Algebraic Expressions and Identities Ex 6.2 Q1

Answer :

(i) To add the like terms, we proceed as follows:

$$
\begin{aligned}
&3a^2b+\left(-4a^2b\right)+9a^2b\\
&=3a^2b-4a^2b+9a^2b\\
&=(3-4+9)a^2b \qquad \text{(Distributive law)}\\
&=8a^2b
\end{aligned}
$$

(ii) To add the like terms, we proceed as follows:

$$
\begin{aligned}
&\tfrac{2}{3}a+\tfrac{3}{5}a+\left(-\tfrac{6}{5}a\right)\\
&=\tfrac{2}{3}a+\tfrac{3}{5}a-\tfrac{6}{5}a\\
&=\left(\tfrac{2}{3}+\tfrac{3}{5}-\tfrac{6}{5}\right)a \qquad \left(\text{Distributive law}\right)\\
&=\tfrac{1}{15}a
\end{aligned}
$$

(iii) To add, we proceed as follows:

$$
\begin{aligned}
&\left(4xy^2-7x^2y\right)+\left(12x^2y\right)+\left(-6xy^2\right)+\left(-3x^2y+5xy^2\right)\\
&=4xy^2-7x^2y+12x^2y-6xy^2-3x^2y+5xy^2\\
&=4xy^2-6xy^2+5xy^2-7x^2y+12x^2y-3x^2y \qquad \left(\text{Collecting like terms}\right)\\
&=3xy^2+2x^2y \qquad \left(\text{Combining like terms}\right)
\end{aligned}
$$

(iv) To add, we proceed as follows:

$$
\begin{aligned}
&\left(\tfrac{3}{2}a-\tfrac{5}{4}b+\tfrac{2}{5}c\right)+\left(\tfrac{2}{3}a-\tfrac{7}{2}b+\tfrac{7}{2}c\right)+\left(\tfrac{5}{3}a+\tfrac{5}{2}b-\tfrac{5}{4}c\right)\\
&=\tfrac{3}{2}a-\tfrac{5}{4}b+\tfrac{2}{5}c+\tfrac{2}{3}a-\tfrac{7}{2}b+\tfrac{7}{2}c+\tfrac{5}{3}a+\tfrac{5}{2}b-\tfrac{5}{4}c\\
&=\tfrac{3}{2}a+\tfrac{2}{3}a+\tfrac{5}{3}a-\tfrac{5}{4}b-\tfrac{7}{2}b+\tfrac{5}{2}b+\tfrac{2}{5}c+\tfrac{7}{2}c-\tfrac{5}{4}c \qquad \left(\text{Collecting like terms}\right)\\
&=\tfrac{23}{6}a-\tfrac{9}{4}b+\tfrac{53}{20}c \qquad \left(\text{Combining like terms}\right)
\end{aligned}
$$

(v) To add, we proceed as follows:

$$
\begin{aligned}
&\left(\tfrac{11}{2}xy+\tfrac{12}{5}y+\tfrac{13}{7}x\right)+\left(-\tfrac{11}{2}y-\tfrac{12}{5}x-\tfrac{13}{7}xy\right)\\
&=\tfrac{11}{2}xy+\tfrac{12}{5}y+\tfrac{13}{7}x-\tfrac{11}{2}y-\tfrac{12}{5}x-\tfrac{13}{7}xy\\
&=\tfrac{11}{2}xy-\tfrac{13}{7}xy+\tfrac{12}{5}y-\tfrac{11}{2}y+\tfrac{13}{7}x-\tfrac{12}{5}x \qquad \left(\text{Collecting like terms}\right)\\
&=\tfrac{51}{14}xy-\tfrac{31}{10}y-\tfrac{19}{35}x \qquad \left(\text{Combining like terms}\right)
\end{aligned}
$$

(vi) To add, we proceed as follows:

$$
\begin{aligned}
&\left(\tfrac{7}{2}x^3-\tfrac{1}{2}x^2+\tfrac{5}{3}\right)+\left(\tfrac{3}{2}x^3+\tfrac{7}{4}x^2-x+\tfrac{1}{3}\right)+\left(\tfrac{3}{2}x^2-\tfrac{5}{2}x-2\right)\\
&=\tfrac{7}{2}x^3-\tfrac{1}{2}x^2+\tfrac{5}{3}+\tfrac{3}{2}x^3+\tfrac{7}{4}x^2-x+\tfrac{1}{3}+\tfrac{3}{2}x^2-\tfrac{5}{2}x-2\\
&=\tfrac{7}{2}x^3+\tfrac{3}{2}x^3-\tfrac{1}{2}x^2+\tfrac{7}{4}x^2+\tfrac{3}{2}x^2-x-\tfrac{5}{2}x+\tfrac{5}{3}+\tfrac{1}{3}-2\\
&\left(\text{Collecting like terms}\right)\\
&=5x^3+\tfrac{11}{4}x^2-\tfrac{7}{2}x\\
&\left(\text{Combining like terms}\right)
\end{aligned}
$$

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