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DMRC Math Aptitude Sample Paper 2016 PDF Download

(1) The banker's discount on Rs. 1600 at 15% per annum is the same as true discount on Rs. 1680 for the same time and at the same rate. The time is:

[A] 3 months

[B] 4 months

[C] 6 months

[D] 8 months

Answer : [B]

Explanation:
S.I. on Rs. 1600 = T.D. on Rs. 1680.
∴ Rs. 1600 is the P.W. of Rs. 1680, *i.e.,* Rs. 80 is on Rs. 1600 at 15%.
∴ Time = $\left(\frac{100 \times 80}{1600 \times 15}\right)_{\text{year}} = \frac{1}{3}$ year = 4 months.

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(2) The present worth of a certain bill due sometime hence is Rs. 800 and the true discount is Rs. 36. The banker's discount is:

[A] Rs. 37

[B] Rs. 37.62

[C] Rs. 34.38

[D] Rs. 38.98

Answer : [B]

Explanation:
B.G. = $\frac{(\text{T.D.})^2}{\text{P.W.}}$ = Rs. $\left(\frac{36 \times 36}{800}\right)$ = Rs. 1.62

∴ B.D. = (T.D. + B.G.) = Rs. (36 + 1.62) = Rs. 37.62

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(3) The difference between the place value and the face value of 6 in the numeral 856973 is

[A] 973

[B] 6973

[C] 5994

[D] None of these

Answer : [C]

Explanation: (Place value of 6) - (Face value of 6) = (6000 - 6) = 5994

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(4) Which one of the following numbers is completely divisible by 99?

[A] 3572404

[B] 135792

[C] 913464

[D] 114345

[E] None of these

Answer : [D]

Explanation:
99 = 11 x 9, where 11 and 9 are co-prime.
By hit and trial, we find that 114345 is divisibleby 11 as well as 9. So, it is divisible by 99.

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(5) The sum all even natural numbers between 1 and 31 is:

[A] 16

[B] 128

[C] 240

[D] 512

Answer : [C]

Explanation:
Required sum = (2 + 4 + 6 + ... + 30)
This is an A.P. in which $a = 2$, $d = (4 - 2) = 2$ and $l = 30$.
Let the number of terms be n. Then,
$t_n = 30 \Rightarrow a + (n - 1)d = 30$
$\Rightarrow 2 + (n - 1) \times 2 = 30$
$\Rightarrow n - 1 = 14$
$\Rightarrow n = 15$
$\therefore S_n = \frac{n}{2}(a + l) = \frac{15}{2} \times (2 + 30) = 240.$

(6) $2 + 2^2 + 2^3 + ... + 2^9 = ?$

[A] 2044

[B] 1022

[C] 1056

[D] None of these

Answer : [B]

Explanation:
This is a G.P. in which $a = 2$, $r = \frac{2^2}{2} = 2$ and $n = 9$.

$\therefore S_n = \frac{a(r^n - 1)}{(r - 1)} = \frac{2 \times (2^9 - 1)}{(2 - 1)} = 2 \times (512 - 1) = 2 \times 511 = 1022.$

(7) How many terms are there in the G.P. 3, 6, 12, 24, ... , 384 ?

[A] 8

[B] 9

[C] 10

[D] 11

[E] 7

Answer : [A]

Explanation:
Here $a = 3$ and $r = \frac{6}{3} = 2$. Let the number of terms be n.

Then, $t_n = 384 \Rightarrow ar^{n-1} = 384$
$\Rightarrow 3 \times 2^{n-1} = 384$
$\Rightarrow 2^{n-1} = 128 = 2^7$
$\Rightarrow n - 1 = 7$
$\Rightarrow n = 8$
$\therefore$ Number of terms = 8.

(8) On multiplying a number by 7, the product is a number each of whose digits is 3. The smallest such number is:

[A] 47619

[B] 47719

[C] 48619

[D] 47649

Answer : [A]

Explanation:
By hit and trial, we find that
47619 x 7 = 333333.

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(9) 587 x 999 = ?

[A] 586413

[B] 587523

[C] 614823

[D] 615173

Answer : [A]

Explanation:
587 x 999 = 587 x (1000 - 1)

= 587 x 1000 - 587 x 1

= 587000 - 587

= 586413.

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(10) 35 + 15 x 1.5 = ?

[A] 85

[B] 51.5

[C] 57.5

[D] 5.25

[E] None of these

Answer : [C]

Explanation:
Given Exp. = $35 + 15 \times \frac{3}{2} = 35 + \frac{45}{2} = 35 + 22.5 = 57.5$

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(11) If $(64)^2 - (36)^2 = 20 \times x$, then x = ?

[A] 70

[B] 120

[C] 180

[D] 140

[E] None of these

Answer : [D]

Explanation:
20 x x = (64 + 36)(64 - 36) = 100 x 28
$\Rightarrow \quad x = \frac{100 \text{ x } 28}{20} = 140$

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(12) 666 ? 6 ? 3 = ?

[A] 37

[B] 333

[C] 111

[D] 84

[E] None of these

Answer : [A]

Explanation:
Given Exp. = $666 \text{ x } \frac{1}{6} \text{ x } \frac{1}{3} = 37$

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(13) $(1000)^9$? 10^{24} = ?

[A] 10000

[B] 1000

[C] 100

[D] 10

[E] None of these

Answer : [B]

Explanation:
Given Exp. = $\frac{(1000)^9}{10^{24}} = \frac{(10^3)^9}{10^{24}} = \frac{(10)^{27}}{10^{24}} = 10^{(27-24)} = 10^3 = 1000$

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(14) 3 + 33 + 333 + 3.33 = ?

[A] 362.3

[B] 372.33

[C] 702.33

[D] 702

[E] None of these

Answer : [B]

Explanation:

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   3 +  33 + 333 +   3.33   ------   372.33   ------
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(15) Three times the first of three consecutive odd integers is 3 more than twice the third. The third integer is:

[A] 9

[B] 11

[C] 13

[D] 15

Answer : [D]

Explanation:
Let the three integers be x, $x + 2$ and $x + 4$.
Then, $3x = 2(x + 4) + 3 \Leftrightarrow x = 11$.
$\therefore$ Third integer = $x + 4 = 15$.

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(16) The difference between a two-digit number and the number obtained by interchanging the digits is 36. What is the difference between the sum and the difference of the digits of the number if the ratio between the digits of the number is 1 : 2 ?

[A] 4

[B] 8

[C] 16

[D] None of these

Answer : [B]

Explanation:
Since the number is greater than the number obtained on reversing the digits, so the ten's digit is greater than the unit's digit.
Let ten's and unit's digits be $2x$ and x respectively.
Then, $(10 \text{ x } 2x + x) - (10x + 2x) = 36$
$\Rightarrow 9x = 36$
$\Rightarrow x = 4$.
$\therefore$ Required difference = $(2x + x) - (2x - x) = 2x = 8$.

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(17) The difference between a two-digit number and the number obtained by interchanging the positions of its digits is 36. What is the difference between the two digits of that number?

[A] 3

[B] 4

[C] 9

[D] Cannot be determined

[E] None of these

Answer : [B]

Explanation:
Let the ten's digit be x and unit's digit be y.
Then, $(10x + y) - (10y + x) = 36$
$\Rightarrow 9(x - y) = 36$
$\Rightarrow x - y = 4$.

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(18) A two-digit number is such that the product of the digits is 8. When 18 is added to the number, then the digits are reversed. The number is:

[A] 18

[B] 24

[C] 42

[D] 81

Answer : [B]

Explanation:

Let the ten's and unit digit be x and $\frac{8}{x}$ respectively.

Then, $\left(10x + \frac{8}{x}\right) + 18 = 10 \text{ x } \frac{8}{x} + x$

$\Rightarrow 10x^2 + 8 + 18x = 80 + x^2$
$\Rightarrow 9x^2 + 18x - 72 = 0$
$\Rightarrow x^2 + 2x - 8 = 0$
$\Rightarrow (x + 4)(x - 2) = 0$
$\Rightarrow x = 2.$

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(19) The sum of the squares of three numbers is 138, while the sum of their products taken two at a time is 131. Their sum is:

[A] 20

[B] 30

[C] 40

[D] None of these

Answer : [A]

Explanation:
Let the numbers be a, b and c.
Then, $a^2 + b^2 + c^2 = 138$ and $(ab + bc + ca) = 131$.
$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca) = 138 + 2 \times 131 = 400$.
$\Rightarrow (a + b + c) = \sqrt{400} = 20$.

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(20) The sum of the digits of a two-digit number is 15 and the difference between the digits is 3. What is the two-digit number?

[A] 69

[B] 78

[C] 96

[D] Cannot be determined

[E] None of these

Answer : [D]

Explanation:
Let the ten's digit be x and unit's digit be y.
Then, $x + y = 15$ and $x - y = 3$ or $y - x = 3$.
Solving $x + y = 15$ and $x - y = 3$, we get: $x = 9$, $y = 6$.
Solving $x + y = 15$ and $y - x = 3$, we get: $x = 6$, $y = 9$.
So, the number is either 96 or 69.
Hence, the number cannot be determined.
