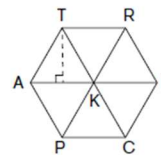


Workout 3

161. Suppose the lengths of the sides of the rectangle are a and b . Then $ab = 20$ and $a + b = 26/2 = 13$. The new rectangle will have area $(a + 1)(b + 1) = ab + a + b + 1$. So, the area of the rectangle is $20 + 13 + 1 = 34 \text{ cm}^2$.

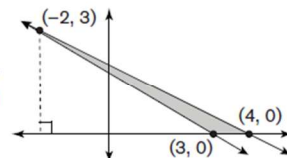
162. The perimeter of heptagon PATRICK is 28 inches, so each segment must be $28 \div 7 = 4$ inches. The area of the heptagon consists of 5 equilateral triangles. Each equilateral triangle has a base of 4 inches, a height of $2\sqrt{3}$ inches, and an area of $1/2 \times 4 \times 2\sqrt{3} = 4\sqrt{3}$ square inches. Thus, the area of heptagon PATRICK is $5 \times 4\sqrt{3} = 20\sqrt{3} \text{ in}^2$.



163. There are 8 letters in the word TOPOLOGY, but 3 letters are the same, so there are $8! \div 3! = 40,320 \div 6 = 6720$ ways to rearrange the letters.

164. At one extreme, the set could contain the number 27 by itself, so $d = 1$ is a possibility. At the other extreme, the set could contain 2, 3, 4, 5, 6 and 7, whose sum is 27, so $d = 6$ is also a possibility. With some checking, we can confirm that d can also be any natural number between 1 and 6. The sum of the possible values of d is thus $1 + 2 + 3 + 4 + 5 + 6 = 21$.

165. The line $x + 2y = 4$ intersects the x -axis at $(4, 0)$, the line $3x + 5y = 9$ intersects the x -axis at $(3, 0)$, and their point of intersection is $(-2, 3)$. The triangle formed by these three points has a base on the x -axis of length 1 unit and a height of 3 units. Thus, the area of this triangle is $(1 \times 3) \div 2 = 3/2$ units².



166. The prime factorization of 2026 is 2×1013 , so the only possible dimensions for George's prism are 1 cm by 2 cm by 1013 cm. Therefore, the surface area is $2(1 \times 2 + 1 \times 1013 + 2 \times 1013) = 2(2 + 1013 + 2026) = 2 \times 3041 = 6082 \text{ cm}^2$.

167. The math club earned $12 \times 3.50 + 13 \times 2.75 + 21 \times 4.00 + 11 \times 2.75 + 16 \times 3.50 = 42 + 35.75 + 84 + 30.25 + 56 = \248 .

168. Since $2026 \div 9 = 225 \frac{1}{9}$, the integer N could have 225 digits of 9 and 1 digit of 1. That's **226** digits, which is the minimum.

169. The value of $6 \clubsuit 4$ is $6^2 \div 4 = 36 \div 4 = 9$.

170. The 192-page book could be divided into $192 \div 8 = 24$ sets of 8 pages, so it will take Sam $24 \times 10 = 240$ minutes or $240 \div 60 = 4$ hours to read the book.