

$$f(r) = r^r - 9 + 1 = 1$$

$$f(-1) = 1 + 1 + 1 = 3$$

$$f(r) = -1 \quad \text{✓}$$

$$\frac{r f(r) + f(-1)}{f'(r)} \rightarrow$$

$$\frac{r + 3}{1} = \boxed{4}$$

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$$f(x) = 3x^2 + 1 = 13$$

$$\text{✓}$$

$$f(r) = (r)^r = 5$$

$$\frac{r f(r) - r f(-r)}{f(r)} \rightarrow$$

$$f(r) = 3x^2 + 1 = 13$$

$$\frac{r \cdot 13 - 1}{13} = \frac{r}{13}$$

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$$\frac{f(1) - f(r)}{f(1) + r} = \frac{4 - 9}{4 - r} = \boxed{9}$$

$$\text{✓}$$

8

$$(\sqrt{r} - r)^r = r + f - f\sqrt{r}$$

$$f(\sqrt{r}) = f\sqrt{r} - 1$$

$$f(\sqrt{r}) = f\sqrt{r} - 1$$

$$\frac{f(\sqrt{r}) - f(r)}{f(\sqrt{r}) + r} = \frac{f\sqrt{r} - 1 - f + f\sqrt{r}}{f\sqrt{r} - 1 + r} = \frac{2f\sqrt{r} - 1 - f + r}{f\sqrt{r} - 1 + r}$$

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$$f(\sqrt{n}) = n + \frac{1}{n}$$

$$n^r + \frac{1}{n^r} + r - (n^r + \frac{1}{n^r}) = r$$

$$(n + \frac{1}{n})^r = n^r + \frac{1}{n^r} + r$$

$$\text{✓}$$

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