Algebra Assessment for Epsilon India 2023

- The problems below will help us to understand your foundation in Algebra. It is important that you have a good understanding of the topics below to be able to follow the curriculum in the camp.
- There is no time limit. If you are not familiar with any of the topics, you can learn it and then attempt the questions. Khan Academy is a free resource that is very useful for sharpening your skills.
- Please print this sheet and write your answers in the space provided. Unlike the Exploration Problems, the space provided should be enough to write the answers.
- The work must be completed on your own. Do not use a calculator!

    Sending the forms to us:
    Priority given to candidates applying before February 22nd, 2023. Registrations open till spots left. Once you have completed the 'Algebra Assessment' and 'Exploration Problems':
- Please go to the **'How to Apply'** section of www.epsilonindia.org and follow the instructions to complete the Application process on our student app. Parents can help with the Application process but the applicant must work independently on the 'Algebra Assessment' and 'Exploration Problems'. Note that the completed tests have to be scanned and uploaded as a single pdf into the student app.
- Please also send the scanned work on both the 'Algebra Assessment' and 'Exploration Problems' as attachments to epsiloncampindia@gmail.com

Certification by Student and Parent

This certification is to be completed in <u>handwriting</u> shortly before submission, after you have completed your work whether you finished all the problems.

I, _____ (write name by hand), applicant to Epsilon India 2023, certify that this submission is entirely my own work. No one has helped in any manner with my work on any problem in the assessment, nor have I even shown my work to anyone prior to submission. I understand that this is for my own benefit. I understand that if Epsilon India finds that I have not been truthful in this, that I would be grounds for denying admission or discontinue access to the camp material with no refund if Epsilon Camp India 2023 is already in session.
To affirm this Certification, after finishing my solutions, I have signed my name, my parent/guardian has signed their name and dated this document, as witness.
Applicant signature: _____

Parent or Guardian name: _____

Signature: _____ Date: _____

1) Round 12323.63492 to the nearest thousand.

2) Round 23454.23469 to the nearest hundredth.

3) $71.5 \times 12.6 =$

4) $\dfrac{784.784}{0.37} =$

5) The profit that a shopkeeper earned in percentage by selling a shirt at INR 680 was 70%. What was the cost price of the article?

6) $12 - x = 6$. Find the value of x.

7) Evaluate $4\sqrt{4} - 4^4$ using the BODMAS rule.
   Note: This problem is similar to the famous four fours problem, where people find what numbers they can make with exactly 4 fours and the BODMAS symbols.

8) Convert $.\overline{457}$ to a fraction.

9) Express $8.\overline{34}$ (a) percentage and (b) fraction.

10)   If a father's age is x and the daughter's age is y, how many years later will the father's age be thrice the daughter's age?

11)   Simplify $(8a^4b^{-3})^2(2a^{-4}b^5)^3$

12)   Area of a quadrilateral is 30. What type of quadrilateral (square, rhombus, rectangle, parallelogram or trapezium) should it be, if its perimeter has to be minimum? Why?

13) Solve $2x + 3 \geq 4x - 5$ and graph the solution set (Attach the graph paper or its scanned image).

14) Solve $|x^2 - 6.5| > 2.5$ and graph the solution set.

15) Solve the following system of equations by graphing. Check the answer algebraically. $x - 3y + 3 = 0$ and $-4x + 3y + 6 = 0$.

16) Express $(7x - 4)(3x^2 + 4x)$ in standard form.

17) Use the long division algorithm to find the quotient and remainder for $\frac{2x^3 - 5x^2 - 14x + 8}{x - 4}$.

18) Simplify $\frac{1}{10x^2 + 21xy - 6y^2} - \frac{1}{6x^2 + xy - 2y^2} + \frac{1}{-8x^2 - xy + 6y^2}$

19) Solve $4x^2 - 12x - 112 = 0$.