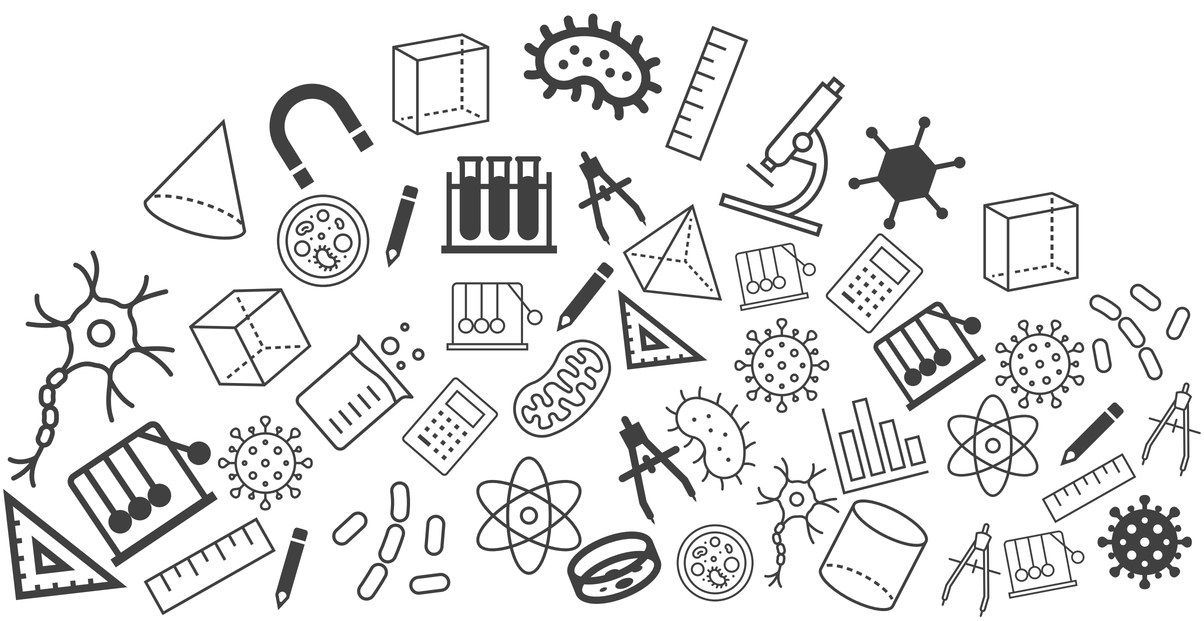
# Grade 10
## Mathematics
### Exam Important Questions



# Real Numbers: Important Questions

Topic : Exam Important Questions

1. For some integer m, every even integer is of the form

   A) m
   B) m+1
   C) 2m
   D) 2m+1

   [1 mark]

   Any integer that can be divided exactly by $2$ is said to be an even integer. In other words, it can be said that every integer which is a multiple of $2$ must be an even integer. Therefore, for an integer , it can be conducted that every even integer must be of the form $2.m = 2m$

   [1 mark]



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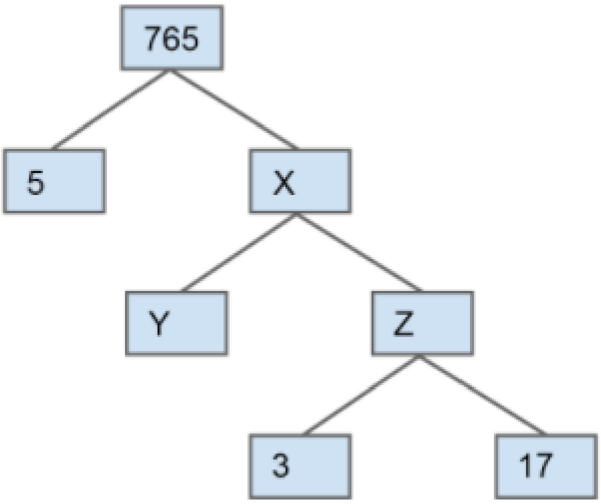
2. In the given factor tree, find the value of $x + y + z$.

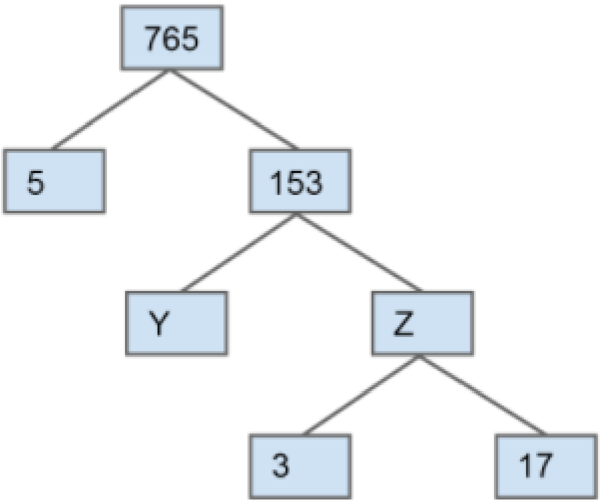



(A) 213
(B) 211
(C) 209
(D) 207

[1 mark]

Answer: (D) 207

Factorisation of 765 by factor tree method




$\Rightarrow x = 153$
$z = (3)(17) = 51$
$y = \dfrac{x}{z} = \dfrac{153}{51} = 3$
$\therefore x + y + z = 153 + 3 + 51 = 207$
[1 mark]



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3. Find the maximum number of students among whom 1001 pens and 910 pencils can be distributed in such a way that each student gets the same number of pens and the same number of pencils.

[2 Marks]

**Solution:**
Total pens = 1001
Total pencils = 910
we need to find maximum no.of students among whom 1001 pens and 910 pencils can be distributed in such a way that each students get same no.of pens and pencils.
Then we need to find HCF of 1001 and 910.

[1 Mark]

Prime factorization of,
$1001 = 7 \times 11 \times 13$
$910 = 2 \times 5 \times 7 \times 13$
HCF = product of commom prime factor of least power
$HCF = 7 \times 13 = 91$
Here HCF of 1001 and 910 is 91.

Hence among 91 students 1001 pens and 910 pencils can be distributed such that each student get same number of pens and pencils.

[1 Mark]


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4. Determine the prime factorisation of each of the following positive integer:
(i) 20570 (ii) 58500 (iii) 45470971
[3 Marks]

**Solution:**
We need to express each of the following numbers as a product of their prime factors.

(i) 20570

$20570 = 2 \times 5 \times 11 \times 11 \times 17$
[1 Mark]

(ii) 58500

$58500 = 2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 5 \times 13$
[1 Mark]

(iii) 45470971

$45470971 = 7 \times 7 \times 13 \times 13 \times 17 \times 17 \times 19$
[1 Mark]



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5. During a sale, colour pencils were being sold in packs of 24 each and crayons in packs of 32 each. If you want full packs of both and the same number of pencils and crayons, how many of each would you need to buy?
[3 Marks]

**Solution:**
We are given that during a sale, color pencils were being sold in packs of 24 each and crayons in packs of 32 each. If we want full packs of both and the same number of pencils and crayons, we need to find the number of each we need to buy.
[1 Mark]

Given that, number of color pencils in one pack = 24
Number of crayons in pack = 32
Therefore, the least number of both colors to be purchased is L.C.M. of 24 and 32 = 2 x 2 x 2 x 2 x 2 x 3 = 96
[1 Mark]

Hence, the number of packs of pencils to be bought $= \frac{96}{24} = 4$

And number of packs of crayon to be bought $= \frac{96}{32} = 3$

[1 Mark]



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6. Find the L.C.M and H.C.F. of 864 and 2520 by applying the fundamental theorem of arithmetic method i.e. using the prime factorisation method. [2 Marks]

**Solution:**

Given, numbers are 864 and 2520.

So,

$864 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 2^5 \times 3^3$

$2520 = 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 7 = 2^3 \times 3^2 \times 5 \times 7$

| | |
|---|---|
| 2 | 864 |
| 2 | 432 |
| 2 | 216 |
| 2 | 108 |
| 2 | 54 |
| 3 | 27 |
| 3 | 9 |
| 3 | 3 |
| | 1 |

| | |
|---|---|
| 2 | 2520 |
| 2 | 1260 |
| 2 | 630 |
| 3 | 315 |
| 3 | 105 |
| 5 | 35 |
| | 7 |

[1 Mark]

L.C.M. = $2^5 \times 3^3 \times 5 \times 7 = 30240$

H.C.F. = $2^3 \times 3^2 = 72$

[1 Mark]



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7. Prove that $\sqrt{10}$ is an irrational number.
[4 Marks]

Solution:

Step 1:
Let us assume, to the contrary, that $\sqrt{10}$ is rational.
We can find integers $a$ and $b(\neq 0)$ such that $\sqrt{10} = \frac{a}{b}$. Suppose that $a$ and $b$ are coprime.
So, $b\sqrt{10} = a$.

[1 Mark]

Step 2:
Squaring on both sides, and rearranging, we get
$10b^2 = a^2$

[1 Mark]

step 3:
Apply the fundamental theorem of arithmetic.
$10b^2 = a^2$ implies that $a^2$ is divisible by $10$, and by the theorem we studied a couple of slides earlier, it follows that $a$ is also divisible by $10$.

[1 Mark]

Step 4:
- By the first application of the fundamental theorem of arithmetic, we know that if a primee number $p$ divides a positive integer $a^2$, then $p$ also divides $a$
- If $10$ divides $a^2$ then $10$ divides $a$. So we can write, $a = 10c$
- By steps $3$ and $4$ we can say $a$ and $b$ have at least $10$ as a common factor. But this contradicts the fact that $a$ and $b$ are coprime.
- This contradiction has arisen because of our incorrect assumption that $10$ is rational.

So, we conclude that “$10$ is irrational.”
[1 Mark]



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8. Given that HCF (306, 657) = 9, find LCM (306, 657).

[1 marks]

Solution:
We know that, product of LCM and HCF = product of two numbers

$\Rightarrow LCM \times 9 = 306 \times 657$

On dividing both sides by 9, we get:

$LCM = \frac{306 \times 657}{9} = 22338$

[1 mark]



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