

Pre-Algebra 2018

Answers and Solutions

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

Solutions:

1. $A=0.2$, $0.45 < B < 0.5$, $C=2$. Hence $C > B > A$. The answer is E.
2. Arranging from smallest to largest, the numbers are 0.0289, 0.05129, 0.089, and 0.09. The required sum is $0.0289+0.09=0.1189$. The answer is A.
3. Since $\sqrt{\frac{601}{9.9} + \frac{395}{100}}$ is approximately $\sqrt{64} = 8$. The answer is B
4. In order to correct the error, the student must subtract 85095 and add 35.9. The single entry is to subtract $85095-35.95=85059.05$. The answer is B
5. The answer is the average of $1/8$ and $7/12$, that is $(1/8 + 7/12)/2=17/48$. Answer E.
6. Let the score of the fifth student is x . Hence $(75+53+62+84+x)/5=68$, $274+x=340$, $x=66$. The answer A.
7. $(\frac{1}{20} + \frac{2}{30} + \frac{3}{40})/3 = \frac{23}{360}$. The answer is B.
8. $180/60=3$. The answer is A.
9. The total of scores earned by 200 students averaged 66% on an examination was $200 \times 66=13200$; the total of scores of 300 students averaged 56% was $300 \times 56=16800$. The average percentage for all students was $(13200+16800)/500=60$. Answer D.
10. In each answers of B, C, and D, sum of the angles is different from 180 degree. Triangle with angles 40 degree, 60 degree and 80 degree is not isosceles. The answer is E.
11. The exterior angle at each vertex is $180 - x$. The sum of all exterior angles is 360. Thus, $n(180-x)=360$ so $n=360/(180-x)$. The answer is E.
12. $(-2.3)^2 > 5$, 1.03 , $\sqrt{4} = 2$, $(1.02)^2=1.0404$, $(1.25)^2=1.5625$. The smallest number is 1.03. The answer is B
13. If $b+1=7-b$, then $2b=6$, $b=3$. This gives lengths of 4, 4, and 10. But this not possible since the sum of any two sides of a triangle must exceed the third side. If $b+1=4b-2$, then $3b=3$, $b=1$. The lengths are 2, 6, 2, again no triangle is possible. If $7-b=4b-2$, then $5b=9$ and $b=1.8$. The lengths are 5.2, 5.2, and 2.8, which can form a triangle. Only one value of b will produce an isosceles triangle. Answer is B
14. $15 \times \$0.1 + 10 \times \$0.05 = \$2$. Answer is C
15. These 4 prime numbers, 2,3,5, and 11 are not factors of 119. The answer is E.
16. The ten divisors of 60 are 2,3,4,5,6,10,12,15,20,30. Answer B
17. Using $z^3 + 1 = 217$, obtain $z^3 = 217 - 1 = 216$, $z=6$, $xyz=6z=6 \times 6=36$. Answer D
18. Since $(a+b+c)^2 \geq 0$, then $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca \geq 0$ Then $1 \geq -2ab - 2bc - 2ca$. We have $ab+bc+ca \geq -1/2$. Answer E

$$a^2 + (a+d)^2 = (a+9d)^2$$

19. By Pythagorean Theorem, $a^2 - 16ad - 80d^2 = 0$ then $a=20d$ or $a=-4d$, since we are
 $(a-20d)(a+4d) = 0$

dealing with the sides of a triangle, a must be positive, and $a:d=20:1$. Answer D

20. If the dimension of the solid are a , b , and c , then $ab=2x$, $bc=y/2$, and $ca=xy$,
 $a^2b^2c^2 = (2x)(y/2)(xy) = x^2y^2$. The volume is $abc=xy$. Answer A.

21. The number of numbers from a to b is $b-a+1$. then the number of integers between a and b is $b-a+1-2=b-a-1$. Answer A.
22. $90 + 91 + 92 + 93 + 94 + 95 + 96 + 97 + 98 + 99 = 945$. Answer B
23. Multiply the equation $ax + 3y = 5$ by 3 and multiply the equation $2x + cy = 3$ by 5, we have $3ax+9y=15$ and $10x+5cy=15$. Thus, $3a=10$ and $5c=9$, therefore, $a+b=10/3 + 9/5 = 77/15$. Answer B
24. Since the area of the square is 144, then the side of the square is 12. So, the diameter of the circle is 12, thus the area of the circle is $6^2\pi = 36\pi$. Answer A
25. Since the area of the circle is $r^2\pi = 9\pi = 3^2\pi$, the radius is 3. Answer E
26. The number 420 is a multiple of 15 but not a multiple of 18. The answer D
27. $\$200(8.5\%-8\%)=\1 . Answer B
28. Since $(5+x)/2=2$ and $(y+7)/2=5$, it follows that $x=-1$ and $y=3$, thus $x+y=2$. Answer E
29. Since a and b are the x- and y- intercepts of a line, then the line equation is $x/a + y/b = 1$. The line passes through the point (2,1), then $2/a + 1/b = 1$. Simplify, $2b+a=ab$, then $a(b-1)=2b$. Answer A
30. The point with integer coordinates which are inside this triangle is (1,1). Answer B
31. The possible pairs of numbers without regard to order are: (1,1), (1,2),(1,3),(1,5),(1,7),(1,9), (2,2),(2,3),(2,5),(2,7), (2,9), (3,3),(3,5),(3,7),(3,9), (5,5),(5,7),(5,9),(7,7),(7,9),(9,9). The possible sums are 2,3,4,5,6,7,8,9,10,11,12,14,16,18. There are 14 possible sums. Answer D
32. There are 499 integers to consider. Of these, 249 are divisible by 2, 166 are divisible by 3, and 83 are divisible by both 2 and 3. Hence, the number of integers that are not divisible by 2 or 3 is $499-(249+166-83)=167$. Answer B
33. $x=(1/5)(5/4)(3/2)=3/8$ Answer A
34. $4\pi(2r)^2 = 4(4\pi r^2)$. Answer B
- 2A4
- 329
35. ---
- 5B3
- Since there is 1 to carry, we get $A+3=B$ from the 2nd column. Since nothing is carried into the third column, the maximum value of B is 9 when $A=6$. But 593 is not divisible by 3. If $B=8$, $A=5$, but 583 is not divisible by 3. However, if $B=7$, then $A=4$ and 573 is divisible by 3. Hence, the largest possible value of A is 4. Answer B
36. 20, 10, 5, $2.5=5-2.5$ Answer B
37. Reciprocal of reciprocal is itself. Answer B
38. $143=11\cdot 13$, the product is divisible by 143 Answer A
39. $2310=2\cdot 3\cdot 5\cdot 7\cdot 11$, $396=2^2\cdot 3^2\cdot 11$, $1056=2^5\cdot 3\cdot 11$, $1375=5^3\cdot 11$ Answer A
40. $\pi(2r)^2 = 4\pi r^2$ Answer B