

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 1

---

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 1

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

1. When my secret number is reduced by thirty-seven and this result is then tripled, the result is eighty-seven. What is my secret number?
2. What is the volume, in cubic meters, of a right rectangular pyramid with a height of 7 m, a width of 6 m, and a length of 5 m?
3. What is the missing term of the sequence beginning 4, 7, 12, 20, 34, 59, 102, \_\_\_\_, 280, ...

---

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

1. When my secret number is reduced by thirty-seven and this result is then tripled, the result is eighty-seven. What is my secret number?
2. What is the volume, in cubic meters, of a right rectangular pyramid with a height of 7 m, a width of 6 m, and a length of 5 m?
3. What is the missing term of the sequence beginning 4, 7, 12, 20, 34, 59, 102, \_\_\_\_, 280, ...

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

ROUND 2

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

ROUND 2

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

4. What number is twenty-three less than the product of nineteen and thirty-two?
5. If  $c(d) = 3 - 2^{4d-5}$ , evaluate  $c(3)$ .
6. The data set  $\{4, 9, 10, 17, 19\}$  also contains positive integers  $x$  &  $y$ . If the mean is greater than the median which is greater than the unique mode, what is the smallest possible sum of  $x$  and  $y$ ?

---

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

4. What number is twenty-three less than the product of nineteen and thirty-two?
5. If  $c(d) = 3 - 2^{4d-5}$ , evaluate  $c(3)$ .
6. The data set  $\{4, 9, 10, 17, 19\}$  also contains positive integers  $x$  &  $y$ . If the mean is greater than the median which is greater than the unique mode, what is the smallest possible sum of  $x$  and  $y$ ?

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 3

---

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 3

2012 Ciphering Time Trials  
Thursday, December 13th, 2012

7. What is the equation, in slope-intercept ( $y = mx + b$ ) form, of the line through the points  $(3, -7)$  and  $(-2, -4)$ ?

8. What is the area, in square meters, of a right triangle with a leg measuring 10 m and a hypotenuse measuring 14 m?

9. What are the coordinates, in the form  $(x, y)$ , of the center of the locus of points satisfying  $4x^2 + 3y^2 - 9x + 12y = 100$ ?

---

2012 Ciphering Time Trials  
Thursday, December 13th, 2012

7. What is the equation, in slope-intercept ( $y = mx + b$ ) form, of the line through the points  $(3, -7)$  and  $(-2, -4)$ ?

8. What is the area, in square meters, of a right triangle with a leg measuring 10 m and a hypotenuse measuring 14 m?

9. What are the coordinates, in the form  $(x, y)$ , of the center of the locus of points satisfying  $4x^2 + 3y^2 - 9x + 12y = 100$ ?

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 4

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 4

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

10. Simplify by multiplying and combining like terms:  $(4x^3 + 12x + 2)(x^2 - 3)$

11. What is the sum of the positive two-digit odd integers?

12. When three cards are drawn from a standard 52-card deck, what is the probability that there are at least two cards of the same rank (e.g. two Kings and a Three)?

---

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

10. Simplify by multiplying and combining like terms:  $(4x^3 + 12x + 2)(x^2 - 3)$

11. What is the sum of the positive two-digit odd integers?

12. When three cards are drawn from a standard 52-card deck, what is the probability that there are at least two cards of the same rank (e.g. two Kings and a Three)?



2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 5

---

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 5

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

13. Evaluate:  $90817 - 26354$

14. What is the measure, in degrees, of an angle that is supplementary to an angle that is its own complement?

15. Liana's marble collection contains fifteen non-congruent marbles with diameters differing by one millimeter. If the smallest marble has a diameter of one millimeter, what is the ratio of the weight of the entire marble collection to the weight of the smallest marble?

---

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

13. Evaluate:  $90817 - 26354$

14. What is the measure, in degrees, of an angle that is supplementary to an angle that is its own complement?

15. Liana's marble collection contains fifteen non-congruent marbles with diameters differing by one millimeter. If the smallest marble has a diameter of one millimeter, what is the ratio of the weight of the entire marble collection to the weight of the smallest marble?

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

ROUND 6

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

ROUND 6

2012 Cipherring Time Trials  
Thursday, December 13th, 2012

16. What are the coordinates, in the form  $(x, y)$  of the x-intercept(s) of the parabola  $y = 2x^2 - 3x - 20$ ?

17. Two points are chosen inside a square with a perimeter of 160 m. What is the probability that each of the points is within ten meters of a side of the square? Note: the two points do not need to be close to the *same* side of the square.

18. If  $m(n) = \frac{(m+2)(3-4m)}{5m-6}$ , evaluate  $m'(1)$ .

---

2012 Cipherring Time Trials  
Thursday, December 13th, 2012

16. What are the coordinates, in the form  $(x, y)$  of the x-intercept(s) of the parabola  $y = 2x^2 - 3x - 20$ ?

17. Two points are chosen inside a square with a perimeter of 160 m. What is the probability that each of the points is within ten meters of a side of the square? Note: the two points do not need to be close to the *same* side of the square.

18. If  $m(n) = \frac{(m+2)(3-4m)}{5m-6}$ , evaluate  $m'(1)$ .

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 7

---

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 7

2012 Cipherring Time Trials  
Thursday, December 13th, 2012

19. Express in simplest radical form:  $\sqrt{832}$

20. What is the circumference, in meters, of a circle inscribed in an isosceles triangle with sides measuring 5 m, 5 m, and 8 m?

21. Evaluate the determinant:  $\begin{vmatrix} -2 & 3 & 0 \\ 0 & 1 & -3 \\ -1 & 2 & 1 \end{vmatrix}$

2012 Cipherring Time Trials  
Thursday, December 13th, 2012

19. Express in simplest radical form:  $\sqrt{832}$

20. What is the circumference, in meters, of a circle inscribed in an isosceles triangle with sides measuring 5 m, 5 m, and 8 m?

21. Evaluate the determinant:  $\begin{vmatrix} -2 & 3 & 0 \\ 0 & 1 & -3 \\ -1 & 2 & 1 \end{vmatrix}$

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 8

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 8

2012 Cipherring Time Trials  
Thursday, December 13th, 2012

22. How many liters of a 30% acid solution should be combined with six liters of a 50% acid solution to create a 35% acid solution?

23. Two circles have the same center, and a 12-meter chord of the larger circle is tangent to the smaller circle. What is the area, in square meters, of the area between the two circles?

24. In the cryptarithm below, each instance of a letter represents the same digit (0-9) and different letters represent different digits. What is the largest possible value of the five-digit

number  $ABCDE$ ? 
$$\begin{array}{r} ABCD \\ -DEC \\ \hline CDC \end{array}$$

---

2012 Cipherring Time Trials  
Thursday, December 13th, 2012

22. How many liters of a 30% acid solution should be combined with six liters of a 50% acid solution to create a 35% acid solution?

23. Two circles have the same center, and a 12-meter chord of the larger circle is tangent to the smaller circle. What is the area, in square meters, of the area between the two circles?

24. In the cryptarithm below, each instance of a letter represents the same digit (0-9) and different letters represent different digits. What is the largest possible value of the five-digit

number  $ABCDE$ ? 
$$\begin{array}{r} ABCD \\ -DEC \\ \hline CDC \end{array}$$



2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 9

---

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

Round 9

2012 Cipherring Time Trials  
Thursday, December 13th, 2012

25. Evaluate:  $4\left(3^{(2^{(1^0)})}\right)$

26. Evaluate as a base seven number:  $3456_7 - 2514_7$

27. When the last group of three Trick-or-Treaters came by, Kelly had six Mee Wusketeers and eight Thrilky May candy bars left, and he wanted to give all of them away so that he wouldn't end up eating the leftovers. If he doesn't care about fairness, in how many distinguishable ways can Kelly pass out the candy bars?

---

2012 Cipherring Time Trials  
Thursday, December 13th, 2012

25. Evaluate:  $4\left(3^{(2^{(1^0)})}\right)$

26. Evaluate as a base seven number:  $3456_7 - 2514_7$

27. When the last group of three Trick-or-Treaters came by, Kelly had six Mee Wusketeers and eight Thrilky May candy bars left, and he wanted to give all of them away so that he wouldn't end up eating the leftovers. If he doesn't care about fairness, in how many distinguishable ways can Kelly pass out the candy bars?

2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

ROUND 10

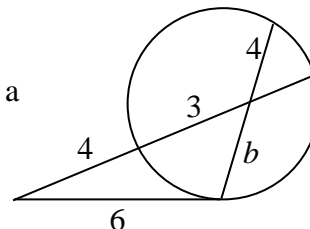
2012 CIPHERING TIME TRIALS  
THURSDAY, DECEMBER 13TH, 2012

ROUND 10

2012 Cipherring Time Trials  
Thursday, December 13th, 2012

28. My piggy bank contains 37 coins, each of which is either a nickel, a dime, or a quarter. If the total value of the coins is \$4.70 and the number of nickels is one more than the sum of the numbers of dimes and quarters, how many quarters are there?

29. In the figure to the right containing a circle, a chord, a secant, and a tangent, distances are given in meters. What is the value of  $b$ ?



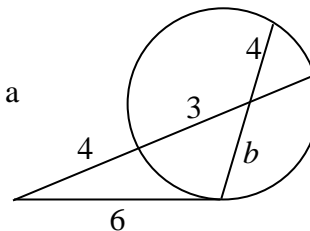
30. A right triangle has a hypotenuse measuring 12 m and a leg measuring 9 m. What is the cosecant of the smallest angle in the triangle?

---

2012 Cipherring Time Trials  
Thursday, December 13th, 2012

28. My piggy bank contains 37 coins, each of which is either a nickel, a dime, or a quarter. If the total value of the coins is \$4.70 and the number of nickels is one more than the sum of the numbers of dimes and quarters, how many quarters are there?

29. In the figure to the right containing a circle, a chord, a secant, and a tangent, distances are given in meters. What is the value of  $b$ ?



30. A right triangle has a hypotenuse measuring 12 m and a leg measuring 9 m. What is the cosecant of the smallest angle in the triangle?