

1. Consider:  $P = 1 - \sqrt{\frac{Q}{R}}$

Find the value of R if  $Q = 90$  and  $P = -0.5$

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2. The distance between the Cartesian points  $(6, m)$  and  $(m + 5, 2)$  for some real number m is 5. What is sum of all possible values of m?

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3. What is the range of  $y = |x - 3| - 2$  ?

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4. At a party, 276 handshakes took place. If each person shook hands with each other person exactly once, calculate the number of people at the party.

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5. What is the sum of all odd integers between 51 and 375 inclusive?

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6. Find the values of  $p$  for which the quadratic equation  $x^2 - (p + 4)x + (p + 7) = 0$  has equal roots.

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7. Simplify:  $\frac{x^2 - y^2}{xy} - \frac{xy - y^2}{xy - x^2}$

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8. 3 employees can make 15 burgers in 10 minutes. How many employees would be needed to make 300 burgers in half an hour?

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9. In a Mathematics Competition each correctly answered question gains 7 marks while 3 marks are deducted for each incorrect answer.

Dinesh answered 20 questions and received a total of 60 marks. How many questions did he get wrong?

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10. Given that it is 4 o'clock, exactly how long, in minutes, will it take for the minute hand to catch up with the hour hand?

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11. When three numbers are added two at a time, their sums are 45, 56, and 77. What is the sum of these three numbers?

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12. When the radius of a circle is increased by 80%, what is the percent increase in the circle's area?

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13. How many milliliters of distilled water should be mixed with 20 milliliters of 60% acid to obtain a mixture that is 30% acid?

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14. There are twenty different pairs of socks in a drawer. If I am randomly grabbing socks without looking, how many socks do I need to grab to make sure that I have at least one matching pair?

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15. Find the value of  $k$  if  $9^{18} + 27^{12} + 81^9 = 3^k$

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16. Kamal, planning to walk 30 km realizes that by walking one km per hour faster, he could make the journey in one hour less time. How many km per hour was he originally going to be walking?

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17. The area of a sector of a circle of radius 6 cm is  $54 \text{ cm}^2$ . Find the perimeter of the sector.

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18. A ball is dropped from a height of 5 m. With each bounce it rises to 60% of its previous height.

Calculate the **total distance**, in metres, travelled by the ball before it comes to rest.

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19. Mangoes contain 99% water. There are 100 kg of fresh cut mangoes. After a few hours in the sun, some water evaporates and the percentage of water in the mangoes becomes 98%. What is the new weight, in kg, of the mangoes?

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20. The first term of a geometric sequence is 1 and the fifth term is 9. Find the product of the first five terms.

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