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1 (10 pts). Find and cancel the common factor:  $\frac{(x-1)^3 + 1}{x}$

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1.(Source: 1.5.17) The third row of Pascal's triangle is 1 3 3 1. Use this to expand

$$(x-1)^3 = x^3 + 3x^2(-1) + 3x(-1)^2 + (-1)^3 = x^3 - 3x^2 + 3x - 1.$$

Now simplify the fraction

$$\begin{aligned} \frac{(x-1)^3 + 1}{x} &= \frac{x^3 - 3x^2 + 3x - 1 + 1}{x} \\ &= \frac{x^3 - 3x^2 + 3x}{x} \\ &= \frac{x(x^2 - 3x + 3)}{x} \\ &= x^2 - 3x + 3. \end{aligned}$$