

Year 12 Finals 2024

Y12/1. Find the coordinates of the point of intersection of the asymptotes of

$$y = 2 - \frac{3x}{x-1}$$

Y12/2. Find what value of k does $3^{2024} + 3^{2024} + 3^{2024} = 3^k$

Y12/3. How many litres of water must be evaporated from 20 litres of a 3% salt solution to make it 5% salt solution?

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Y12/4. Find the sum of all positive integers less than 100 which do not contain the digit 7.

Y12/5. Evaluate
$$\frac{2024^2 + 2 \times 2024 \times 2025 + 2025^2}{4049}$$

Y12/6 Solve $\frac{x-3}{x+1} < 0$

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Y12/7. Solve $2(4^{2x}) - 17(4^x) + 8 = 0$

Y12/8. Kara drove a distance of 144 km. If she had driven 6 km/h faster, she could have made the trip in 20 minutes less time. How fast did she drive in km/h?

Y12/ 9 How many integers satisfy $|1 - 3x| < 20$

Y12/10. For what values of m straight lines of the form $y = mx + 1$ do not intersect the parabola $y = x^2 - 2x + 5$

Y12/11. At the school library, Dolly decides to select 3 books from a group of 6.

In how many different ways can Dolly make the selection?

Y12/12. An aeroplane takes 4 hours and 15 minutes to fly from Island A to Island B. If it were to increase its speed by 25%, how long would the trip take? Give your answer in hours (h) and minutes (min).

Y12/13. What is the size of the obtuse angle between the hour and minute hands of a clock at 2:45?

Y12/14 Tara pulls 2 socks at random from a drawer which contains 9 black and 7 white socks. What is the probability that the socks match? Give your answer as a fraction in its simplest form.

Y12/15 If $x + 1$, $2x$ and $2x + 3$ are the first three terms of a geometric sequence in the order given, calculate the possible values of x .

Y12/16 A long ladder is leaning against a house with its lower end 15m from the house. When the lower end is pulled 9 m further from the house, the upper end slides 13 m down. How long is the ladder in metres?

Y12/17 A chemist mixes one container of 7% solution of a chemical and another container of 3% solution to yield 10 litres of a 6% solution.?

How many litres of 7% solution is required?

Y12/18 At Aman's hardware 3 hammers, 1 screwdriver and 1 spanner cost \$25; 1 hammer, 3 screwdrivers and 1 spanner cost \$20 while 1 hammer, 1 screwdriver, and 3 spanners cost \$17.50.

How much will 3 hammers, 3 screwdrivers and 3 spanners cost?

Y12/19. Two vertical poles, 80 m and 20 m high, are 13 m apart on level ground. Straight wires are attached from the top of each pole to the bottom of the other pole. Find the vertical distance, in metres, from the ground to the intersection of the wires.

Y12/20. What is the maximum value of xy if $2x + y = 8$?
