Christmas Calculated Colouring 2017

1. Find the coefficient of x^4 in the expansion of $(1+x)^5$.
2. The x coordinate of the minimum point of $x^2 - 10x + 21$.
3. The derivative of $y = x^2$ evaluated at $x = 5$.
4. The power of z when you simplify $\dfrac{x^2 z^{24} \times x z^{-11}}{z}$.
5. The x coordinate of where the line $y = 2x - 20$ crosses the x-axis.
6. The largest root of the quadratic equation $x^2 - 6x + 8 = 0$.
7. The discriminant of $y = x^2 + 4x + 3$.
8. The gradient of the line perpendicular to $y = -\dfrac{1}{16}x + 3$.
9. Remainder on dividing $3x^3 + 16x^2 + 31x + 36$ by $(3x + 4)$.
10. Evaluate $y = 4^x$ at $x = 2$.
11. The coefficient of x in the expansion of $8\left(x + \dfrac{1}{2}\right)^4$
12. The area of the triangle formed by the line $x + 2y = 4$, the x-axis and the y-axis.
13. The y-coordinate of the minimum point of the quadratic $2x^2 - 8x + 24$.
14. The gradient of the line joining (1,2) to (3,34).
15. Both the x- and y- coordinates of the point of intersection of the lines $-x + y = 0$ and $x + y = 24$.
16. The derivative of $y = \dfrac{x^3}{3} + 2x^2 + 4x + 5$ evaluated at $x = 2$.
17. The coefficient of x in the expanded form of $(x + 3)(x + 2)(x + 1) + 5(x + 2)$.
18. Subtract 3 from the denominator when you rationalise $\dfrac{2}{3 + \sqrt{2}}$.
19. $\sqrt{144}$.
20. The coefficient of x in the quotient when you divide $x^4 + 3x^3 + 12x^2 - 21x + 5$ by $(x - 1)$.
21. The largest value of x that is a solution to the simultaneous equations $y = x + 1$ and $x^2 - 16x + y^2 - 8y = -55$.
22. The y-intercept of the line parallel to $-3x + 7y = 7$ that passes through the point (7,7).
23. y-intercept of the line $3x + y = 12$.

24. The number b when you write $\dfrac{\left(3+\sqrt{5}\right)^4}{42}$ in the form $a+b\sqrt{5}$.
25. Length of the line joining (2,4) to (5,8).
26. The largest root (in absolute magnitude) of the equation $x^3-11x^2+8x+20$.
27. Derivative of $y=-\dfrac{32}{x}$ evaluated at $x=\sqrt{2}$.
28. Remainder on dividing $x^3+6x^2+12x+24$ by $(x+2)$.
29. The length of the line OA where O is the origin and A is the intersection of the lines $x+y=7$ and $-2x+3y=6$.
30. The area of the triangle ABC where A is the point where the line $-x+2y=2$ crosses the x-axis, B is the point of intersection of the lines $-x+2y=2$ and $-x-2y=-6$, and C is the point where the line $-x-2y=-6$ crosses the x-axis.
31. The $y-$coordinate of the maximum value of $y=-x^2-6x+3$.
32. The power of x when you simplify $x^{12}y^2\times x^4z^5$.
33. The real solution to the equation $2^{2x+2}=1024$.
34. Discriminant of the quadratic $2x^2+8x+6$.
35. The coefficient of x^4 in the expansion of $(2+x)^8$ divided by 140.
36. The y-intercept of the quadratic $y=x^2+5x+4$.
37. The coefficient of x when you expand (and collect like terms) of the function $(x+3)(x-1)(x-3)+(x+1)(x+3)$.
38. The gradient of the line passing through the points $\left(-\frac{3}{5},3\right)$ and $\left(-\frac{1}{10},8\right)$.
39. Double the constant term in the expansion of $(2+x)^3(1+2x)$.
40. The positive root of $x^2-x-12=0$.
41. Evaluate $y=x^3+9x^2-30x-2$ at $x=3$.
42. The number b when writing $\dfrac{x^2+14x+48}{x+6}$ in the form $ax+b$
43. The x-coordinate of the minimum point of the quadratic $y=x^2-16x+52$.
44. Solve $3^{2x-6}=27^{\frac{4}{3}}$.
45. The x-coordinate of smallest magnitude when you solve the simultaneous equations $y=x^2-10x+24$ and $y=-x+4$.
46. Divide the coefficient of x^5 in the expansion of $\left(4+\dfrac{x}{2}\right)^8$ by 7.