Algebraic Expressions and Identities Ex 6.5 Q19

Answer :

To multiply, we will use distributive law as follows:

$$\left(\frac{1}{3}x-\frac{y^2}{5}\right)\left(\frac{1}{3}x+\frac{y^2}{5}\right)$$
$$=\left[\frac{1}{3}x\left(\frac{1}{3}x+\frac{y^2}{5}\right)\right]-\left[\frac{y^2}{5}\left(\frac{1}{3}x+\frac{y^2}{5}\right)\right]$$
$$=\left[\frac{1}{9}x^2+\frac{xy^2}{15}\right]-\left[\frac{xy^2}{15}+\frac{y^4}{25}\right]$$
$$=\frac{1}{9}x^2+\frac{xy^2}{15}-\frac{xy^2}{15}-\frac{y^4}{25}$$
$$=\frac{1}{9}x^2-\frac{y^4}{25}$$

$$\therefore\left(\frac{1}{3}x-\frac{y^2}{5}\right)\left(\frac{1}{3}x+\frac{y^2}{5}\right)=\frac{1}{9}x^2-\frac{y^4}{25}$$

Now, we will put $x=-1$ and $y=-2$ on both the sides to verify the result.

$$\text{LHS}=\left(\frac{1}{3}x-\frac{y^2}{5}\right)\left(\frac{1}{3}x+\frac{y^2}{5}\right)$$
$$=\left[\frac{1}{3}(-1)-\frac{(-2)^2}{5}\right]\left[\frac{1}{3}(-1)+\frac{(-2)^2}{5}\right]$$
$$=\left(-\frac{1}{3}-\frac{4}{5}\right)\left(-\frac{1}{3}+\frac{4}{5}\right)$$
$$=\left(\frac{-17}{15}\right)\left(\frac{7}{15}\right)$$
$$=\frac{-119}{225}$$

$$\text{RHS}=\frac{1}{9}x^2-\frac{y^4}{25}$$
$$=\frac{1}{9}(-1)^2-\frac{(-2)^4}{25}$$
$$=\frac{1}{9}\times 1-\frac{16}{25}$$
$$=\frac{1}{9}-\frac{16}{25}$$
$$=-\frac{119}{225}$$

Because LHS is equal to RHS, the result is verified.

Thus, the answer is $\frac{1}{9}x^2-\frac{y^4}{25}$.

Algebraic Expressions and Identities Ex 6.5 Q20

Answer :

To simplify, we will proceed as follows:

$$
\begin{aligned}
& x^2(x+2y)(x-3y) \\
&= \left[x^2(x+2y)\right](x-3y) \\
&= \left(x^3+2x^2y\right)(x-3y) \\
&= x^3(x-3y)+2x^2y(x-3y) \\
&= x^4-3x^3y+2x^3y-6x^2y^2 \\
&= x^4-x^3y-6x^2y^2
\end{aligned}
$$

Thus, the answer is $x^4-x^3y-6x^2y^2$.

Algebraic Expressions and Identities Ex 6.5 Q21

Answer :

To simplify, we will proceed as follows:

$$
\begin{aligned}
& \left(x^2-2y^2\right)(x+4y)x^2y^2 \\
&= \left[x^2(x+4y)-2y^2(x+4y)\right]x^2y^2 \\
&= \left(x^3+4x^2y-2xy^2-8y^3\right)x^2y^2 \\
&= x^5y^2+4x^4y^3-2x^3y^4-8x^2y^5
\end{aligned}
$$

Thus, the answer is $x^5y^2+4x^4y^3-2x^3y^4-8x^2y^5$.

Algebraic Expressions and Identities Ex 6.5 Q22

Answer :

To simplify, we will proceed as follows:

$$
\begin{aligned}
& a^2b^2(a+2b)(3a+b) \\
&= \left[a^2b^2(a+2b)\right](3a+b) \\
&= \left(a^3b^2+2a^2b^3\right)(3a+b) \\
&= 3a\left(a^3b^2+2a^2b^3\right)+b\left(a^3b^2+2a^2b^3\right) \\
&= 3a^4b^2+6a^3b^3+a^3b^3+2a^2b^4 \\
&= 3a^4b^2+7a^3b^3+2a^2b^4
\end{aligned}
$$

Thus, the answer is $3a^4b^2+7a^3b^3+2a^2b^4$.

********** END **********