March Polynomial-a-Day

Answer each polynomial themed question.	1) Expand $(3x+2)(4x+5)^2$	2) Factorise $y = 2x^2 + 7x + 6$	3) Divide $x^4 + 4x^3 - x^2 - 16x - 12$ by $(x-2)$
4) $(5x-4)$ is a factor of $f(x) = ax^2 + 42x - 40$. Find a.	5) Find the coefficient of x^4 in the expansion of $(2-3x)^6$.	6) What is the quotient when dividing $6x^3 + 17x^2 + 14x + 10$ by $(2x+3)$	7) Given that $(x+3)$ and $(x+2)$ are factors of $x^3 + ax^2 + bx - 24$. Find a and b.
8) Sketch the quadratic $y = x^2 - 3x - 10$	9) Show that $(x-3)$ is a factor of $f(x) = 2x^3 + x^2 - 15x - 18$	10) Sketch $y = x^3 + 6x^2 + 11x + 6$ showing all intersection points.	11) Expand $(1+x)(2-3x)^3$
12) $f\left(\dfrac{3}{2}\right) = 0$ for $f(x) = 2x^2 + 5x - 12$ means	13) Find the values of k for the quadratic $y = 2x^2 + kx + 2k$ to have real roots.	14) What are the coordinates of the turning point of $y = x^2 + x - 12$?	15) Solve the inequality $2x^2 - x - 10 \le 0$
16) Simplify $\dfrac{3x^3 + 10x^2 + 9x + 2}{3x^2 + 9x + 6}$	17) Expand $(4-2x)^5$	18) For $f(x) = ax^2 + bx - 18$, the point $(2, -12)$ lies on $f(x)$ and the gradient here is 6. Find a and b.	19) Find the point of inflection for $y = 2x^3 - 15x^2 + 6x + 6$
20) Solve, by completing the square $2x^2 + 10x - 7 = 0$.	21) Simplify $(x-2)^2(x+3) + (x^2-4)(x+2)$	22) For $f(x) = 3x^2 + bx + 2$, $f(-2) = 0$. Find b.	23) Expand $(2x+1)(x+2)^3(x-3)$
24) Simplify $\dfrac{x^2-4}{x+2}$	25) Find the line of symmetry for the quadratic $y = 3x^2 + 7x - 2$.	26) Divide $x^4 + 4x^3 - x^2 - 16x - 12$ by $(x+2)$	27) Divide $2x^3 + 4x^2 - 7x3$ by $(x-2)$.
28) Shade the region satisfying $2x^2 - 9x + 9 \ge 0$ and $3x + 1 \ge 5$.	29) Find the stationary points (and classify them) for $y = 4x^3 - 15x^2 - 18x + 7$.	30) Derive the quadratic formula for $ax^2 + bx + c = 0$.	31) Show that the quadratic $kx^2 + (k+3)x + 2 = 0$ cannot have real roots.

Polynomial-a-Day Solutions

	1) $48x^3 + 152x^2 + 155x + 50$	2) $(2x + 3)(x + 2)$	3) $(x - 2)(x^3 + 6x^2 + 11x + 6)$
4) $a = 10$	5) 4860	6) $3x^2 + 4x + 1$	7) $a = 1, b = -14$
8) Sketch	9) $f(3) = 2 \times 3^3 + 3^2 - 15 \times 3 - 18 = 0$	10) Sketch	11) $-27x^4 + 27x^3 + 18x^2 - 28x + 8$
12) That $(2x - 3)$ is a factor of $2x^2 + 5x - 12$.	13) $k < 0$ and $k > 16$	14) $\left(-\dfrac{1}{2}, -\dfrac{49}{4} \right)$	15) $-2 \leq x \leq \dfrac{5}{2}$
16) $\dfrac{3x + 1}{3}$	17) $-32x^5 + 320x^4 - 1280x^3 + 2560x^2 - 2560x + 1024$	18)	19)
20)	21)	22) 23)	
24)	25)	26)	27)
28)	29)	30)	31)