ANSWER KEY

1	(B)$3\sqrt{3}$
2	(B)2
3	(A)13
4	(C)81
5	(D)120
6	(B)235
7	(C)6
8	(C)35
9	(D) A is false and R is True
10	(D) A is false and R is True
11	Required number = Lcm(28,32) − Sum of remainder Lcm(28,32) = $2\times2\times2\times2\times2\times7 = 224$ $\begin{array}{r\|l} 2 & 28, 32 \\ 2 & 14, 16 \\ 2 & 7, 8 \\ 2 & 7, 4 \\ 2 & 7, 2 \\ 7 & 7, 1 \\ & 1, 1 \end{array}$ Sum of remainder ($\cancel{12+20}$) ($\cancel{1}$ 8+12) = 20 N = 224 − 20 = 204 $\boxed{OR}$ LCM(15,24,36) = 360 $\begin{array}{r\|l} 2 & 15, 24, 36 \\ 2 & 15, 12, 18 \\ 2 & 15, 6, 9 \\ 3 & 15, 3, 9 \\ 3 & 5, 1, 3 \\ 5 & 5, 1, 1 \\ & 1, 1, 1 \end{array}$ $\begin{array}{r} 27 \\ 360 \overline{)9999} \\ 720\downarrow \\ \hline 2799 \\ 2520 \\ \hline 279 \end{array}$ $\cancel{9999 - 99 = 9900}$ 9999 − 279 = 9720 is the number Ans.
12	

	Given; $LCM = 14HCF \rightarrow I$ $LCM + HCF = 600 \rightarrow II$ Put (I) in (II) $14HCF + HCF = 600$ $15HCF = 600$ $HCF = \frac{600}{15}$ $\boxed{HCF = 40}$ $LCM = 14HCF$ $= 14 \times 40$ $\boxed{LCM = 560}$ We know, $HCF \times LCM = a \times b$ $560 \times 40 = 280 \times b$ $\frac{\overset{2}{\cancel{560}} \times 40}{\cancel{280}} = b$ $\Rightarrow \boxed{b = 80}$
13	$64 = 2^6$ $80 = 2^4 \times 5$ $96 = 2^5 \times 3$ $LCM = 2^6 \times 3 \times 5 = 64 \times 3 \times 5$ $= 960$ cm. The least length of cloth can be measured exactly using any of the rods is 960 cm.

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OR

We will find LCM of 4, 7 and 14.

$$\begin{array}{r|l} 2 & 4, 7, 14 \\ 2 & 2, 7, 7 \\ 7 & 1, 7, 7 \\ & 1, 1, 1 \end{array}$$

LCM (4, 7, 14) = 28

$\therefore$ At 6:28 am, the three bells will ring together next.

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Given: The number is $\frac{1}{\sqrt{2}+5}$

$\frac{1}{\sqrt{2}+5} = \frac{1 \times \sqrt{2}-5}{\sqrt{2}+5 \times \sqrt{2}-5} = \frac{\sqrt{2}-5}{4-25} = \frac{\sqrt{2}-5}{-21}$

$= -\frac{(\sqrt{2}-5)}{21}$

$= \frac{5-\sqrt{2}}{21}$

Let us assume $\frac{5-\sqrt{2}}{21}$ is rational

$\Rightarrow \frac{5-\sqrt{2}}{21} = \frac{a}{b}$ [a & b are co-prime, $b \neq 0$]

$5-\sqrt{2} = \frac{21a}{b}$

$-\sqrt{2} = \frac{21a}{b} - 5$

$-\sqrt{2} = \frac{21a-5b}{b}$

$\sqrt{2} = \frac{21a-5b}{-b}$ [$\frac{p}{q}$ form, $q \neq 0$ p & q → co-prime]

Here, Rational = Irrational which is not possible.

Hence, our assumption is wrong.

$\frac{1}{\sqrt{2}+5}$ is irrational.

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	$1251 - 1 = 1250$ $9377 - 2 = 9375$ $15628 - 3 = 15625$ $(1250, 9375, 15625) = 625$ largest no. $= 625$ OR $LCM + HCF = 1260 \rightarrow I$ $LCM = HCF + 900 \rightarrow II$ Put (II) in (I): $HCF + 900 + HCF = 1260$ $2HCF + 900 = 1260$ $2(HCF + 450) = 1260 \Rightarrow HCF + 450 = 630$ $\boxed{HCF = 180}$ $LCM = HCF + 900$ $\Rightarrow LCM = 180 + 900$ $LCM = 1080$ $HCF \times LCM = a \times b$ $HCF \times LCM = 1080 \times 180$ $= 194400$ Ans.
16	16 i) We will find HCF Small $= 2 \times 3 \times 2^3 = \boxed{2^4 \times 3}\ cm^2$ Medium $= 12 \times 24 = 2 \times 2 \times 3 \times 2 \times 2 \times 2 \times 3$ $= \boxed{2^5 \times 3^2}\ cm^2$ Large $= 24 \times 36 = 2^3 \times 3 \times 2^2 \times 3^2$ $= \boxed{2^5 \times 3^3}\ cm^2$ Extra large $= 36 \times 48 = 2^2 \times 3^2 \times 2^4 \times 3$ $= \boxed{2^6 \times 3^3}\ cm^2$ $XXL = 48 \times 96 = 2^4 \times 3 \times 2^4 \times 3 \times 2$ $= 2^4 \times 3 \times 2^4 \times 3 \times 2$ $= \boxed{2^9 \times 3^2}\ cm^2$ $HCF = 2^4 \times 3 = 48$ (We have found HCF of areas of all different types of cartons) Maximum Size of ~~...~~ $= 48\ cm^2$ ~~.....~~ sheet ii The Area of Semi-large carton is b/w $288\ cm^2$ and $864\ cm^2$

17 (i)	Greatest no. of students in each row = HCF(480, 640) $2 \mid 480, 640$ $2 \mid 240, 320$ $2 \mid 120, 160$ $2 \mid 60, 80$ $2 \mid 30, 40$ $5 \mid 15, 20$ $\quad 3, 4$ $= 32 \times 5$ $= 160$
(ii)	Rows required for girls $= \frac{480}{160} = 3$ rows Rows required for boys $= \frac{640}{160} = 4$ rows Total number of rows $= 4+3 = 7$ rows
(iii)A	LCM (480, 640) $\Rightarrow$ LCM $= 2^7 \times 5 \times 3$ $= 1920$ LCMx HCF = 480X 640
(iii)B	We need to find LCM of 45 and 60 = 180(using prime factorisation)
18	Let us assume $\sqrt{5}$ is rational ($\sqrt{5} = \frac{p}{q}$, $q \neq 0$ P&q are co-prime) $\sqrt{5} = \frac{p}{q}$ $\sqrt{5}q = p$ Squaring on both sides: $5q^2 = p^2 \rightarrow \text{I}$ $q^2 = \frac{p^2}{5} \rightarrow \text{II}$ As 5 divides, p^2, 5 divides p also. $\Rightarrow \frac{p}{5} = k$ $p = 5k \rightarrow$ Put in (I) $5q^2 = (5k)^2$ $\quad$ ~~$q^2 = \frac{25k^2}{5}$~~ $5q^2 = 25k^2$ $q^2 = 5k^2$ $\frac{q^2}{k^2} = 5$ $\Rightarrow \frac{q^2}{5} = k^2$

	As 5 divides q^2, 5 divides q also. As 5 divides both p and q, this contradicts our assumption that p & q are co-prime. Hence, our assumption is wrong. $\sqrt{5}$ is ~~is~~ irrational.
19	Let us assume $\sqrt{2}+\sqrt{3}$ is rational ($\Rightarrow \sqrt{2}+\sqrt{3} = \frac{p}{q}$, $q \neq 0$, p & q are co-prime) Squaring both sides $(\sqrt{2}+\sqrt{3})^2 \Rightarrow 2+3+2\sqrt{6} \Rightarrow 5+2\sqrt{6}$ $5+2\sqrt{6} = \frac{p^2}{q^2}$ $2\sqrt{6} = \frac{p^2}{q^2} - 5$ $2\sqrt{6} = \frac{p^2-5q^2}{q^2}$ $\sqrt{6} = \frac{p^2-5q^2}{2q^2}$ Here, Irrational = Rational (which isn't pos Hence, our assumption is wrong. $\sqrt{2}+\sqrt{3}$ is irrational.

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