

Year 13 Finals 2025

Y13/1. Evaluate $\sqrt{-16} + \sqrt{-25} - \sqrt{-9}$

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Y13/2. Find $\text{Arg}(-1 + \sqrt{3}i)$ in radians

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Y13/3. The length of the vector $pi + 4j - 4k$ is 6 units. Solve for p ?

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Y13/4 Find the value of m that makes $\frac{\sqrt{3} + mi}{1 + \sqrt{3}i}$ is a purely real number.

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Y13/5. Find the equation of the oblique asymptote of $y = \frac{-3x^2 + 2}{x - 1}$

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Y13/6. Evaluate $\lim_{x \rightarrow 4} \frac{2 - \sqrt{x}}{4 - x}$

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Y13/7. If $2x + y = 6$, what is the largest value of xy ?

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Y13/8. Adding 3 years to the age of a boy would make him one quarter of his father's age. Two years ago, his father was three years more than six times his son's age. How old is the boy?

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Y13/9 Solve $|x - 2| \geq 3$

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Y13/10. Solve $\frac{x}{x-4} < 3$

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Y13/11. A company charges \$200 for each set of tools on orders of 150 or fewer sets. The cost to the buyer on every set is reduced by \$1 for each set in excess of 150. For what size order is revenue maximum?.

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Y13/12 In Tom's drawer, there are three different colours of socks: 6 blue socks, 14 black socks, and 9 red socks. Without looking into his drawer, what is the smallest number of socks that Tom needs to take out to be sure 2 black socks have been taken out?

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Y13/13. Simplify $\sqrt{7 + \sqrt{13}} - \sqrt{7 - \sqrt{13}}$

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Y13/14 If $f(x) = \sqrt{2x} + 5^2$, find $f'(2)$

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Y13/15 A committee of 6 is to be formed from a group of 5 men and 4 women. How many different committees are possible if it must consist of at least 4 men?

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Y13/16 The ratio of the speed of two trains is equal to the ratio of the time they take to pass each other going in the same direction to the time they take to pass each other going in the opposite directions. Find the ratio of the speed of the faster train to the slower train.

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Y13/17. Solve $4^x - 9(2^x) = -8$

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Y13/18. Solve $7^{x+1} - 7^{x-1} = 336\sqrt{7}$

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Y13/19. What is the domain of the function $= \frac{x^2}{x^2 - 1}$?

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Y13/20. In how many ways can six people sit around a table if two particular people must be seated next to each other?

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