

Practice Assignment 2A

1. Show that any positive odd integer is of the form $4q + 1$, or $4q + 3$, where q is some integer.
2. A contingent of 556 NCC cadets is to march behind NCC boy band of 52 members during the republic parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?
3. Use Euclid's division lemma to show that the square of any positive odd integer is of form $8m + 1$ for some integer m .

[Hint: Let x be any positive odd integer then it is of the form $4q + 1$, or $4q + 3$. Now square each of these and show that they can be rewritten in the form $8m + 1$.]

4. Consider the numbers 8^n , where n is a natural number. Check whether there is any value of n for which 8^n ends with the digit zero.
5. Given that $\text{HCF}(300, 600) = 300$, find $\text{LCM}(300, 600)$.
6. Explain why $9 \times 13 \times 15 + 15$ and $9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5$ are composite numbers.
7. Alex and Zach are cyclists. Alex takes 16 minutes to cover one round around a circular park, while Zach takes 14 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?
8. Prove that $\sqrt{7}$ is irrational.
9. Prove that $3 + 2\sqrt{7}$ is irrational.
10. Write down the decimal expansions of following terminating decimal expansions:

(i) $\frac{23}{625}$

(ii) $\frac{27}{16}$



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11. The following real numbers have decimal expansions as given below. In each case, decide whether they are rational or not. If they are rational, and of the form $\frac{p}{q}$, what can you say about the prime factor of q ?

(i) 23.123456789

(ii) 0.140140014000140000...

(iii) $23.\overline{123456789}$