Christmas Calculated Colouring Questions

Answer each question and then use the key to find which colour.

1) The sum of the coefficients of the x^2 and x^3 terms in the expansion of $(1+x)^5$.
2) The gradient of $y = 3x^2 + 6x + 1$ evaluated at $x = 1$.
3) Double the radius of the circle $x^2 + 4x + y^2 - 6y - 23 = 0$.
4) One less than the sixth triangular number.
5) The $y-$coordinate of the vertex of the quadratic $y = x^2 - 10x + 37$.
6) The $x-$intercept of the line passing through $(8,3)$ and $(12,2)$.
7) $\int_0^4 2x + 1 \ \mathrm{d}x$
8) Divide the coefficient of x^2 in the expansion of $(3+2x)^4$ by 18.
9) Number of integers satisfying $x^2 - 64 < 0$
10) One third of the x value which solves the simultaneous equations $3x + 4y = 43$ and $x - 2y = 16$.
11) The smallest such $x-$coordinate such that (x, y) is an intersection point of the line $y = 2x - 12$ and the quadratic $y = x^2 - 18x + 87$.
12) Take the y value which solves the simultaneous equations $3x + 4y = 43$ and $x - 2y = 16$ and then multiply by -14.
13) The value of $\frac{\mathrm{d}^2y}{\mathrm{d}x^2}$ for $y = x^3 + 6x + 17$ when $x = \frac{5}{3}$.
14) Find $a \in \mathbb{Z}$ such that $f(a) = 40474$ where $f(x) = 4x^3 + 3x + 17$.
15) The gradient of $y = x^3 + x^2 + 4x$ evaluated at $x = 2$
16) The remainder when you compute $6x^3 + 13x^2 + 12x + 29$ is divided by $(2x+3)$.
17) The area of the triangle enclosed by the $x-$axis and the lines $-6x - 5y = -30$ and $-3x + y = 6$.
18) $\binom{5}{2} + \binom{5}{3}$ (NB: These are binomial coefficients)
19) The triangle ABC has area $21\sqrt{3}$. Side $AB = 7cm$ and the angle between AB and BC is $60°$. Find the length of BC
20) The number of sides on a Icosagon.
21) The value p such that $\sqrt{27} + \sqrt{48} + \sqrt{75} = p\sqrt{3}$.
22) Double the distance between $(3,6)$ and $(13,6)$.

23) The radius of the circle $x^2 - 4x + y^2 - 6y - 428 = 0$

24) Multiply by 4 the radius of the circle $x^2 - 16x + y^2 + 12y + 75 = 0$

25) The number of solutions to the equation $\cos(5x) = \frac{1}{2}$ in the range $0 \leq \theta \leq 360.$

26) The coefficient of x^7 in the expansion of $(3 + x)^n$ is 3240. Find n.

27) The $y-$intercept of the line parallel to $y = 2x + 2$ which passes through $(-4.5,0)$

28) The $x-$coordinate of the stationary point of $y = -x^2 + 18x - 70.$

29) The only positive root of $x^4 + x^3 - 19x^2 - 49x - 30 = 0$

30) Add one to the $y-$coordinate of the stationary point of $y = -x^2 + 18x - 70.$

31) Find x_1, such that the point (x_1, y_1), is an intersection of $x - y = -6$ and $y = x^2 - 3x - 39,$ where x_1 is positive.

32) $\sqrt[5]{759375}$

33) Solve $4^{x+2} = 2^{3x-1}$.

34) The $x-$intercept of the line $-2x - 3y = -30.$

35) Double the smallest such $y-$coordinate such that (x, y) is an intersection point of the line $y = 2x - 12$ and the quadratic $y = x^2 - 18x + 87.$

36) The denominator of $\frac{1}{\sqrt{5}}$ when rationalised.

37) $\int_1^{2\sqrt[3]{2}} 3x^2 \, \mathrm{d}x.$

38) The repeated root of $x^3 - 12x^2 + 45x - 50 = 0.$

39) Work out the area bounded by the $x-$axis, the line $2x + 3y = 24$ and the line $-3x + 2y = 42$. Divide this answer by 31.2.

40) The power of z when you simplify $\frac{(x^2z^9)^3y^4}{(z^4y^2)^3}$

41) The length of the line OA where O is the origin and A is the point of intersection of the lines $4x + 5y = 32$ and $4x - 13y = -40.$

42) Discriminant of the quadratic $x^2 + 3x + 1.$

43) The $x-$coordinate of the vertex of the quadratic $y = x^2 - 10x + 37.$

44) The $x-$coordinate of the local minimum for the function

$$y = \frac{x^3}{3} - 12x^2 + 135x + 12.$$

45) The coefficient of x when you expand and simplify
$(x+2)(x+1)(x-3) + (x+2)(x+3) + 7(x+3)$

46) The gradient of the line joining $(-6,2)$ to $(2,42)$

47) The coefficient of x^2 in the expansion of $\frac{1}{12}(1+2x)^{10}$

48) Find y_1, such that the point (x_1, y_1), is an intersection of $x - y = -6$ and $y = x^2 - 3x - 39,$ such that x_1 is positive.

49) The gradient of the line perpendicular to $y = -\frac{1}{9}x + 13.$

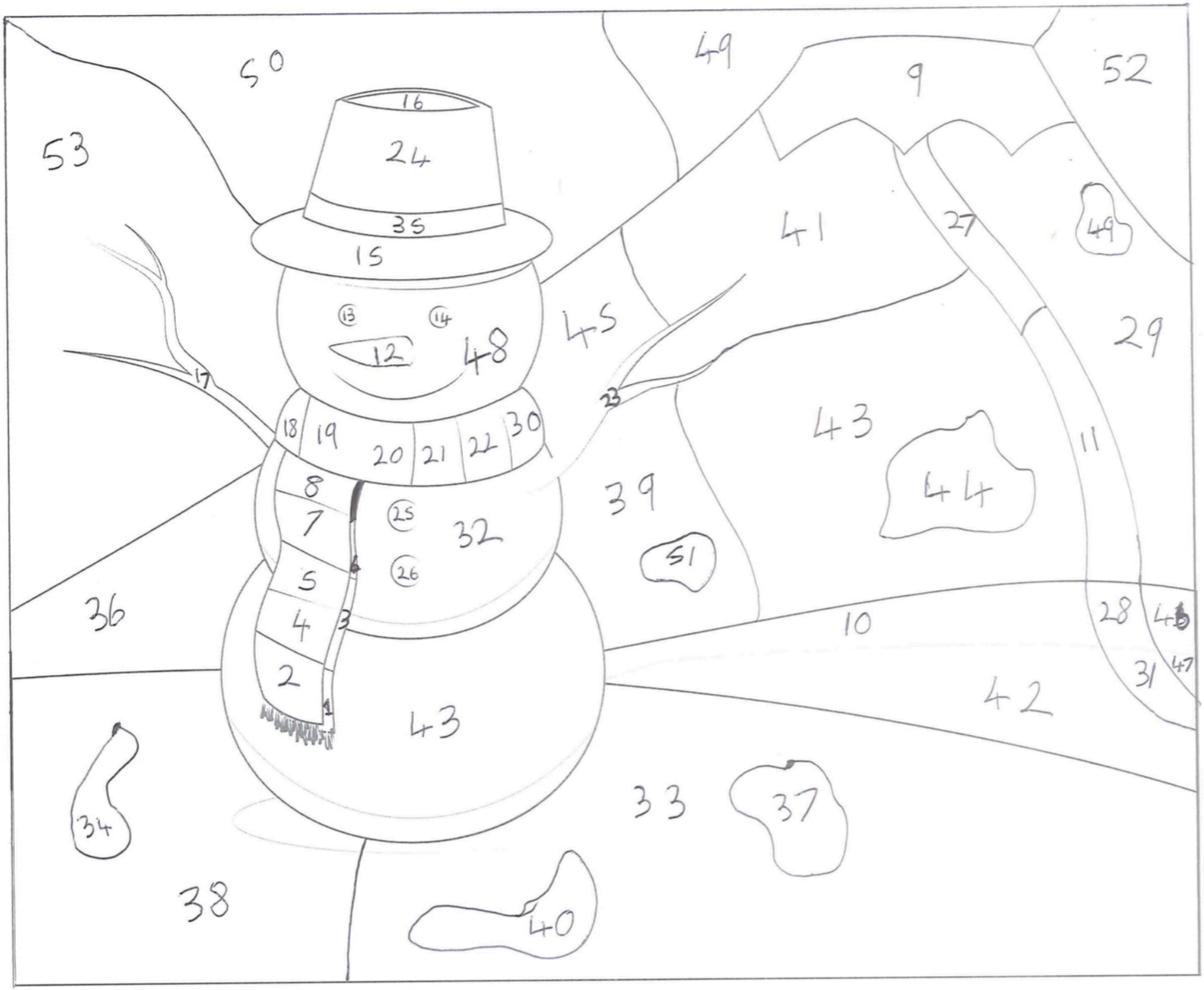
50) The square root of the result of evaluating $y = 3^x + 10x + 24$ at $x = 3.$

51) Subtract 5 from the denominator when you rationalise $\frac{3}{5+\sqrt{5}}$.

52) The $x-$coordinate of the local maximum for the function
$$y = \frac{x^3}{3} - 12x^2 + 135x + 12.$$

53) The square of the $y-$coordinate of the centre of the circle
$x^2 - 4x + y^2 - 6y - 428 = 0$

Colour	Answer Value	Colour	Answer Value
Black	10	**Green**	5
Brown	21	**Orange**	7
White	15	**Red**	12
Blue	9	**Yellow**	20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