1 *For the following rational expressions, factor the numerator and denominator and (if possible) cancel common factors to produce a simplified expression. (Show the factored form* before *cancelling as an intermediate step.)*

a $\dfrac{3n^2+12n}{6n}$

$$\frac{3n^2+12n}{6n} = \frac{3n(n+4)}{2\cdot 3n} = \frac{n+4}{2}.$$

Since this is a polynomial, you could also leave the answer in factored form as $\frac{1}{2}(n+4)$ or in expanded form as $\frac{1}{2}n+2$.

b $\dfrac{25z^2-1}{3-15z}$

$$\frac{25z^2-1}{3-15z} = \frac{25z^2-1}{-15z+3} = \frac{(5z-1)(5z+1)}{-3(5z-1)} = -\frac{5z+1}{3}.$$

You could also leave the answer in expanded form as $\frac{-5z-1}{3}$; since it's a polynomial, you could also leave it in factored form as $-\frac{1}{3}(5z+1)$ or in expanded form as $-\frac{5}{3}z-\frac{1}{3}$.

2 **Extra credit.** *For* one *part of Problem 1 above, state when the original expression is undefined, and state when the simplified expression is undefined. Are these the same?*

a The original expression is undefined when $6n=0$, so when

$$n=0;$$

the simplified expression is undefined when $2=0$, so **never**. These are **different**.

b The original expression is undefined when $3-15z=0$, so when

$$z=\frac{1}{5};$$

the simplified expression is undefined when $3=0$, so **never**. These are **different**.