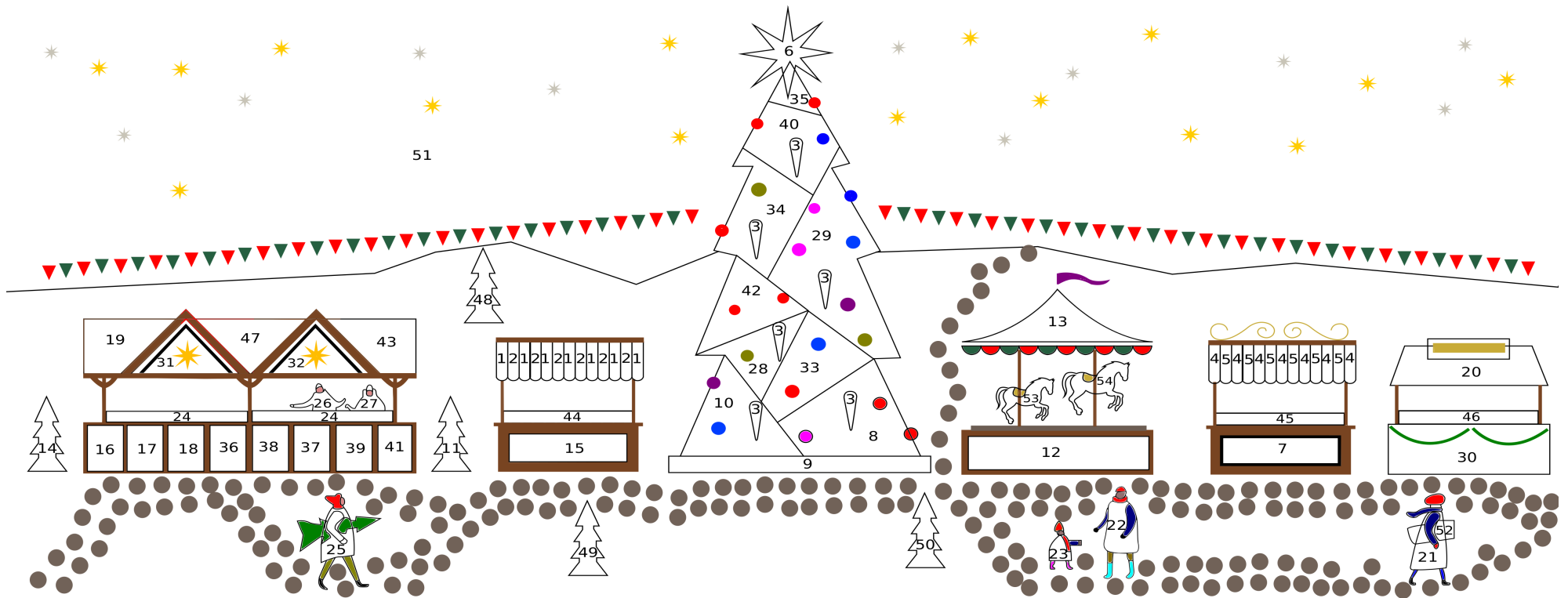


A-Level Calculated Colouring Christmas 2019



6	3	25	100	18	4	5	9
Red	Blue	Yellow	Orange	Light Green	Dark Green	Grey	Brown

1. The largest root of $x^2 - 8x + 12 = 0$.
2. Find a such that $\sqrt{63} = a\sqrt{b}$, where $a, b \in \mathbb{Z}$.
3. Evaluate $\left(\frac{1}{5}\right)^{-2}$.
4. Find the gradient of the line $6x - 2y + 8 = 0$.
5. The x solution to the pair of simultaneous equations $2x + 3y = 24$ and $-x + 4y = 10$.
6. The discriminant of $y = 3x^2 + 13x + 12$.
7. The radius squared of $x^2 - 6x + y^2 - 8y - 75 = 0$.
8. The highest common factor of 270 and 252.
9. The x -coordinate of the minimum point of $y = 2x^3 - 15x^2 - 36x$.
10. Divide the coefficient of the x^2 term in the binomial expansion of $(3 + 2x)^3$ by 2.
11. Let $f(x) = 2x^3 - 3x^2 + 7x$. Find $a \in \mathbb{R}$ such that $f(a) = 10818$.
12. The y solution to the pair of simultaneous equations $2x + 3y = 35$ and $-x + 4y = 32$.
13. Double the number of faces of a Rhombicosahedron.
14. Find the y -intercept of the line $6x - 2y + 8 = 0$.
15. $78125^{\frac{2}{7}}$.
16. Find a such that $x^3 + 8x^2 + 9x - 18 = (x + a)(x + 6)(x - 1)$.
17. The power of z when you simplify $\frac{(x^2z^3)^3y^4}{z^3y^5}$.
18. Find b when $\sqrt{108}$ is written in the form $a\sqrt{b}$.
19. The gradient of the line segment joining $A(-2, 2)$ to $B(3, 27)$.
20. Subtract 13 from the denominator you obtain when you rationalise $\frac{3}{5 + \sqrt{3}}$.
21. Where the tangent to the circle $(x - 1)^2 + (y - 1)^2 = 25$ at the point $(6, 1)$ crosses the x -axis.
22. The gradient of $y = 3x^3 + 10x^2 + 24x$ at $x = 2$.
23. The number of solutions to the equation $\sin(3x) = 0.7$ in the range $0^\circ \leq x \leq 150^\circ$.
24. The y -coordinate of the centre of the circle $x^2 - 6x + y^2 - 10y + 18 = 0$.
25. The discriminant of the quadratic $y = 3x^2 + 8x - 3$.
26. Expand and simplify $(x + 1)(x + 4)(x - 1) + (x + 3)(x + 2) + 6(x + 1)$ then multiply the coefficient of x by 10.
27. Solve $3^{2x+1} = 27^{\frac{7}{3}}$.
28. The square of the radius of the circle $x^2 - 2x + y^2 - 4y - 13 = 0$.
29. The x -intercept of the line $4x + 9y = 72$.
30. The second derivative of $y = \frac{1}{2}x^3 + 3x^2 + 4$ evaluated at the point $\left(1, \frac{15}{2}\right)$.
31. Find a when $\sqrt{108}$ is written in the form $a\sqrt{b}$.

32. The repeated root of $f(x) = x^3 - 11x^2 + 24x + 36$.
33. The positive x solution when you solve $x^2 + y^2 = 17$ and $-x + y = -3$ simultaneously.
34. The coefficient of x^3 in the expansion of $(x + 1)^4$.
35. Find a such that $\sqrt{12} + \sqrt{147} - \sqrt{75}$ simplifies into the form $a\sqrt{b}$.
36. Solve $4^{2x+1} = 2^{2x+14}$.
37. Half of $\binom{3}{2} + \binom{7}{1} + \binom{2}{1}$ (binomial coefficients)
38. Find b such that $\sqrt{12} + \sqrt{147} - \sqrt{75}$ simplifies into the form $a\sqrt{b}$.
39. The y -coordinate of the vertex of $y = -x^2 - 4x - 1$.
40. The y -coordinate of the minimum point of $y = x^2 - 10x + 43$.
41. The remainder when $x^3 + 7x^2 + 17x + 21$ is divided by $(x + 3)$.
42. A single digit square number that is the same as the answer to Question 14.
43. The x -coordinate of the minimum point of $y = x^2 - 10x + 43$.
44. The area of the triangle formed from the points $A(5,2)$, $B(6,5)$ and $C(9,4)$.
45. The y -coordinate of the intersection point of the curve $y = x^2 + 3x + 1$ and the line $x + \frac{1}{2}y = \frac{7}{2}$ which has positive x -coordinate.
46. The area of the triangle ABC is $\frac{15\sqrt{3}}{4}$ with the angle at C equal to 60° and side length $CA = 3$. Find the length of side CB .
47. $(x + 1)$ and $(x + 3)$ are both factors of $p(x) = x^3 + ax^2 + 7x + b$. Find a .
48. The radius of the circle $x^2 - 6x + y^2 - 10y + 18 = 0$.
49. The coefficient of x^3 in the expansion of $(3 + 2x)^n$ is 96. Find n .
50. The y -coordinate of the point of intersection of the line $l_1 : 4x + 9y = 72$ and the line perpendicular to l_1 which passes through the point $(13,13)$.
51. The denominator of $\frac{1}{\sqrt{3}}$ when rationalised.
52. The square of the x -coordinate of the centre of the circle $x^2 - 6x + y^2 - 10y + 18 = 0$.
53. $(x + 1)$ and $(x + 3)$ are both factors of $p(x) = x^3 + ax^2 + 7x + b$. Find b .
54. The x -intercept of the line perpendicular to $y = 3x - 17$ passing through the point $(6,1)$.