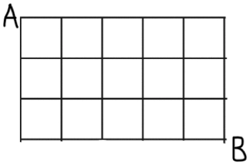
* + - 1. Aaron wants to explore the solar system. To do this, he needs to power his rocket ship. Rocket fuel packets contain 3 gallons of fuel each and Aaron’s rocket ship needs 103 gallons of fuel. How many rocket fuel packets does he need to buy?

1. 33 B) 34 C) 35 D) 36 E) NOTA
2. Aaron needs to get permission from his teacher, Mr. Kenyon, to skip class to go to outer space. Mr. Kenyon told Aaron he can go if he solves this equation for x: . What is the answer?
3. 3 B) 6 C) 9 D) 12 E) NOTA
4. Looking at the clock, Lilly sees that it is currently 11:55 am. She plans to launch her rocket ship the next time the smaller angle made by the hour and minute hand is 33 degrees. At what time will she launch the rocket ship?
5. 11:57 am B) 12:03 am C) 12:05 am D) 12:06 am E) NOTA
6. Oops, Lilly forgot to pack her bags! Figure out how long it will take her to pack 3 bags if she can pack 10 bags in 45 minutes.
7. 12 mins B) 12.5 mins C) 13.5 mins D) 15 mins E) NOTA
8. Lilly figures that this would take a while and she is very lazy, so she gets Aaron to help her pack. If Aaron can pack 4 bags in 22.5 minutes and Lilly’s speed is the same as in the last question, how long will it take to pack 3 bags if the two work together?
9. 5 mins B) 7.5 mins C) 10 mins D) 12.5 mins E) NOTA
10. Hadriel decides to travel to Venus. When he landed on Venus, he was surprised at how hot it was, but luckily, he had his protective suit on. If it is currently 455°C, how hot is it in Fahrenheit? Tip: Use this formula °C = (5/9) (°F – 32).
11. 235°F B) 423°F C) 787°F D) 851°F E) NOTA
12. Oh no! Evil Martians detected Aaron’s presence. They told Aaron “You must solve this math problem, or else we will take your rocket ship and invade Earth! Help Aaron save Earth by solving this! Find the value of x, where .
13. 0 B) 1 C) -2 D) 1, -2 E) NOTA
14. Lebron James, who has 4 rings, wants to travel to Saturn to see its 7 rings. Due to having less rings, Lebron must first find the value of P(23), where P is the quadratic with leading coefficient 1 satisfying P(4)=7 and P(7)=4. What answer should Lebron get if he does it correctly?
15. -12 B) 32 C) 132 D) 292 E) NOTA
16. Bruce is inspecting the asteroid belt and finds a funny-looking asteroid. He tries to calculate the volume of the asteroid and somehow gets a weird number, . Rationalize and simplify this number.
17. B) C) D) 210 E) NOTA
18. If space was a Cartesian plane, Lilly would be traveling along the line 3y = 4x + 2. She wants to stop at Jupiter, which is at the point (11,15). What is the shortest distance from Jupiter to the line Lilly is traveling along?
19. 1/5 B) 3/5 C) 1 D) 29/5 E) NOTA
20. Bruce lands on Mercury and sees Emily, Omar, and Evan playing tennis, so he joins them. After a few minutes, Bruce accidentally hits the ball away! If the ball is 50 feet in front of Bruce and is rolling at a speed of 12 mph, and Bruce runs at 17 mph, how long (to the nearest second) will it take Bruce to catch up to the ball? Hint: there’s 5280 feet in a mile. Assume both the ball’s and Bruce’s speeds are constant.
21. 1 second B) 3 seconds C) 5 seconds D) 7 seconds E) NOTA
22. Whoops, Bruce fell into a giant hole while trying to get the ball. He climbs up for 20 feet at a constant speed for 1 hour and then takes a 10 minute break, causing him to slide down 6 feet, and repeats this cycle until he gets out. If the hole is 100 feet deep and Bruce starts at the bottom of the hole, how many hours will it take for Bruce to climb out?
23. 6 hours B) 6.8 hours C) 7 hours D) 7.8 hours E) NOTA
24. Aaron is jumping for joy on Mars. His jump path is the parabola . If a and b are the roots of his jump path, calculate the value of .
25. 47 B) 51 C) 192 D) 200 E) NOTA
26. Hadriel is exploring Venus and sees a line of interesting rocks. He is at the point (3,2) and wants to stop by the rocks at the line y = 0, then walk to the point (-5,4). What is the shortest distance he can walk to accomplish this?
27. B) C) D) 10 E) NOTA
28. Lilly wants to fly from point A to point B in the 5 miles x 3 miles grid shown below. If she can only move along the grid lines, and she can only travel 8 miles before running out of fuel. How many different paths can she take from A to B?



1. 21 B) 28 C) 35 D) 56 E) NOTA
2. On Mars, the aliens use special kinds of currency. 2 mers = 1 mas, 2 mas = 7 moks, and 4 moks = 20 marz. How many mers equal 70 marz?
3. 2 B) 8 C) 14 D) 20 E) NOTA
4. The lower gravity on Mercury can make people taller! The function describes the increase in height (in inches) for a person on Mercury, where x is the number of days the person spends on Mercury. How much taller will someone on Mercury get after 5 days?
5. 65/16 B) 211/32 C) 243/32 D) 665/64 E) NOTA
6. While exploring Mars, James finds a rock, and he finds its weight on Mars to be 20 kg. Given that the mass of the Earth is 9 times that of Mars and the radius of the Earth is twice that of Mars, how much will the rock weigh on Earth? Assume that the weight of an object on a planet is directly proportional to both the mass of the object and the mass of the planet, and inversely proportional to the square of the radius of the planet.
7. 45 kg B) 90 kg C) 180 kg D) 360 kg E) NOTA
8. Nelson wants to steal the moon, so he decides to build a spaceship to get there. However, in order to access the blueprints on his account, he needs to pass a security question that reads, “Of the eight planets in the solar system, four of them are rocky planets, and the other four are gas planets. If you randomly select three of these eight planets. What is the probability that you select at least two rocky planets?” Please help Nelson solve this problem!
9. 1/14 B) 5/14 C) 1/2 D) 9/14 E) NOTA
10. Unfortunately, Nelson puts in the wrong answer, so when he attempts to fly to the moon on his spaceship, the engines cut out mid-flight. Nelson and his spaceship begin freely falling when he is two miles in the air. Given that the distance (in feet) Nelson falls after t seconds is , how much time elapses between the engine cutting out and Nelson crash-landing? Round to the nearest second.
11. 12 seconds B) 18 seconds C) 24 seconds D) 30 seconds E) NOTA
12. Miraculously, Nelson survives the crash and is determined to try again, so he has Arib rebuild the spaceship. To ensure that only intellectuals would use the spaceship, Arib programs it so that in order to start the spaceship, the ship presents a math question that must be solved correctly. Given that the spaceship asks to find the sum of the cubes of the roots of the equation, what answer should Arib give to start the ship?
13. 438 B) 1314 C) 9130 D) 10,648 E) NOTA
14. A cross-section of the spaceship can be represented by the region in the coordinate plane bounded by the inequalities and . What is the area of this region?
15. 40 B) 52 C) 56 D) 64 E) NOTA
16. Arib and Nelson make it to the moon safely using the rebuilt spaceship. Nelson's brilliant plan to steal the moon involved gathering as many moon rocks as they could to fit into the spaceship, which happens to be 168 rocks. Given that Nelson gathers 6 rocks every minute and Arib gathers 9 rocks every two minutes, how much less time would it take for the two of them working together to fill the spaceship compared to only Nelson gathering rocks?
17. 12 minutes B) 14 minutes C) 16 minutes D) 28 minutes E) NOTA
18. After gathering all the rocks, Arib and Nelson each gather another rock to throw. Nelson climbs to the top of the 390-foot-tall spaceship to throw his rock, and Arib stands directly beneath Nelson. They throw their rocks in the same direction, with the trajectories of Arib's and Nelson's rocks being represented by the equations and , where x and y are the distance and height of the rocks, in feet. Assuming that the moon is completely flat, what is the distance between the two points their rocks land?
19. 13 feet B) 30 feet C) 130 feet D) 390 feet E) NOTA
20. Cyrus, who loves space, creates a model of the solar system by connecting each of the eight planets to the sun using wooden rods. The lengths of the rods form an arithmetic sequence, with the rod connected to Mercury having a length of 12 feet, the rod for Venus having a length of 17 feet, and so on. What is the total length of the wooden rod Cyrus uses in his model?
21. 189 feet B) 236 feet C) 256 feet D) 288 feet E) NOTA
22. What is the number of distinguishable permutations of the letters in SOLARSYSTEM?
23. 3,628,800 B) 6,652,800 C) 9,979,200 D) 39,916,800 E) NOTA
24. Jupiter has 79 moons, which happens to be a prime that is two less than a perfect square. What is the sum of all primes less than 100 that are two less than a perfect square?
25. 79 B) 156 C) 158 D) 366 E) NOTA
26. Wesley believes that Pluto should be made a planet again, so he starts a petition. On day n, he gets n(100-n) people to sign his petition. Wesley wants to get 200,000 signatures and runs the petition from days 0 to 100. How many signatures was he over/under his goal?
27. 33,500 B) 50,000 C) 189,900 D) 194,950 E) NOTA
28. Shaoyang is unable to dunk a basketball, so he travels to Mercury, where the force of gravity is weaker. When he jumps on Earth, the distance between him and the ground can be represented as , where is the amount of time after he jumps, and d is in meters. However, the equation for when he is on Mercury is . What is the difference between the maximum height Shaoyang can jump on the two planets in centimeters?
29. 30 cm B) 45 cm C) 60 cm D) 75 cm E) NOTA
30. Nima is convinced that aliens exist on Neptune. Since Neptune is the eighth planet, he believes that these aliens use the base-8 numeral system. What is the sum of the digits when 2023 expressed in base 8?
31. 7 B) 14 C) 21 D) 28 E) NOTA
32. Hadriel and Rohan are racing towards Uranus from Earth in their spaceships. Uranus is 1.8 billion miles away from Earth. Hadriel travels at a constant one million miles per second, while Rohan travels one half of the total distance at half a million miles per second, and the other half at 1.5 million miles per second. Who reaches Uranus first, and by how much time?
33. They arrive at the same time B) Hadriel arrives first by 1800 seconds C) Rohan arrives first by 600 seconds D) Hadriel arrives first by 600 seconds E) NOTA
34. For how many positive integers does there exist a quadratic with integer coefficients and discriminant n?
35. 25 B) 50 C) 99 D) 100 E) NOTA