Pre-Algebra 2019
Answers and Solutions

Answer Key:
1. A
2. D
3. B
4. D
5. A
6. A
7. B
8. B
9. C
10. C
11. C
12. A
13. D
14. D
15. A
16. D
17. A
18. D
19. A
20. B
21. D
22. C
23. B
24. B
25. D
26. D
27. A
28. A
29. C
30. C
31. D
32. B
33. B
34. C
35. C
36. C
37. A
38. B
39. A
40. D

Solutions:

1. Solution: A is the answer. We go at it by just multiplying it out, dividing, etc,
$$\frac{4 \times 5}{9 \times 11} \times \frac{2 \times 9 \times 11}{4 \times 5 \times 2} = 1.$$

2. Solution: The answer is D. We immediately see some canceling. We see powers of ten on the top and on the bottom, and we make quick work of this: $\dfrac{10^{17}}{5 \times 10^{14}} = \dfrac{10^3}{5}$

   We know that $10^3 = 10 \times 10 \times 10 = 1000$, so 1000/5=200.

3. Solution: Answer is B, 89201.7+90201.7 + 91201.7 + 92201.7 +93201.7 + 94201.7 + 95201.7 + 96201.7 + 97201.7 +98201.7 + 99201.7 =1036218.7

4. Solution: Answer D, $\dfrac{500 \times 75}{5} = 7500$

5. Solution: Answer is A,   {-3(-2.5), 4(-2.5), 24/(-2.5),   (-2.5)(-2.5), 1}

6. Solution: Answer is A. First doing the subtraction, we get $\dfrac{1}{2} \times \dfrac{2}{3} \times \dfrac{3}{4} \times \cdots \times \dfrac{9}{10}.$ We notice a lot of terms cancel. In fact, every term in the numerator except for the 1and every term in the denominator except for the 10will cancel, so the answer is $\dfrac{1}{10}.$

7. Answer B. The result is (1/8 +7/12)/2=17/48.

8. The answer is B. We are given the three side lengths of the triangle, so we can compute the perimeter of the triangle to be $6.2 + 8.3 + 9.5 = 24$ cm. The square has the same perimeter as the triangle, so its side length is $\dfrac{24}{4} = 6$ cm. Finally, the area of the square is $6^2 = 36 \ cm^2$.

9. The answer is C, $(0.5 \times 4 + 0.75 \times 10) = 9.5$

10. The answer is C. $200(8.5%-8%)=$1.

11. The answer is C, 1234<1243<1324<1342<1423<1432<......

12. The answer is A , $(2k+3k)=500$, 300-200=100

13. The answer is D. If the average score of the first five is 84, then the sum of those five scores is 6x84=504. The average score of the first six is 85, so the sum of the seven is 7x85=595. Taking the difference leaves us with just the sixth score, which is 595-504=91.

14. The answer is D, the reason is 1, 2, 5, 10, 17, 26, 37, 50,...

15. The answer is A since 75k=25x3k, when k=3, 75k=25x9= 15^2

16. The answer is D since 420=15X28, 18 does not divides 420

17. The answer is A, the reason is: let Ann has x dollars, then Joe has x+150, and Henry has x+150+240, together, they have x+(x+150)+(x+150+240)=990, solve for x, x=150

18. The answer is D, since $187 = 11 \bullet 17$, the product is divisible by 187.

19. The answer is A since x=(1/5)(5/4)(3/2)=3/8

20. The answer is B since 200, 100, 50, 25=50-25

21. The answer is D. Number of multiples of 2 less than 100 = 49 (2*49 = 98), Number of multiples of 3 less than 100 = 33 (3*33 = 99). Some of the integers that are divisible by both 2 and 3 are double counted. LCM(2, 3) = 6. Number of multiples of 6 less than 100 = 16 (6*16 = 96). Number of positive integers that are not divisible by 2 or 3 is 99 - (49 + 33 - 16) = 100 - 66 = 33.

22. Answer is C. The surface area of sphere is S=4*pi*r^2 (radius=r). Since new radius r'=r/2, new surface area is S'=4*pi*(r')^2 = 4*pi*r^2/4=S/4. Surface area reduces by 4 times. Change in area is S-S/4 = 3S/4.

23. The answer is B. $\dfrac{x}{4}+\dfrac{y}{5}=\dfrac{5x+4y}{20}=\dfrac{18}{20}$, x=2 and y=2, thus 5x+3y=16

24. The answer is B. $\dfrac{4\pi(3r)^3}{3}=27\dfrac{4\pi(r)^3}{3}=27V$

25. The answer is D.   Area=Length times Width=LW, thus the new area is $(1.1L)x(1.1W)=1.1^2(LW)=1.21(LW)$. We have 1.21(LW)-(LW)=21%LW

26. The answer is D, since the salary after four years is $1.1^4 > 1.45$

27. The answer is A, since 579+597+759+795+957+975=4662.

28. The answer is A. The reason: The maximum number of jellybeans that a person could eat where they have only ate 3 colors is $15 \cdot 3 = 45$. This means that the person has eaten every jellybean of the first 3 colors. If they eat one more, they will have eaten the last color. Therefore, the least number that a blindfolded person must eat to be certain of having eaten at least one of each color is 45 + 1 = 46.

29. The answer is C. Solution $b = 4d$, $c = 2d$, $b + c + d = 42$. Substituting: $4d + 2d + d = 42$, we have $7d = 42$, thus $d = 42/7 = 6$. Substituting this back: $b = 4(6) = 24$.

30. The answer is C. Solution $5x − 3 = 5$, $5x = 8$, $x = 8/5$, $10x − 10 = 10(8/5) − 10 = 16 − 10 = 6$.

31. The answer is D. Solution: Recall that two angles are supplementary if and only if the sum of the two angles is 180 degrees. Let x be the smaller angle. $(x + 50) + x = 180$, $2x = 130$, $x = 65$. Therefore the smaller angle is 65 degrees.

32. The answer is B. Solution: There are $24−1 = 23$ days between these two days. Since there are 7 days in a week, this means there are 3 weeks and 2 (that is $23 − 3· 7 = 2$) days between these two dates. Since each of the 3 weeks will bring us back to a Thursday, we only need to worry about the remaining 2 days. 2 days before a Thursday is a Tuesday. Therefore the first day of June, in the same year, will be on a Tuesday.

33. The answer is B. Solution: In three years, each of the 6 children will be 3 years older. This means the ages of the children will total $36 + (6· 3) = 54$.

34. The answer C. Solution: January has four full weeks and then three extra consecutive days. Each full week contributes one Tuesday and one Saturday, so the three extra days do not contain a Tuesday and Saturday. Therefore, those three days are Wednesday, Thursday, and Friday. Wednesday is the 29th day of January, therefore, Thursday is the 30th day of January, and Friday is the 31st day of January. Based on the choices given, so the answer is (C).

35. The answer is C. Solution: If each student has 5 classes, and there are 600 students, then they have a total of 5x600=3000 student-classes among them. Each class has 15 students, so there must be 3000/15=200 classes. Each class has 1 teachers, so the teachers have a total of 200 classes among them. Each teacher teaches 4 classes, so if there are t teachers, they have $4t$ classes among them. This was found to be 200, so $4t = 200 \Rightarrow t = 50$. This is answer choice C.

36. The answer is C. Solution: To find the smallest sum, we just have to find the smallest 3 numbers and add them together. Obviously, the numbers are $-3, -1, 7$, and adding them gets us 3.

37. The answer is A. Solution: There are 60 minutes in an hour. So, we can easily eliminate some of the choices by noting that 9am is exactly 12x60=720 minutes away from 9pm. We know that the contest ended 1000-720=280 minutes after 9pm. The highest multiple of 60 that will fit into 280 is 240, which is 4×60, and the remainder is 40 minutes, meaning that the contest ended at 1:40am.

38. The answer is B.   Solution: The smallest whole number between $\sqrt{7}$ and $\sqrt{99}$ is 3. the largest whole number between $\sqrt{7}$ and $\sqrt{99}$ is 9, the whole number between $\sqrt{7}$ and $\sqrt{99}$ is 7.

39. The answer is A. Solution: B $\pi(3r)^2 = 9\pi r^2$, thus 9:1

40. The answer is D. Solution: 0+1+3+4+5+6=19, 0+2+3+4+5+6=20, 1+2+3+4+5+6=21, the sum cannot be 22