1. MacGyver is on a train, being pursued by a pack of velociraptors, starting with a 400m head start. He frantically begins to build an anti-velociraptor weapon out of his paper clip, fork, spoon, energy bar, and spring-loaded click pen; he needs 35 seconds to finish. The antiquated train is running at 10m/s, and dramatically crashes to a stop after 20 seconds, but MacGyver finishes as the raptors close to only 5m away. How fast were the raptors running, in m/s?

2. I attach my pet snake, Earl, to one corner of my barn with a leash. The barn is square, with sides of length 10, and the leash has a length of twenty, which wraps around the barn. I would like to make sure that I am being humane to Earl, and would therefore like to know that area of my lawn he can traverse while on the leash. What is this area?

3. A parallelogram is given with a base of length $2x + 15$, and a height of $10 - x$. Find x such that the area is maximized.

4.

5. In a paralleogram, the measure of one angle is four times that of another angle. Find the measure of the larger angle.

6. A fireworks factory can currently produce Fizzbangs for two dollars each. Upgrades are available for the machinery, each of which will decrease cost by ten cents. The first upgrade costs $100, the second costs $200, and so on. What is the cheapest cost (in dollars) to produce 10001 fizzbangs?

7. The line $y = mx$ intersects the line $y = 10 - x$ at a distance of $\sqrt{82}$ from the origin. Find the product of all possible values of m.

8. At the grocery store, Jeffrey notices berries on sale and decides to make an extremely large number of berry tarts. Each tart uses $\frac{1}{4}$ of a container of blueberries, $\frac{1}{7}$ a container of blackberries, and $\frac{1}{10}$ a container of strawberries. If he bakes an integer number of tarts, using all the berries, and resists eating berries before baking, what is the fewest number of containers he could have used?

9. An ice cream cone has a radius of 5 and a height of 8. After five hours in the sun, the ice cream melts, filling the cone up to a height of 3. What is the volume of the melted ice cream?

10. A brick wall containing several windows is built. In sections without windows, the wall uses 120 bricks per meter, while in sections with windows, it uses only 80 bricks per meter. If the wall is 20 meters long and contains 2120 bricks, how many meters of wall without windows are there?

11. A mouse factory makes 3- and 5-button mice. The factory normally uses 207 buttons a day, but one day accidentally switches the orders and makes 5-button mice instead of 3-button mice, and vice versa, and ends up using 281 buttons. How many 3-button mice does the factory normally make?

12. Find the largest prime factor of 3599.

13. How many factors does 12345 have?

14. Given a drawer with 8 white gloves, 12 black gloves, and 6 gray gloves, find the number of gloves you need to pull out to ensure you have a pair of matching gloves. Assume that each glove has a matching pair.

15. Bill has made a bet with Tom. Bill will flip a fair coin 20 times; if all 20 come up heads, Bill wins a million dollars. The first 19 coins come up heads. What is the probability that Bill will win?

16. As we know, a mathematician is a device for turning coffee into theorems. Nathan, a mathematician, can prove a theorem in six hours (given enough coffee, of which he has an infinite supply). Silas's invention, the Lemm-o-Matic 1729, can prove a theorem in five hours. Working together, how long will it take them to prove 100 theorems? Express your answer to the nearest hour.

17. In the parliament of Pythonistan, the Silly Party controls N seats, and the Sensible Party controls 25 seats. The Silly members always vote yes on everything, but they need at least $\frac{2}{3}$ of the total members of parliament to vote yes in order to pass a bill. For some values of N, they will find that by kicking out one of their own members (and reducing the total membership by one), they will need fewer votes from the Sensible party to pass bills. How many such values of N are there?

18. Find the sum of the distinct real roots of $x^4 - 3x^3 + 4x^2 - 3x + 1 = 0$.

19. Compute $1 + 2 + 3 + \ldots + 1000000$.

20. I want to join several equilateral triangles along their edges (so that vertices coincide) to form a 7-sided polygon. What is the minimum number of triangles that I will need?

21. An ellipse has semimajor axis 2 and semiminor axis 1. Find the distance between its foci.

22. Find all positive integers n such that $n^4 + n^2 + 1$ is prime.

23. I flip 4 fair coins and eat all of the coins that land on tails. I flip all the uneaten coins again and then eat all the coins that land on tails. What is the probability that I have eaten at least 3 coins?

24. Cody can eat a 2 meter diameter pizza in 1 minute. Frank can eat a 2 meter diameter pizza in 2 minutes. Jeffrey can eat a 2 meter diameter pizza in 3 minutes. If they combine their powers together, how many minutes does it take them to eat one pizza of diameter 6?

25. How many consecutive zeros occur at the end of the decimal expansion of $(8!)!?$.