

MATH CHALLENGERS

Math Challengers

Provincial Competition
Face-off Round 2013

A question always follows a blue page. The next page is blue!

1. What is the volume of the cone with base radius 2 and height 3? Give the answer to the nearest integer.

1. What is the volume of the cone with base radius 2 and height 3? Give the answer to the nearest integer.

Answer: 13 (units³)

2. What is the smallest perfect square greater than 600 whose square root has digit sum equal to 6?

2. What is the smallest perfect square greater than 600 whose square root has digit sum equal to 6?

Answer: 1089

3. Which of the following four numbers is the largest?

$$\frac{33}{37}$$

0.89

$$\frac{25}{28}$$

$$\frac{41}{46}$$

3. Which of the following four numbers is the largest?

$$\frac{33}{37}$$

0.89

$$\frac{25}{28}$$

$$\frac{41}{46}$$

Answer: $\frac{25}{28}$

4. What is the probability of getting exactly 4 heads in 5 tosses of a fair coin? Express the answer as a common fraction.

4. What is the probability of getting exactly 4 heads in 5 tosses of a fair coin? Express the answer as a common fraction.

Answer: $\frac{5}{32}$

5. What is the volume, in cubic centimetres, of a cube whose surface area is equal to 294 square centimetres?

5. What is the volume, in cubic centimetres, of a cube whose surface area is equal to 294 square centimetres?

Answer: 343 (cubic centimetres)

6. Jane (an Olympic runner) ran 1.5 km in 4 minutes and 10 seconds. What was her average speed in metres per second?

6. Jane (an Olympic runner) ran 1.5 km in 4 minutes and 10 seconds. What was her average speed in metres per second?

Answer: 6 (metres per second)

7. What is the radius of the smallest circle with integer radius whose area is larger than 400 square units?

7. What is the radius of the smallest circle with integer radius whose area is larger than 400 square units?

Answer: 12 (units)

8. Alicia's auto repair bill is \$3000, of which \$1200 is for parts and the rest for labour. If labour is billed at \$100 per hour, how many hours of labour were billed?

8. Alicia's auto repair bill is \$3000, of which \$1200 is for parts and the rest for labour. If labour is billed at \$100 per hour, how many hours of labour were billed?

Answer: 18 (hours)

9. What is the smallest 3-digit number whose digit sum is the same as the digit sum of 2013?

9. What is the smallest 3-digit number whose digit sum is the same as the digit sum of 2013?

Answer: 105

10. What is the largest prime whose square is less than 2013?

10. What is the largest prime whose square is less than 2013?

Answer: 43

11. The sum of 5 different positive integers is 2013. What is the largest possible value of any of these 5 integers?.

11. The sum of 5 different positive integers is 2013. What is the largest possible value of any of these 5 integers?.

Answer: 2003

12. If 11 cookies cost \$11.99, what is the cost of 5 cookies?

12. If 11 cookies cost \$11.99, what is the cost of 5 cookies?

Answer:

5.45 (dollars) or 5 dollars and 45 cents

13. You roll a die twice. What is the probability that the sum is 5? Express the answer as a common fraction in lowest terms.

13. You roll a die twice. What is the probability that the sum is 5? Express the answer as a common fraction in lowest terms.

Answer: $\frac{1}{9}$

14. Among the two-letter “words” that only use the letters A and/or B and/or C, how many have exactly one C?

14. Among the two-letter “words” that only use the letters A and/or B and/or C, how many have exactly one C?

Answer: 4 (words)

15. How many integers smaller than 2013 have digit sum equal to 2?

15. How many integers smaller than 2013 have digit sum equal to 2?

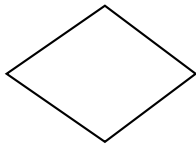
Answer: 10

16. Evaluate $\frac{2^{10} - 1}{2^5 - 1}$.

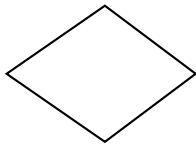
16. Evaluate $\frac{2^{10} - 1}{2^5 - 1}$.

Answer: 33

17. The diagonals of a rhombus have lengths 12 and 9. What is the perimeter of the rhombus?



17. The diagonals of a rhombus have lengths 12 and 9. What is the perimeter of the rhombus?



Answer: 30

18. The mean of 20, 21, and $2x$ is 35. What is the value of x ?

18. The mean of 20, 21, and $2x$ is 35. What is the value of x ?

Answer: 32

19. Alan has three-sevenths as much money as Beti, and between them they have 400 dollars. How many dollars does Beti have?

19. Alan has three-sevenths as much money as Beti, and between them they have 400 dollars. How many dollars does Beti have?

Answer: 280 (dollars)

20. The line with equation $y = mx + 13$ goes through the point $(25, 2013)$. What is the value of m ?

20. The line with equation $y = mx + 13$ goes through the point $(25, 2013)$. What is the value of m ?

Answer: 80

21. A store has cans of beans on sale for 89 cents per can. What is the largest number of cans of beans you can buy at that store if all you have is a \$10 bill?

21. A store has cans of beans on sale for 89 cents per can. What is the largest number of cans of beans you can buy at that store if all you have is a \$10 bill?

Answer: 11 (cans)

22. The side of a square has length 12 inches. What is the length of the diagonal of this square? Give the answer in inches, rounded to the nearest inch.

22. The side of a square has length 12 inches. What is the length of the diagonal of this square? Give the answer in inches, rounded to the nearest inch.

Answer: 17(inches)

23. Two fair dice are tossed. What is the probability that neither number so obtained is divisible by 3? Express the answer as a common fraction in lowest terms.

23. Two fair dice are tossed. What is the probability that neither number so obtained is divisible by 3? Express the answer as a common fraction in lowest terms.

Answer: $\frac{4}{9}$

24. The sides of a triangle are integers. The perimeter of the triangle is 100. What is the smallest possible length of the largest side of the triangle?

24. The sides of a triangle are integers. The perimeter of the triangle is 100. What is the smallest possible length of the largest side of the triangle?

Answer: 34

25. For every integer $n \geq 1$, the sum of the first n terms of a sequence is equal to n^2 . What is the 10-th term of the sequence?

25. For every integer $n \geq 1$, the sum of the first n terms of a sequence is equal to n^2 . What is the 10-th term of the sequence?

Answer: 19

26. What is the value of $4^2 + 5^2 + 6^2$?

26. What is the value of $4^2 + 5^2 + 6^2$?

Answer: 77

27. The area of circle \mathcal{A} is 36% less than the area of circle \mathcal{B} . By how many percent is the circumference of \mathcal{B} more than the circumference of \mathcal{A} ?

27. The area of circle \mathcal{A} is 36% less than the area of circle \mathcal{B} . By how many percent is the circumference of \mathcal{B} more than the circumference of \mathcal{A} ?

Answer: 25 (percent)

28. Simplify $\frac{\frac{1}{5} - \frac{1}{6}}{\frac{1}{15} - \frac{1}{16}}$.

28. Simplify $\frac{\frac{1}{5} - \frac{1}{6}}{\frac{1}{15} - \frac{1}{16}}$.

Answer: 8

29. If $x/4$ is the reciprocal of $x^2/16$, what is the value of x ?

29. If $x/4$ is the reciprocal of $x^2/16$, what is the value of x ?

Answer: 4

30. At the Provincial, each of the 26 Blitz questions is worth 1 point and each Bull's Eye question is worth 2. The maximum total points achievable is 50. Ana's total mark was 31 points and she answered correctly 50% of the Bull's Eye questions. How many Blitz questions did she answer correctly?

30. At the Provincial, each of the 26 Blitz questions is worth 1 point and each Bull's Eye question is worth 2. The maximum total points achievable is 50. Ana's total mark was 31 points and she answered correctly 50% of the Bull's Eye questions. How many Blitz questions did she answer correctly?

Answer: 19

