

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

Round 1

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

Round 1

2016 Cipherring Time Trials
Thursday, December 8th, 2016

1. What is the volume, in cubic meters, of a right rectangular pyramid with base edges measuring 8 m and 12 m and a height of 5 m?
2. Express the hexadecimal numeral $8AD4_{16}$ as a binary numeral.
3. What is the sum of the squares of the roots of $2r^2 - r + 3 = 0$?

2016 Cipherring Time Trials
Thursday, December 8th, 2016

1. What is the volume, in cubic meters, of a right rectangular pyramid with base edges measuring 8 m and 12 m and a height of 5 m?
2. Express the hexadecimal numeral $8AD4_{16}$ as a binary numeral.
3. What is the sum of the squares of the roots of $2r^2 - r + 3 = 0$?

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

ROUND 2

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

ROUND 2

2016 Cipherring Time Trials
Thursday, December 8th, 2016

4. What is the equation of the axis of symmetry of the parabola with equation $x = 2y^2 - 20y + 38$?

5. What is the sum of the positive integers less than 17?

6. In set of five integer test scores from 0 to 100 inclusive, the mean, median, and mode are all 80. What is the largest possible value of the range?

2016 Cipherring Time Trials
Thursday, December 8th, 2016

4. What is the equation of the axis of symmetry of the parabola with equation $x = 2y^2 - 20y + 38$?

5. What is the sum of the positive integers less than 17?

6. In set of five integer test scores from 0 to 100 inclusive, the mean, median, and mode are all 80. What is the largest possible value of the range?

2016 Cipherring Time Trials
Thursday, December 8th, 2016

Round 3

2016 Cipherring Time Trials
Thursday, December 8th, 2016

Round 3

2016 CIPHERING Time Trials
Thursday, December 8th, 2016

7. What is the area, in square meters, of a triangle with sides measuring 3 m, 5 m, and 6 m?

8. On average, ten woodworkers can produce fifteen headboards in twelve hours. How many hours would it take for six woodworkers to produce six headboards?

9. A dragon senses that his hoard of 2500 coins contains exactly one counterfeit coin which is slightly lighter than the others. Fortunately, he has a very precise balance on which he can compare any two sets of coins. Using an optimal strategy, what is the greatest number of such comparisons that the dragon must be prepared to make in order to find the offending coin?

2016 CIPHERING Time Trials
Thursday, December 8th, 2016

7. What is the area, in square meters, of a triangle with sides measuring 3 m, 5 m, and 6 m?

8. On average, ten woodworkers can produce fifteen headboards in twelve hours. How many hours would it take for six woodworkers to produce six headboards?

9. A dragon senses that his hoard of 2500 coins contains exactly one counterfeit coin which is slightly lighter than the others. Fortunately, he has a very precise balance on which he can compare any two sets of coins. Using an optimal strategy, what is the greatest number of such comparisons that the dragon must be prepared to make in order to find the offending coin?

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

Round 4

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

Round 4

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

10. When the secret number is tripled and this result is then reduced by 758, the final result is 1345. What is the secret number?
11. A triangle has sides measuring 12 m, 14 m, and 6 m. The angle bisector of the largest angle is drawn, dividing the far side into two line segments. What is the length, in meters, of the larger of these two segments?
12. What is the sum of the positive even numbers less than 524?

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

10. When the secret number is tripled and this result is then reduced by 758, the final result is 1345. What is the secret number?
11. A triangle has sides measuring 12 m, 14 m, and 6 m. The angle bisector of the largest angle is drawn, dividing the far side into two line segments. What is the length, in meters, of the larger of these two segments?
12. What is the sum of the positive even numbers less than 524?

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

Round 5

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

Round 5

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

13. What is the remainder when 1689 is divided by 24?

14. List the numbers below that are divisible by 3 but not 6.

14, 52, 789, 78, 66, 579, 41, 25, 678, 256, 39, 0

15. Cherie surrounds a rectangular picture of her daughter with a pretty rectangular border that is the same width on all sides of the picture. If the picture measures 20 cm by 25 cm, and the area of the border (NOT including the picture) is 826 cm^2 , what is the perimeter, in centimeters, of the exterior edge of the border?

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

13. What is the remainder when 1689 is divided by 24?

14. List the numbers below that are divisible by 3 but not 6.

14, 52, 789, 78, 66, 579, 41, 25, 678, 256, 39, 0

15. Cherie surrounds a rectangular picture of her daughter with a pretty rectangular border that is the same width on all sides of the picture. If the picture measures 20 cm by 25 cm, and the area of the border (NOT including the picture) is 826 cm^2 , what is the perimeter, in centimeters, of the exterior edge of the border?

2016 Cipherring Time Trials
Thursday, December 8th, 2016

Round 6

2016 Cipherring Time Trials
Thursday, December 8th, 2016

Round 6

2016 Ciphering Time Trials
Thursday, December 8th, 2016

16. Express 60135.79 in scientific notation rounded to three significant digits.
17. What is the area, in square meters, of a right triangle with legs measuring 42 m and 68 m?
18. Two computers each choose a random number between 0 and 1. What is the probability that the smaller number is more than one-third of the larger number?

2016 Ciphering Time Trials
Thursday, December 8th, 2016

16. Express 60135.79 in scientific notation rounded to three significant digits.
17. What is the area, in square meters, of a right triangle with legs measuring 42 m and 68 m?
18. Two computers each choose a random number between 0 and 1. What is the probability that the smaller number is more than one-third of the larger number?

2016 Cipherring Time Trials
Thursday, December 8th, 2016

Round 7

2016 Cipherring Time Trials
Thursday, December 8th, 2016

Round 7

2016 Ciphering Time Trials
Thursday, December 8th, 2016

19. What is the slope of a line perpendicular to the line $2x - 5y = 7$ and passing through the point $(-53, -45)$?

20. If $v(u) = 6u + 2$ and $t(s) = 3s - 9$, evaluate $v\left(t^{-1}\left(v^{-1}(t(10))\right)\right)$.

21. If u is an angle with a secant of -3 , find the possible values of $\csc \frac{u}{2}$.

2016 Ciphering Time Trials
Thursday, December 8th, 2016

19. What is the slope of a line perpendicular to the line $2x - 5y = 7$ and passing through the point $(-53, -45)$?

20. If $v(u) = 6u + 2$ and $t(s) = 3s - 9$, evaluate $v\left(t^{-1}\left(v^{-1}(t(10))\right)\right)$.

21. If u is an angle with a secant of -3 , find the possible values of $\csc \frac{u}{2}$.

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

Round 8

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

Round 8

2016 Cipherring Time Trials
Thursday, December 8th, 2016

22. What is the circumference, in meters, of a circle with an area of $725\pi \text{ m}^2$?

23. A recursive sequence has first term $q_1 = 144$ and subsequent terms defined by $q_n = \frac{q_{n-1}}{n} + n$. What is the fourth term of this sequence?

24. When the digits of a positive two-digit integer are reversed to form a new positive two-digit integer, the result is exactly ten more than half of the original number. What is the smallest possible value of the original number?

2016 Cipherring Time Trials
Thursday, December 8th, 2016

22. What is the circumference, in meters, of a circle with an area of $725\pi \text{ m}^2$?

23. A recursive sequence has first term $q_1 = 144$ and subsequent terms defined by $q_n = \frac{q_{n-1}}{n} + n$. What is the fourth term of this sequence?

24. When the digits of a positive two-digit integer are reversed to form a new positive two-digit integer, the result is exactly ten more than half of the original number. What is the smallest possible value of the original number?

2016 Cipherring Time Trials
Thursday, December 8th, 2016

Round 9

2016 Cipherring Time Trials
Thursday, December 8th, 2016

Round 9

2016 Ciphering Time Trials
Thursday, December 8th, 2016

25. The probability that it rains tomorrow is $\frac{1}{3}$. If it rains, the probability that I go hiking is $\frac{1}{4}$, otherwise it's $\frac{1}{2}$. What is the probability I hike in the rain tomorrow?

26. A square is inscribed in a circle, which is inscribed in an equilateral triangle. If the triangle's area is $9\sqrt{3}$ m², what is the square's perimeter, in meters?

27. What value(s) of w satisfy $\frac{2w+3}{4-w} = \frac{4w+5}{w+1}$?

2016 Ciphering Time Trials
Thursday, December 8th, 2016

25. The probability that it rains tomorrow is $\frac{1}{3}$. If it rains, the probability that I go hiking is $\frac{1}{4}$, otherwise it's $\frac{1}{2}$. What is the probability I hike in the rain tomorrow?

26. A square is inscribed in a circle, which is inscribed in an equilateral triangle. If the triangle's area is $9\sqrt{3}$ m², what is the square's perimeter, in meters?

27. What value(s) of w satisfy $\frac{2w+3}{4-w} = \frac{4w+5}{w+1}$?

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

ROUND 10

2016 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 8TH, 2016

ROUND 10

2016 Cipherring Time Trials
Thursday, December 8th, 2016

28. What is the surface area, in square meters, of a right circular cylinder with a base radius of 4 m and a height of 15 m?

29. What is the maximum value of the function $p(m) = 3m^3 - 5m^2 + m$ on the interval $m \in [-2, 2]$?

30. What is the largest integer value of w that satisfies $3 \cdot 2^{6w} - 926 \leq 10^{10}$?

2016 Cipherring Time Trials
Thursday, December 8th, 2016

28. What is the surface area, in square meters, of a right circular cylinder with a base radius of 4 m and a height of 15 m?

29. What is the maximum value of the function $p(m) = 3m^3 - 5m^2 + m$ on the interval $m \in [-2, 2]$?

30. What is the largest integer value of w that satisfies $3 \cdot 2^{6w} - 926 \leq 10^{10}$?