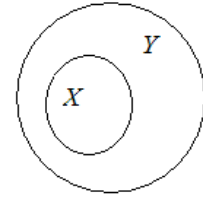


Solutions:

1. $(-1)^{37} - k - 4 = 0 \rightarrow -1 - k - 4 = 0 \rightarrow k = -5$ **D**

2. Draw a Venn diagram with circle X completely inside circle Y (see picture to the right). $X \cap Y = X$; $X \cup Y = Y$ **A**

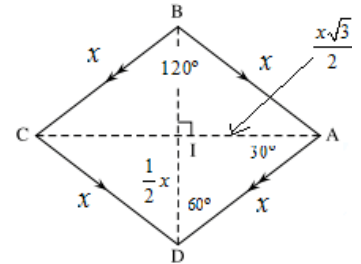


3. None of these are true. Don't forget division by zero. **A**

4. $4x + 4 + 12x + 3 = 16x + 7$ **A**

5. Median is the average of the two bases. $\frac{x + 2x}{2} = \frac{3x}{2}$ **D**

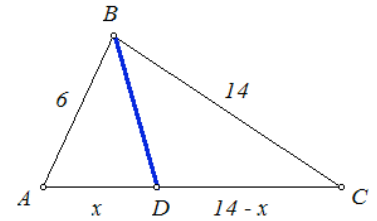
6. Draw yourself a picture (see picture to the right). Remember that a rhombus' diagonals bisect each angle and are perpendicular, so you have four 30-60-90 right triangles. Therefore, the longer diagonal's length is $x\sqrt{3}$ and the shorter diagonal's length is x . The ratio is $x\sqrt{3} : x \Rightarrow \sqrt{3} : 1$ **A**



7. Draw yourself a picture (see picture to the right):

$\frac{6}{x} = \frac{14}{14-x} \rightarrow 84 - 6x = 14x \rightarrow 20x = 84 \rightarrow x = 4.2$ **D**

8. $\frac{(x^2 - 4)(x^2 - 16)}{x^2(x + 4) - 4(x + 4)} = \frac{x^2 - 16}{x + 4} = x - 4$ **B**



9. Set the real parts equal to each other and the imaginary parts equal to each other: $3x = 6$ and $(x + y)i = 3i \Rightarrow x + y = 3 \Rightarrow x = 2 \rightarrow y + 2 = 3 \rightarrow y = 1$ **D**

10. $y = kx^2z^3 \rightarrow y = k(2x)^2(2z)^3 = 32kx^2z^3$ **A**

11. $\frac{10N = 23.\bar{8}}{N = 2.3\bar{8}} \Rightarrow 9N = 21.5 \rightarrow N = \frac{21.5}{9} = \frac{43}{18} \rightarrow 61$ **C**

12. $(a + b)^2 = a^2 + 2ab + b^2 = 15 + 10 = 25 \rightarrow a + b = \pm 5$ **C**

13. Draw yourself a picture (see picture to the right) and you will create an isosceles triangle with two congruent angles of measure 75 degrees. **A**

14. Rewrite series as: $(b - 3c) + (-2b - 3c)$ and find the common difference

$\rightarrow d = -3b \rightarrow a_{15} = b - 3c + 14(-3b) \rightarrow b - 3c - 42b = -41b - 3c$ **B**

15. $k^2 - 4(k + 8) = 0 \rightarrow k^2 - 4k - 32 = 0 \rightarrow (k - 8)(k + 4) = 0$ **D**

16. $m = \frac{-3 - -11}{4 - 8} = \frac{8}{-4} = -2 \rightarrow m_{\perp} = \frac{1}{2} \rightarrow x - 2y = c$; plug in either point to get

$x - 2y = 20$: **A**

17. $(x^2 + 6x + 9) - 2 \rightarrow y = (x + 3)^2 - 2$, the axis of symmetry is $x = -3$, the vertex is $(-3, -2)$, and the parabola opens up so it would have a minimum point. **A**

18. **C**

19. $\frac{\log_{14} 432}{\log_{14} 196} = \frac{1}{2} \log_{14} 432 \rightarrow \frac{1}{2} \log_{14} (2^4 \cdot 3^3) \rightarrow \frac{1}{2} (4 \log_{14} 2 + 3 \log_{14} 3) = 2x + \frac{3}{2}y$ **C**

