NMOT TEST PAPER_22-12-2017
SUB-JUNIOR GROUP_VI & VII
ANSWER-KEY SOLUTIONS

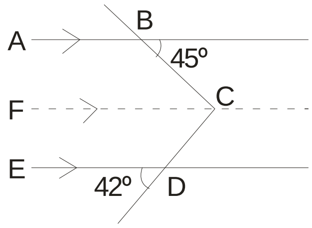
Ques	1	2	3	4	5	6	7	8	9	10
Ans.	C	C	C	A	A	C	D	C	C	B
Ques	11	12	13	14	15	16	17	18	19	20
Ans.	B	D	D	C	B	9	2	1	1	3

1. Middle No. = HCF of 551 and 1073 = 29

First No. = $\frac{551}{29} = 19$

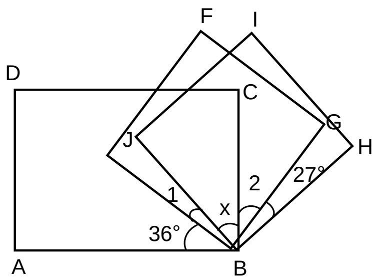
Third No. = $\frac{1073}{29} = 37$

Sum = 19 + 29 + 37 = 85



2.

$\angle ABC = 180^\circ - 45^\circ = 135$
$\angle CDE = 180^\circ - 42^\circ = 138$
$\angle BCF = 45^\circ$
$\angle FCD = 42^\circ$
$\angle BCD = \angle BCF + \angle FCD = 45 + 42 = 87$
$\therefore \angle ABC + \angle BCD + \angle CDE$
$= 135^\circ + 138^\circ + 87^\circ = 360^\circ$



3.

ABCD, BGFE and BHIJ are squares
$36^\circ + \angle 1 + x = 90^\circ$ __________(1)
$\angle 1 + x + \angle 2 = 90^\circ$__________(2)
$x + \angle 2 + 27^\circ = 90^\circ$_________(3)
from equation (2) and equation (3)
$\angle 1 + x + \angle 2 = x + \angle 2 + 27^\circ$
$\angle 1 = 27^\circ$
from equation (1)
$36 + \angle 1 + x = 90^\circ$
$36 + 27 + x = 90^\circ$
$x = 27^\circ$

4. a = – 1 b = 0

$a^{2007} + \frac{b^{2009}}{2008}$

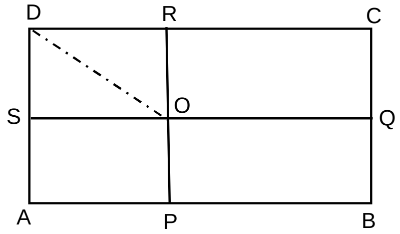
$(-1)^{2007} + \frac{(0)^{2009}}{2008} = -1 + 0 = -1$

5. Case I $\rightarrow$

RO = 1 , OP = 3 , OQ = 2 , OS = 4

$\therefore$ RP = 4 , SR = 6

Area of rectangle = 4 × 6 = 24



Case II $\rightarrow$

RO = 1 , OP = 2 , OQ = 3 , OS = 4

$\therefore$ RP = 3 , SR = 7

Area of rectangle = 3 × 7 = 21

Case III $\rightarrow$

RO = 1 , OP = 4 , OQ = 2 , OS = 3

RP = 5 , SR = 5

Area of rectangle = 5 × 5 = 25

Minimum area of Rectangle = 21

6. Case I when n =4

$$\frac{2008}{n(n+1)} = \frac{2008}{4(4+1)} = \frac{2008}{20}$$

Remainder = 8

Case II when n= 5

$$\frac{2008}{n(n+1)} = \frac{2008}{5(5+1)} = \frac{2008}{30}$$

Remainder = 28

Case III when n = 6

$$\frac{2008}{6(6+1)} = \frac{2008}{42}$$

Remainder = 34

Case IV when n = 7

$$\frac{2008}{7(7+1)} = \frac{2008}{56}$$

Remainder = 48

Case V when n = 8

$$\frac{2008}{8(8+1)} = \frac{2008}{72}$$

Remainder = 64

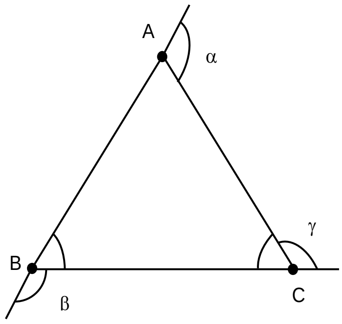
$$\frac{\text{Largest possible Value of R}}{\text{Smallest possible Value of R}} = \frac{64}{8} = 8 : 1$$

7. $5^{10x} = 4900$

So $5^{5x} = 70$ and $2^{\sqrt{y}} = 25 = 5^2$

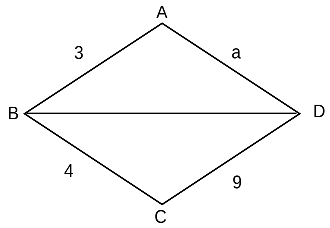
Now $\dfrac{5^{(x-1)5}}{4^{-\sqrt{y}}} = \dfrac{5^{5x} \times 5^{-5}}{2^{-2\sqrt{y}}} \Rightarrow \dfrac{70 \times 2^{2\sqrt{y}}}{5^5} = \dfrac{70 \times \left(2^{\sqrt{y}}\right)^2}{5^5} \Rightarrow \dfrac{70 \times (25)^2}{5^2} = \dfrac{70 \times 5^4}{5^5} = \dfrac{70}{5} = 14.$

8.



$\beta + B = 180°$
$2B + B = 180°$
$3B = 180°$
$B = 60°$
$\alpha + A = 180°$ and $\gamma + C = 180$
$\alpha = 180 - A$ $\gamma = 180 - C$
given $\alpha - \gamma = 40$
$180 - A - (180 - C) = 40$
$C - A = 40°$ __________ (1)
$C + A + B = 180°$
$A + C + 60° = 180°$
$A + C = 120°$ ___________(2)
from (1) and (2)
$C = 80°$
$A = 40°$

9.



In ΔBCD
$BC + CD > BD$
$BD < 4 + 9$
$BD < 13$ _______ (1)
$BD > CD - BC$
$BD > 9 - 4$
$BD > 5$ _______(2)
In ΔABD
$AB + BD > AD$
$3 + BD > a$ ______ (3)
from (1) and (3)
$a < 16$
In ΔABD
$BD - AB < AD$
$BD - 3 < a$ _______(4)
from (2) and (4)
$a > 2$
So that $2 < a < 16$

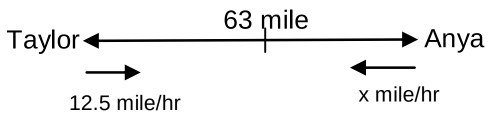
10. Let the number of candies in first box be 'x'
Number of candies in second box = 176 – x
If 16 candies are taken out from second box and put in first box.
Then,
Number of candies in first box = x + 16
Number of candies in second box = 176 – x – 16
= 160 – x
ATP $m(160 - x) + 16 = x + 16$
$m(160 - x) = x$
$m = \dfrac{x}{160 - x}$
m is an integer so minimum possible value of m = 3
$\therefore x = 120$

11. Suppose another angle of triangle ABC is $\angle C$
For the lowest possible angle of $\angle B$
$\angle B = \angle C$ ________(1)
$\because 2\angle B = 2\angle C = 5\angle A$
$\dfrac{\angle B}{5} = \dfrac{\angle C}{5} = \dfrac{\angle A}{2}$
So that $\angle B = \angle C = 75°$ & $\angle A = 30°$
For the largest possible value of $\angle A$
$\angle A = \angle C$
$2\angle B = 5\angle A = 5\angle C$
$\dfrac{\angle B}{5} = \dfrac{\angle C}{2} = \dfrac{\angle A}{2}$
So that $\angle B = 100°$, $\angle A = \angle C = 40°$
So that sum of lowest possible value of $\angle B$ (75°) + largest possible value of $\angle A$ (40°) = 115°

12. The ratio in which x and y are mixed, is not given. So both 1 and 2 together cannot given the answer.

13. Sample spaces = (1 , 1) , (2 , 1) , (3 , 1) , (4 , 1) , (5 , 1) , (6 , 1) , (2 , 2) , (3 , 2) , (4 , 2) , (5 , 2) , (6 , 2) , (3 , 3) , (4 , 3) , (5 , 3) , (6 , 3) , (4 , 4) , (5 , 4) , (6 , 4) , (5 , 5) , (6 , 5) , (6 , 6)
$\Rightarrow$ total favourable outcomes = 21
Total possible outcomes = 6 × 6
Probability = $\dfrac{21}{36} = \dfrac{7}{12}$

14. $34^n = (17 \times 2)^n$
34^n is multiple of 17 and 17 is a prime no.
$x = 32^2 \times 33^4 \times 35^6 \times 36^8$ in this expression there is not any multiple of 17.
So the value of n = 0
$0^{34} - 34^0 = 0 - 1 = -1$



15. Let speed of Anya = x mile/hr
Total time = 3hr
Relative speed = 12.5 + x
$\therefore$ speed = $\dfrac{\text{distance}}{\text{time}}$
$12.5 + x = \dfrac{63}{3}$
$\therefore x = 8.5$ mile/hr

16. $\frac{9^{3x}}{3^{4y}} = \frac{(3^2)^{3x}}{3^{4y}} = \frac{3^{6x}}{3^{4y}} = 3^{6x-4y}$
$= 3^{2(3x-2y)} = 3^{2\times 1} = 3^2 = 9$

17. $a^2 + b^2 - 6a - 4b + c^2 - 8c + 29 = 0$
$a^2 - 6a + 9 + b^2 - 4b + 4 + c^2 - 8c + 16 = 0$
$(a-3)^2 + (b-2)^2 + (c-4)^2 = 0$
So that
$a = 3, b = 2, c = 4$
Now $\frac{(ab+bc+ca)}{13}$
$\frac{3\times 2+2\times 4+4\times 3}{13}$
$\frac{6+8+12}{13} = \frac{26}{13} = 2$

18. Amount after 2 years = 5661
Amount after 5 years = 5827.5
Interest of 3 years = 5827.5 – 5661 = 166.5
Interest of 1 years = $\frac{166.5}{3} = 55.5/-$
Interest of 2 years = 55·5 × 2 = 111/-
So that principal = 5661 – 111 = 5550/-
Now S.I. = $\frac{P\times R\times T}{100}$
$111 = \frac{5550\times R\times 2}{100}$ $\qquad R = \frac{111\times 100}{5550\times 2} = 1\%$

19. $P = 20\frac{2}{3} - \left\{5\frac{1}{2} + 3 - \left(5 - \overline{6\frac{1}{2} - 2\frac{1}{3}}\right) + 9\right\}$
$Q = -5 - \left\{25 - 42 + \left(7 - 3\frac{1}{3} - 6\frac{2}{3}\right) + 10\right\}$
$P = \frac{62}{3} - \left\{\frac{11}{2} + 3 - \left(5 - \frac{25}{6}\right) + 9\right\} = \frac{62}{3} - \left\{\frac{50}{3}\right\} = \frac{12}{3} = 4$
$Q = -5 - \{25 - 42 + (-3) + 10\}$
$Q = -5 - \{-10\} = 5$
HCF of (4 , 5) = 1

20. Sum of the digits from 1 to 10 = 46
Sum of the digits from 11 to 20 = 56
Sum of the digits from 21 to 29 = 63
Sum of the digits from numbers
46 + 56 + 63 = 165
Sum of the digits in the number 165 = 12 which gives a remainder of 3 when divided by 9.