

2017 Cipherring Time Trials
Thursday, December 7th, 2017

Round 1

2017 Cipherring Time Trials
Thursday, December 7th, 2017

Round 1

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

1. What are the coordinates, in the form (x, y) , of the midpoint of the line segment connecting the points $(7, 4)$ and $(6, -7)$?
2. If the cosine of an angle in the third quadrant is $-\frac{1}{4}$, what is the sine of that angle?
3. What is the sum of the distinct prime factors of 675?

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

1. What are the coordinates, in the form (x, y) , of the midpoint of the line segment connecting the points $(7, 4)$ and $(6, -7)$?
2. If the cosine of an angle in the third quadrant is $-\frac{1}{4}$, what is the sine of that angle?
3. What is the sum of the distinct prime factors of 675?

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

Round 2

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

Round 2

2017 CIPHERING Time Trials
Thursday, December 7th, 2017

4. What is the value of the discriminant of $4g^2 + 9g + 2 = 0$?
5. What is the equation of the plane through the point $(9,5,9)$ and perpendicular to the vector $\langle 5,7,4 \rangle$? Express your answer in the form $Ax + By + Cz = D$, where $A > 0$ and A , B , and C are collectively relatively prime.
6. What is the value, as a decimal number of dollars, of 40 quarters, 4 dimes, 83 nickels, and 587 pennies?

2017 CIPHERING Time Trials
Thursday, December 7th, 2017

4. What is the value of the discriminant of $4g^2 + 9g + 2 = 0$?
5. What is the equation of the plane through the point $(9,5,9)$ and perpendicular to the vector $\langle 5,7,4 \rangle$? Express your answer in the form $Ax + By + Cz = D$, where $A > 0$ and A , B , and C are collectively relatively prime.
6. What is the value, as a decimal number of dollars, of 40 quarters, 4 dimes, 83 nickels, and 587 pennies?

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

Round 3

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

Round 3

2017 CIPHERING Time Trials
Thursday, December 7th, 2017

7. If $g(h) = -8h + 5 - \frac{5}{h}$, evaluate $g(3)$.

8. What is the next term of a harmonic sequence beginning with 16 and 6?

9. A cylinder with a base radius of 6 m and a height of 4 m is inscribed in a sphere. What is the volume, in cubic meters, of the sphere?

2017 CIPHERING Time Trials
Thursday, December 7th, 2017

7. If $g(h) = -8h + 5 - \frac{5}{h}$, evaluate $g(3)$.

8. What is the next term of a harmonic sequence beginning with 16 and 6?

9. A cylinder with a base radius of 6 m and a height of 4 m is inscribed in a sphere. What is the volume, in cubic meters, of the sphere?

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

Round 4

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

Round 4

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

10. What is the product of the roots of $-3b^3 - 4b^2 + 9b + 7 = 0$?
11. How many diagonals can be drawn in a regular 32-gon, not counting the shortest diagonals?
12. The probabilities that Dharma, Eugene, and Fernbelly pass tomorrow's Algebra test are $\frac{3}{4}$, $\frac{2}{5}$, and $\frac{1}{6}$, respectively. If these events are independent, what is the probability that exactly two of the three pass the test?

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

10. What is the product of the roots of $-3b^3 - 4b^2 + 9b + 7 = 0$?
11. How many diagonals can be drawn in a regular 32-gon, not counting the shortest diagonals?
12. The probabilities that Dharma, Eugene, and Fernbelly pass tomorrow's Algebra test are $\frac{3}{4}$, $\frac{2}{5}$, and $\frac{1}{6}$, respectively. If these events are independent, what is the probability that exactly two of the three pass the test?

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

Round 5

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

Round 5

2017 Cipherring Time Trials
Thursday, December 7th, 2017

13. What is the measure, in degrees, of an interior angle of a regular 24-gon?
14. Set D is the set of positive two-digit even numbers, and Set E is the set of multiples of 10 less than 1000. What is the number of elements in the set $D \cap E$?
15. What value(s) of b satisfy $8(6b - 6) = 4(7b + 8) + 576$?

2017 Cipherring Time Trials
Thursday, December 7th, 2017

13. What is the measure, in degrees, of an interior angle of a regular 24-gon?
14. Set D is the set of positive two-digit even numbers, and Set E is the set of multiples of 10 less than 1000. What is the number of elements in the set $D \cap E$?
15. What value(s) of b satisfy $8(6b - 6) = 4(7b + 8) + 576$?

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

ROUND 6

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

ROUND 6

2017 Cipherring Time Trials
Thursday, December 7th, 2017

16. Evaluate: $875 + 7130$

17. What is the volume, in cubic meters, of a rectangular pyramid with base edges measuring 6 m and 5 m and a height of 9 m?

18. Evaluate: $\sum_{c=3}^{11} \frac{1}{c^2+6c+8}$

2017 Cipherring Time Trials
Thursday, December 7th, 2017

16. Evaluate: $875 + 7130$

17. What is the volume, in cubic meters, of a rectangular pyramid with base edges measuring 6 m and 5 m and a height of 9 m?

18. Evaluate: $\sum_{c=3}^{11} \frac{1}{c^2+6c+8}$

2017 Cipherring Time Trials
Thursday, December 7th, 2017

Round 7

2017 Cipherring Time Trials
Thursday, December 7th, 2017

Round 7

2017 Cipherring Time Trials
Thursday, December 7th, 2017

19. If $y = -4x^3 + x^2 - x - 3$, evaluate $\frac{dy}{dx}$ at the point $(-2, 35)$.

20. What is the solution, in the form (c, d, f) , of the system of equations $-c + d + f = -15$, $c - d + f = 1$, and $c + d - f = 15$?

21. When 7 liters of 7% sugar solution are mixed with 49 liters of 72% sugar solution, what percent of the final solution is sugar? Express your answer as a decimal, e.g. 7.89.

2017 Cipherring Time Trials
Thursday, December 7th, 2017

19. If $y = -4x^3 + x^2 - x - 3$, evaluate $\frac{dy}{dx}$ at the point $(-2, 35)$.

20. What is the solution, in the form (c, d, f) , of the system of equations $-c + d + f = -15$, $c - d + f = 1$, and $c + d - f = 15$?

21. When 7 liters of 7% sugar solution are mixed with 49 liters of 72% sugar solution, what percent of the final solution is sugar? Express your answer as a decimal, e.g. 7.89.

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

Round 8

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

Round 8

2017 Ciphering Time Trials
Thursday, December 7th, 2017

22. How many months are in $49\frac{1}{4}$ years?

23. A right triangle with an angle measuring 45° has an area of 3 square meters. What is the perimeter, in meters, of the triangle?

24. The average score on last week's Geometry quiz was 35.4. Excluding my score, the average of the other 21 students was 35.1. What was my score?

2017 Ciphering Time Trials
Thursday, December 7th, 2017

22. How many months are in $49\frac{1}{4}$ years?

23. A right triangle with an angle measuring 45° has an area of 3 square meters. What is the perimeter, in meters, of the triangle?

24. The average score on last week's Geometry quiz was 35.4. Excluding my score, the average of the other 21 students was 35.1. What was my score?

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

Round 9

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

Round 9

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

25. Which quadrant does the line $4x - y = -4$ **not** pass through?
26. A right triangle has legs measuring 14 and 36. What is the cosecant of the smallest angle in the triangle?
27. How many positive integers are factors of 7764?

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

25. Which quadrant does the line $4x - y = -4$ **not** pass through?
26. A right triangle has legs measuring 14 and 36. What is the cosecant of the smallest angle in the triangle?
27. How many positive integers are factors of 7764?

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

ROUND 10

2017 CIPHERING TIME TRIALS
THURSDAY, DECEMBER 7TH, 2017

ROUND 10

2017 CIPHERING Time Trials
Thursday, December 7th, 2017

28. A cube of purple plastic is painted orange on four sides and then cut into 1728 congruent cubes. What is the largest possible number of these smaller cubes that could be orange on exactly one side?

29. The backpacker has completed her dayhike to the summit near her camp, and now must filter water at the stream before returning to her camp. If the camp is at the point $(8, -1)$, the summit is at the point $(-7, -6)$, and the stream follows the line $y = 8x - 7$, what is the shortest distance she can hike?

30. At 9PM on Halloween, as I'm about to turn out our porch light, the last four Trick-or-Treaters arrive at my house. I have nine Kit-Kats left, and I decide to randomly distribute them among the four kids without regard for fairness, except to make sure each kid gets at least one Kit-Kat. In how many ways can I distribute the candy?

2017 CIPHERING Time Trials
Thursday, December 7th, 2017

28. A cube of purple plastic is painted orange on four sides and then cut into 1728 congruent cubes. What is the largest possible number of these smaller cubes that could be orange on exactly one side?

29. The backpacker has completed her dayhike to the summit near her camp, and now must filter water at the stream before returning to her camp. If the camp is at the point $(8, -1)$, the summit is at the point $(-7, -6)$, and the stream follows the line $y = 8x - 7$, what is the shortest distance she can hike?

30. At 9PM on Halloween, as I'm about to turn out our porch light, the last four Trick-or-Treaters arrive at my house. I have nine Kit-Kats left, and I decide to randomly distribute them among the four kids without regard for fairness, except to make sure each kid gets at least one Kit-Kat. In how many ways can I distribute the candy?