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1. What is the largest number that is less than 100 and has exactly 3 whole number factors?

1.

2. Triangle ABC has a right angle at A . The two legs AB and AC have lengths 9 centimetres and 40 centimetres. What is the length, in centimetres, of the hypotenuse BC ?

2.

3. Given that $\frac{1}{2x} + \frac{3}{2} = \frac{3}{4x} + \frac{5}{4}$, what is the value of x ?

3.

4. If a computer is worth a certain amount, it is worth 40% less a year later. Alphonse's computer is now worth \$2000. How many dollars will it be worth 3 years from now?

4.

5. Suppose that a and b are real numbers such that $a^b = 5$. What is the value of $a^{3b} - 6$?

5.

6. The cost of sending a parcel is \$4.00 for the first kilogram, and \$0.60 for each additional kg. A certain parcel weighs a whole number of kg, and costs \$40.00 to send. How many kg does the parcel weigh?

6.

7. A rectangular field is 50% longer than it is wide. The perimeter of the field is 300 metres. What is the area of the field, in square metres?

7.

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8. Alphonse sold a house to Beth for \$300,000. She sold it immediately to Gamal at a 10% profit. Then Gamal sold the house back to Alphonse at a 10% loss. What was Alphonse's overall profit (in dollars)? 8.
9. A string of length 120 centimetres is cut into three parts whose lengths are proportional to 4, 5, and 6. What is the length, in centimetres, of the longest part? 9.
10. To get some money, Tom decided to sell his CDs. After he had sold six-sevenths of his collection for \$8.00 per CD, he had three CDs left that he couldn't sell. How much money did Tom get (in dollars)? 10.
11. The ratio of x to y is $\frac{3}{4}$, and the ratio of x to z is $\frac{5}{6}$. What is the ratio of y to z ? Express your answer as a common fraction. 11.
12. When an integer n is divided by 12, the remainder is 7. What is the remainder when $7n$ is divided by 12? 12.
13. The two legs of a right-angled triangle have length 20 and 100. To the nearest integer, what is the length of the hypotenuse? 13.
14. If a car travels at 70 kilometres per hour, how many metres does it travel in 18 seconds? 14.

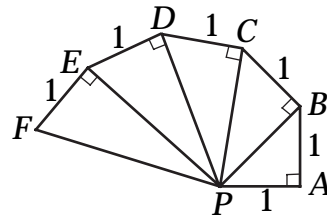
15. There are 12 tickets (numbered 1 to 12) in a hat. Alfonso takes two tickets, chosen at random. What is the probability that the sum of the numbers on Alfonso's two tickets is odd? Express your answer as a common fraction.

15.

16. The number of cubic millimetres in a cubic kilometre is 10^n . What is n ?

16.

17. Line segments PA , AB , BC , CD , DE , and EF have length 1, and angles PAB , PBC , PCD , PDE , PEF are right angles. Find the length of PF .



17.

18. The sum of two positive whole numbers is 144. If the larger of the two numbers is divided by the smaller, the quotient is 3 and the remainder is 12. What is the smaller of the two numbers?

18.

19. Suppose that you play the following game: you toss a fair nickel, dime, and quarter at the same time. If you get at least one "head," stop (game over). If you don't, you toss the coins again. If you get at least one head, stop. Otherwise, go on . . .

19.

When you toss for the last time, what is the probability that all three coins show heads? Express your answer as a common fraction.

20. If we start adding the consecutive positive integers like this, $1 + 2 + 3 + 4 + 5 \dots$, and we stop adding when the next number would put our sum over 1000, what sum do we get?

20.

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21. There were three candidates for mayor of Mathville, Alpha, Beta, and Gamma. Gamma came in last with 5000 votes. Alpha was 1000 votes ahead of Beta, who was 1500 votes ahead of Gamma. How many people voted? 21.
22. Let $N = 2^{22}$. What is the second digit from the left in the decimal expansion of N ? (If instead we had $N = 3^8$, then the answer would be 5, since $3^8 = 6561$.) 22.
23. Alphonse lost all his marbles. Some were blue, some were white, and the rest were red. All but 99 were blue, all but 85 were white, and all but 70 were red. How many marbles did Alphonse lose? 23.
24. How many three-digit numbers have exactly one 9 in their decimal expansion? 24.
25. Beth is one-fifth of the way through her cross-country race. After she runs a further three-quarters of a kilometre, she will be one-quarter of the way through the race. Over how many kilometres is the whole race? 25.
26. A gambler started off with 1 dollar. She placed a series of 1 dollar bets, winning a dollar or losing a dollar each time. After a total of 9 bets, the gambler was broke. In how many orders could this have happened? If you have no money you can't bet. 26.