

⇒ $y = z = (6^4)^{1/4}$

∴ y = z = 6

Set - 2 : Solving independently for A, B, C and D.

A = xy + z

⇒ A = 15 × 6 + 6

∴ A = 96

B = x + y + (z/2)

⇒ B = 15 + 6 + 6/2

∴ B = 24

C = yz + x – 3

⇒ C = 6 × 6 + 15 – 3

⇒ C = 36 + 12

∴ C = 48

D = y + z

⇒ D = 6 + 6

∴ D = 12

∴ The above series can be written as

?, 96, 24, 48, 12

Series pattern:

Alternate series

96/2 = 48

Similarly 24/2 = 12

∴ Next difference should be 24 × 2 = 48

∴ ? = 48

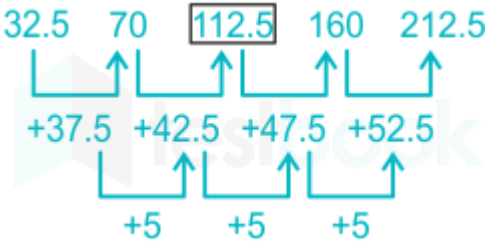
6.B

Given:

32.5 , 70 , ? , 160 , 212.5

Calculation:

Here the logic follows as,



Hence the third term will be 112.5
∴∴ The correct answer is 112.5.

7.C
Series I :
7 × 2 + 1 = 15
15 × 2 + 2 = 32
32 × 2 + 3 = 67
67 × 2 + 4 = 138
138 × 2 + 5 = 281
281 × 2 + 6 = 568
The wrong term of series I = 35
The first term of series II = 35
35 × 2 + 1 = 71
71 × 2 + 2 = 144 = K
144 × 2 + 3 = 291
291 × 2 + 4 = 586
586 × 2 + 5 = 1177
Series II = 35, 71, 144, 291, 586, 1177
HCF of (35 and 144) = 1
Unit digit of 19^{144} = Unit digit of 9^{144} = Unit digit of $9^{2 \times 72}$ = 1
One root of x2 - px + 144 = 0 is 18.
Then, $(18)^2$ - p × 18 + 144 = 0
⇒ p = 26
Hence, the correct answer is Wrong term of series I and 'K' are co-prime to each other.

8.C
Series I :
110, 66, 40, 28, 19, 12.5
110 × 0.5 + 11 = 66
66 × 0.5 + 9 = 42 {x = 40}
42 × 0.5 + 7 = 28
28 × 0.5 + 5 = 19
19 × 0.5 + 3 = 12.5
Series II :
24 × 0.5 - 1 = 11
11 × 1 - 1 = 10
10 × 1.5 - 1 = 14
14 × 2 - 1 = 27 {y = 32}
27 × 2.5 - 1 = 66.5
Option1: x + y = 40 + 32 = 72 [True]
Option2: 2x - y = 2 × 40 - 32 = 48 [True]
Option3: x + 2y = 40 + 2 × 32 = 104 [False]
Option4: x - y = 40 - 32 = 8 [True]
Hence, the correct answer x + 2y = 114.

9.E
Calculation:
The pattern of the number series is-
⇒ 320 ÷ 2 + 2 =162
⇒ 162 ÷ 2 + 3 = 84
⇒ 84 ÷ 2 + 4 = 46
⇒ 46 ÷ 2 + 5 = 28
⇒ 28 ÷ 2 + 6 = 20
∴ The value of ? is 20

10.D
The series follows the following pattern:
5.5 × 2 + 1 = 12
12 × 2 + 1 = 25
25 × 2 + 1 = 51
51 × 2 + 1 = 103
103 × 2 + 1 = 207
∴ The wrong term in the series is 205.

QUADRATIC EQUATION ANS KEY \
1.D
Calculation:
$(625)^{1/2} / x^2$ - 144/12x + 729 / $81x^2 = (64)^{1/3} / x^2$
25 /x^2 - 12/x + 9/ x^2 = 4/ x^2
30 / x^2 = 12/x
$30x = 12x^2$
30 = 12x
x = 30/12 = 5/2 = 2.5
So, x = 2.5
Now,
$19.68 - 5.28 - 1.9 = 2y^2$
y^2 = 6.25
y = ± 2.5
When we compare root of x with roots of y, two cases will form,

Value of x	Value of y	Relation
2.5	2.5	x = y
2.5	-2.5	x > y

Hence, x ≥ y is satisfied.
∴ The correct answer is option (4).

2. alculation:
I. $3X^2 - 42X + 135 = 0$
⇒ $X^2 - 14X + 45 = 0$ ----(∵ divide by 3)
⇒ $X^2 - 9X - 5X + 45 = 0$
⇒ X(X – 9) – 5(X – 9) = 0
⇒ (X – 5) (X – 9) = 0
∴ The value of X is 5, 9.
II. $2Y^2 - 42y + 220 = 0$
⇒ $Y^2 - 11Y - 10Y + 110 = 0$ ----(∵ taking 2 as common)
⇒ Y(Y – 11) – 10Y(Y – 11) = 0
⇒ (Y – 10) (Y – 11) = 0
∴ The value of Y is 10, 11.

Value of X	Value of Y	Relation
5	10	X < Y

5	11	X < Y
9	10	X < Y
9	11	X < Y

∴ X < Y.

3.A
Given:
I. x^2 - 31x + 240 = 0
⇒ x^2 - 16x - 15x + 240 = 0
⇒ x (x - 16) - 15 (x - 16) = 0
⇒ (x - 15) (x - 16) = 0
⇒ x = 15, 16
II. y^2 - 27y + 182= 0
⇒ y^2 - 14y - 13y + 182 = 0
⇒ y (y - 14) - 13 (y - 14) = 0
⇒ (y - 13) (y - 14) = 0
⇒ y = 13, 14
Comparison between x and y (via Tabulation):

Value of y	Value of y	Relation
15	13	x > y
15	14	x > y
16	13	x > y
16	14	x > y

Hence, x > y
4.C
Given:
kx2 – 20x + (21 + k) = 0
Concept Used:
If a quadratic equation (ax2 + bx + c = 0) has equal roots, then discriminant should be zero i.e. b2 – 4ac = 0
Calculation:
kx2 – 20x + (21 + k) = 0
Therefore, b2 – 4ac = 0
⇒ (20)2 – 4(k)(21 + k) = 0
⇒ 400 – 4k(21 + k) = 0
⇒ 400 – 84k – 4k2 = 0
⇒ 4k2 + 84k – 400 = 0
⇒ k2 + 21k – 100 = 0
⇒ k2 + 25k – 4k – 100 = 0
⇒ k(k + 25) – 4(k + 25) = 0
⇒ (k – 4)(k + 25) = 0
⇒ k = -25, 4
Therefore, positive values for k = 4
Given:
x2 – (k + 2)x + 121 = 0
Concept Used:
If a quadratic equation (ax2 + bx + c = 0) has equal roots, then discriminant should be zero i.e. b2 – 4ac = 0
Calculation:
x2 – (k + 2)x + 121 = 0
Therefore, b2 – 4ac = 0
⇒ (k + 2)2 – 4(1)(121) = 0
⇒ k2 + 4k + 4 – 484 = 0
⇒ k2 + 4k – 480 = 0
⇒ k2 + 24k – 20k – 480 = 0
⇒ k(k + 24) – 20(k + 24) = 0
⇒ (k + 24)(k – 20) = 0
⇒ k = -24, 20
Therefore, positive values for k = 4
Required product = (20 x 4) = 80
Hence, the correct answer is 80.
5.B
Given:
kx2 – 20x + (21 + k) = 0
Concept Used:
If a quadratic equation (ax2 + bx + c = 0) has equal roots, then discriminant should be zero i.e. b2 – 4ac = 0
Calculation:
kx2 – 20x + (21 + k) = 0
Therefore, b2 – 4ac = 0
⇒ (20)2 – 4(k)(21 + k) = 0
⇒ 400 – 4k(21 + k) = 0
⇒ 400 – 84k – 4k2 = 0
⇒ 4k2 + 84k – 400 = 0
⇒ k2 + 21k – 100 = 0
⇒ k2 + 25k – 4k – 100 = 0
⇒ k(k + 25) – 4(k + 25) = 0
⇒ (k – 4)(k + 25) = 0
⇒ k = -25, 4
Therefore, positive values for k = 4
Given:
x2 – (k + 2)x + 121 = 0
Concept Used:
If a quadratic equation (ax2 + bx + c = 0) has equal roots, then discriminant should be zero i.e. b2 – 4ac = 0
Calculation:
x2 – (k + 2)x + 121 = 0
Therefore, b2 – 4ac = 0
⇒ (k + 2)2 – 4(1)(121) = 0
⇒ k2 + 4k + 4 – 484 = 0
⇒ k2 + 4k – 480 = 0
⇒ k2 + 24k – 20k – 480 = 0
⇒ k(k + 24) – 20(k + 24) = 0
⇒ (k + 24)(k – 20) = 0
⇒ k = -24, 20
Therefore, positive values for k = 4
Positive value of second equation is greater than positive value of first equation is correct statement.
Hence, the correct answer is option 2.

6.C
Calculation:
$(36)^{1/2}x^2 – (24389)^{1/3}x + 1156/34 = 0$
$6x^2 – 29x + 34 = 0$
(x-2)(6x-17)=0
x = 2, 17/6

p = 17/6
$(64)^{1/3}y^2 – (169)^{1/2}y + 9 = 0$
$4y^2 – 13y + 9 = 0$
(y-1)(4y - 9) = 0
y = 1, 9/4
q = 1
p + q = 17/6 + 1 = 23/6
Hence, the correct answer is option number 3.

7.B

According to given equations
I. x2 – 42x + 405 = 0
⇒ x2 – 27x – 15x + 405 = 0
⇒ x(x – 27) –15(x – 27) = 0
⇒ (x – 27) (x – 15) = 0
⇒ x = 27, 15
II. y2 + 17y – 480 = 0
⇒ y2 + 32y – 15y – 480 = 0
⇒ y(y + 32) – 15(y + 32) = 0
⇒ (y + 32) (y – 15) = 0
⇒ y = 15, -32
Comparison between x and y (via Tabulation):

x	y	Relation
27	15	x>y
27	-32	x>y
15	15	x=y
15	-32	x>y

∴ x ≥ y

8.B

General Solution:
I. 18x2 - 3ax -19 = 11x2 - 2ax – 10
$18x^2 - 11x^2 - 3ax + 2ax – 19 + 10 = 0$
$7x^2 - ax - 9 = 0$ ---- 1
Substitute x = - 3/7 in equation 1
$7 × (- 3/7)^2 - a × (-3/7) – 9 = 0$
7× (9/49) + (3a/7) – 9 = 0
9/7 + 3a/7 = 9
9 + 3a = 63
3a = 54
Sub a = 18 in equation 1
$7x^2 - 18x – 9 =0$
$7x^2 - 21x + 3x – 9 = 0$
7x (x – 3) + 3 (x – 3) = 0
(7x + 3) (x – 3) = 0
x = -3/7 (or) 3
Hence the larger root of the equation is 3
The larger root of the equation II is 5* 3 = 15
II. $y^2 - 5by + 210 = - 4by + 15$
$y^2 – 5by + 4by + 210 – 15 = 0$
$y^2 – by + 195 = 0$ --- 2
(15) 2 - b×15 + 195 = 0
225 – b × 15 + 195 = 0
b = 420/15 = 28
sub b = 28 in equation 2
$y^2 – 28b + 195 = 0$
$y^2 - 28y + 195 = 0$
$y^2 - 13y – 15y + 195 = 0$
y (y - 13) – 15 (y - 15) = 0
(y - 13) (y - 15) = 0
y = 13, 15

Higher root in the equation I = 3
Smaller root in the equation II = 13
The square root of the sum of the required roots = √ (13 + 3) = √16 = 4

9.D

General Solution:
I. 18x2 - 3ax -19 = 11x2 - 2ax – 10
18x2 - 11x2 - 3ax + 2ax – 19 + 10 = 0
7x2 - ax – 9 = 0 ----◊ 1
Substitute x = - 3/7 in equation 1
7 × (- 3/7)2 - a × (-3/7) – 9 = 0
7× (9/49) + (3a/7) – 9 = 0
9/7 + 3a/7 = 9
9 + 3a = 63
3a = 54
Sub a = 18 in equation 1
7x2 - 18x – 9 =0
7x2 - 21x + 3x – 9 = 0
7x (x – 3) + 3 (x – 3) = 0
(7x + 3) (x – 3) = 0
x = -3/7 (or) 3
Hence the larger root of the equation is 3
The larger root of the equation II is 5* 3 = 15
II. y2 - 5by + 210 = - 4by + 15
y2 – 5by + 4by + 210 – 15 = 0
y2 – by + 195 = 0 ---◊ 2
(15) 2 - b×15 + 195 = 0
225 – b × 15 + 195 = 0
b = 420/15 = 28
sub b = 28 in equation 2
y2 – 28b + 195 = 0
y2 - 28y + 195 = 0
y2 - 13y – 15y + 195 = 0
y (y - 13) – 15 (y - 15) = 0
(y - 13) (y - 15) = 0
y = 13, 15
Solution for Question No 2:
Value of a = 18
b = 28
check option 1)
4b – 2a = 32
4× 28 – 2 × 18 = 76
4b – 2a ≠ 32 option 1 is wrong
check option 2)
2a – 3b = 120
2 × 18 – 3 × 28 = - 48
check option 3)
2a + b = 82
2 × 18 + 28 = 64
option 3 is correct
check option 4)
3b – 4a = 52
3 × 28 – 4 × 18 = 25
12 ≠ 25
3b – 4a ≠ 52
option 4 is wrong

10.A

I. $6x^2 - 11x + 4 = 0$

$\Rightarrow 6x^2 - 8x - 3x + 4 = 0$

$\Rightarrow (3x - 4)(2x - 1) = 0$

$\Rightarrow x = 4/3, 1/2$

II. $20y^2 - 13y + 2 = 0$

$\Rightarrow 20y^2 - 8y - 5y + 2 = 0$

$\Rightarrow (5y - 2)(4y - 1) = 0$

$\Rightarrow y = 2/5, 1/4$

Value of x	Value of y	Relation
4/3	2/5	x > y
4/3	1/4	x > y
1/2	2/5	x > y
1/2	1/4	x > y

$\therefore$ x > y