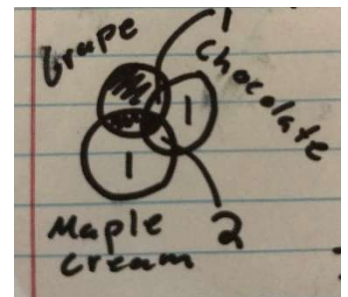


**CHILES MINI MU 2019**  
**ALG. I NOCAL**  
**ANSWERS**

- 1)C
- 2)D
- 3)D
- 4)D
- 5)C
- 6)A
- 7)D
- 8)B
- 9)B
- 10)A
- 11)C
- 12)B
- 13)C
- 14)B
- 15)E
- 16)A
- 17)B
- 18)C
- 19)B
- 20)A
- 21)A
- 22)A
- 23)C
- 24)A
- 25)C
- 26)A
- 27)D
- 28)B
- 29)D
- 30)B

## Solutions

1.  $180\sqrt{441}=2x+2$ ,  $90\sqrt{21(21)} = x + 1$ ,  $(90(21))-1=x=1889$  **(C)**
2.  $3x^2 + 12 = 0$ ,  $x^2 + 4 = 0$ ,  $x = 2$  (asks for the positive solution); if they buy 2 potato chips then they also buy 2 fruit gummies, and they only buy 1 granola bar, leaving a maximum of 4 unaccounted snacks, so the answer is **(D)**.
3. The sum of the first ten terms in the Fibonacci sequence ( 1, 1, 2, 3, 5, 8, 13, 21, 34, 55) is 143. **(D)**
4. If they saw 70 squirrels, and the ratio of squirrels to bobcats is 35 to 3, then you can multiply this by 2 to get the number of bobcats that they say (6). If the number of black bears is  $11/6$  that of bobcats, then you can multiply 6 (the total number of bobcats seen) by  $11/6$ , getting 11 **(D)**.
5.  $2X^2 - 9X - 26 = 0$ ,  $X^2 - (9/2)X - 13 = 0$ ,  $(X - (13/2))(X + 2) = 0$ , the positive solution is  $13/2 = x$ , or 6.5 **(C)**
6. First, set the line  $y = \frac{x^2}{2} + x - \frac{35}{2}$  equal to 0 because we're finding the roots. Then multiply by two to get  $0 = X^2 + 2X - 35$ ,  $0 = (X + 7)(X - 5)$ ,  $-7 + 5 = -2$  **(A)**
7. Since the chance of eruption in 1981 is 5.1%, you use this as a starting point. For the next 30 years the chance increases by 0.02%.  $0.02 \times 30 = 0.6$  then for 8 years it increases by 0.025.  $0.025 \times 8 = 0.2$ .  $5.1 + 0.6 + 0.2 = 5.9$  **(D)**
8.  $y = -10|x+1| + 20$ , when set to equal 0, gives you the values of -3 and 1 for X. This makes the intersection points (-3,0) and (1,0) **(B)**
9. If you divide the triangle into 2 right triangles, the bases of each are 2 units and it has a height of 20 units.  $2(0.5(2 \times 20)) = 40$  **(B)**
10. If you multiply the ratio of steelhead:chinook (20:3) by 4, and the ratio of Rainbow:chinook (5:4) by three, the two ratios will have a common factor. When there's 12 chinook there's 80 steelhead and 15 rainbow, which is a total of 107 fish. **(A)**
11.  $729 = 8\left(\frac{x+2}{2}\right)^3$ , the cube root of  $(729/8) = 9/2 = (x+2)/2$ ,  $x+2=9$ ,  $x=7$ . The equation is in hundreds of feet, so  $7(100) = 700$  feet **(C)**
12.  $500x^3 + 300000x^2 - 20000000x = 0$ ,  $x^2 + 600x - 400000 = 0$ ,  $0 = (x+1000)(x-400)$ ,  $x=400$ , -1000. In the question it says the diameter is equal to the positive solution, so we use 400 ft for D. Using the formula for the area of a circle we get  $A = 40000\pi \text{ ft}^2$  **(B)**
13. For this question it's best to make a Venn diagram (an example is shown below). Since no one gets more than 2 doughnuts, you can eliminate the intersection between the three flavors. It also says that only one person gets a grape doughnut, and no one get only one grape. So since Neha is the only grape order we can deduce she get a grape and chocolate. We know that chocolate is 3 times grape so that would be 3 chocolate doughnuts and that leaves 3 doughnuts to be maple. **(C)**
14.  $10 + (17 \times 60) = 1,030$  feet;  $20 \times 60 = 1200$ ;  $1200 - 1030 = 170$  feet **(B)**



$$15. \quad 3\sqrt{\left(\frac{4}{3}(x-15)\right)^2} = 2^2, \frac{4}{3} = \sqrt{\left(\frac{4x}{3} - 20\right)^2}, \frac{4}{3} = \frac{4x}{3} - 20, 4 = 4x - 60, x = 16, (E)$$

**16.** The fourth smallest height is 40 feet and the sixth smallest diameter is 12 inches. The volume of a cylinder is  $\pi r^2 h$ . So the area should be  $\pi (1/2 \text{ foot})^2 \cdot 40$  feet if we change the radius of 6 inches into feet. **10 pi (A)**

**17.** For quadratics in the form

$$y = ax^2 + bx + c$$

The discriminant is  $b^2 - 4ac$ . So if  $b=9$ ,  $a = 4$ , and  $c = 3$ , we get that it equals 33 **(B)**

**18.** For the next two hours, the number of bubbles produced in the first mud pot is  $3 \cdot 120 = 360$  and the number produced in the second mud pot is  $5 \cdot 120 = 600$ .  $600 - 360 = 240$  **(C)**

**19.** Jason's net climb speed is 2 feet per minute. So at a height of 2,996 feet it has taken him  $2,996/2 = 1498$  minutes. Thus, it only takes one more minute to climb the next four feet because at that time he is already over the edge. **(B)**

**20.** If we do the distance formula of  $\sqrt{x^2 + y^2}$ , for San Francisco, the distance is 200 and the distance from Santa Rosa is 390 **(A)**

**21.**  $(x+9)(x-10)$ . Roots are -9 and 10. The sum of the reciprocals is  $-1/9 + 1/10 = -1/90$  **(A)**

**22.** The speeds that Jessica goes at is 50, 55, 60, 65 mph. Because she travels at a constant time interval for her increases in speed, we can just take the average of all of these values, which is 57.5 **(A)**

**23.** We can see that  $871 = 873 - 2$  and  $875 = 873 + 2$ . So  $871 \cdot 875 = (873-2)(873+2) = 873^2 - 2^2$  which becomes  $762129 - 4 = 762125$  **(C)**

**24.** If we solve this equation by moving all  $x$ 's to one side and all constants to the other, we get.

$$4x = 35924$$

If we divide both sides by 4 we get that  $x = 8981$  and so Jessica was closer by 1 foot. **(A)**

**25.** The twelve ounces in Jessica's drink given to Michael contain 25% sweetness, which we can think of as 3 ounces of pure sweetness. The twelve ounces in Michael's drink given to Jessica are 75% sweetness, which we can think of as 9 ounces of pure sweetness. We can think of the remaining 4 ounces of Jessica's drink to contain 1 ounce of pure sweetness and the remaining 4 of Michael's to contain 3 ounces of pure sweetness. So to Jessica's drink there is a total of  $1 + 9$  ounces of pure sweetness.  $10/16 = 62.5\%$  **(C)**

**26.** The shape that Jason and Michael make is a 3-4-5 right triangle. So the distance between their two places of dinner is 20 miles, and midway would be 10 miles. **(A)**

**27.** The square root of a number can never be negative. Only positive **(D)**

**28.** The probability of the coin landing heads is  $1/2$ . So for two heads in a row it would be  $\frac{1}{2} \cdot \frac{1}{2} = 1/4$ . **(B)**

**29.** If Steve was lying he would be from LA and so would Melissa, that makes Leon a liar from LA and Chris would be a liar but then Steve would be from Berkeley so the logic loop breaks. So assume Steve is telling the truth him and Melissa are from different places. Him being a truth teller from Berkeley and Melissa being a liar from LA, then Leon's a Liar which makes Chris a liar and Steve from Berkeley a complete logic loop. Steve tells the truth get directions from him. **(D)**

**30. B.** The x coordinate of the vertex of a parabola is given by  $-b/2a$ . Thus it is  $-24/-4 = 6$ . If we plug this back into the quadratic equation, we find that the y coordinate is 32, so the sum of the coordinates is 38.