Name: _____

1. Find the equation of the line that passes through the points $(-1, 4)$ and $(2, 10)$. Give your answer as an equation in slope-intercept form (i.e., as $y = mx + b$).

**Solution:** The slope is

$$m = \frac{10 - 4}{2 - (-1)} = 2.$$

In point-slope form, the equation is

$$y - 4 = 2(x + 1).$$

Rewriting this in slope-intercept form, we get

$$y = 2x + 6.$$

2. Expand $(2x + 1)^2(x - 1)$ as a cubic polynomial, i.e., a polynomial of the form $ax^3 + bx^2 + cx + d$ for constants $a, b, c, d$.

**Solution:**

$$\begin{aligned}(2x + 1)^2(x - 1) = (4x^2 + 4x + 1)(x - 1) &= 4x^3 + 4x^2 + x - 4x^2 - 4x - 1 \\ &= 4x^3 - 3x - 1.\end{aligned}$$

3. Find all solutions to $x - \dfrac{7}{x} = 3$. **Please note:**

   - Give exact answers, not approximations.
   - As you solve the problem, write down equations one after the other on the page, not scattered all around.
   - Do not cross out or write on top of any equation; do not draw arrows that don't have any mathematical meaning.

**Solution:** Multiply both sides of the equation by $x$ (we know that $x \neq 0$):

$$x^2 - 7 = 3x.$$

Rewrite this as

$$x^2 - 3x - 7.$$

This doesn't factor, so we apply the quadratic formula to get

$$x = \frac{3 \pm \sqrt{9 + 4(7)}}{2} = \frac{3 \pm \sqrt{37}}{2}.$$