EXERCISE 1C

Question 1:
Irrational number: A number which cannot be expressed either as a terminating decimal or a repeating decimal is known as irrational number. Rather irrational numbers cannot be expressed in the fraction form, p/q, p and q are integers and $q \neq 0$

For example, 0.101001000100001 is neither a terminating nor a repeating decimal and so is an irrational number.
Also, $\sqrt{2}$, $\sqrt{5}$, $\sqrt{3}$, $\sqrt{6}$, $\sqrt{7}$ etc are examples of irrational numbers.

Question 2:
(i) $\sqrt{4}$
We know that, if n is a perfect square, then $\sqrt{n}$ is a rational number.
Here, 4 is a perfect square and hence, $\sqrt{4} = 2$ is a rational number.
So, $\sqrt{4}$ is a rational number.

(ii) $\sqrt{196}$
We know that, if n is a perfect square, then $\sqrt{n}$ is a rational number.
Here, 196 is a perfect square and hence $\sqrt{196}$ is a rational number.
So, $\sqrt{196}$ is rational.

(iii) $\sqrt{21}$
We know that, if n is a not a perfect square, then $\sqrt{n}$ is an irrational number.
Here, 21 is a not a perfect square number and hence, $\sqrt{21}$ is an irrational number.
So, $\sqrt{21}$ is irrational.

(iv) $\sqrt{43}$
We know that, if n is a not a perfect square, then $\sqrt{n}$ is an irrational number.
Here, 43 is not a perfect square number and hence, $\sqrt{43}$ is an irrational number.
So, $\sqrt{43}$ is irrational.

(v) $3+\sqrt{3}$
$3+\sqrt{3}$, is the sum of a rational number 3 and $\sqrt{3}$ irrational number .
Theorem: The sum of a rational number and an irrational number is an irrational number.
So by the above theorem, the sum, $3+\sqrt{3}$, is an irrational number.

(vi) $\sqrt{7}-2$
$\sqrt{7}-2 = \sqrt{7} + (-2)$ is the sum of a rational number and an irrational number.
Theorem: The sum of a rational number and an irrational number is an irrational number.
So by the above theorem, the sum, $\sqrt{7} + (-2)$, is an irrational number.
$\sqrt{7}-2$ is irrational.

(vii) $\frac{2}{3}\sqrt{6}$

$$\frac{2}{3}\sqrt{6} = \frac{2}{3} \times \sqrt{6}$$

is the product of a rational number and an irrational number .
Theorem: The product of a non-zero rational number and an irrational number is an irrational number.
Thus, by the above theorem, 2/3×√6 is an irrational number.
So, 2/3×√6 is an irrational number.

(viii) $0.\overline{6}$

Every rational number can be expressed either in the terminating form or in the non-terminating, recurring decimal form.
Therefore, solution is 0.6666

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