Algebraic Expressions and Identities Ex 6.2 Q7

Answer :

$$\text{(i)}\ x^2-3x+5-\tfrac{1}{2}\left(3x^2-5x+7\right)$$
$$=x^2-3x+5-\tfrac{3x^2}{2}+\tfrac{5x}{2}-\tfrac{7}{2}$$
$$=x^2-\tfrac{3x^2}{2}-3x+\tfrac{5x}{2}+5-\tfrac{7}{2} \qquad \text{(Collecting like terms)}$$
$$=\left(\tfrac{1-3}{2}\right)x^2+\left(\tfrac{-3+5}{2}\right)x+\left(\tfrac{10-7}{2}\right)$$
$$=-\tfrac{x^2}{2}-\tfrac{x}{2}+\tfrac{3}{2}$$

Thus, the answer is $-\tfrac{x^2}{2}-\tfrac{x}{2}+\tfrac{3}{2}$.

$$\text{(ii)}\ [5-3x+2y-(2x-y)]-(3x-7y+9)$$
$$=[5-3x+2y-2x+y]-(3x-7y+9)$$
$$=[5-5x+3y]-(3x-7y+9)$$
$$=5-5x+3y-3x+7y-9$$
$$=5-9-5x-3x+3y+7y$$
$$=-4-8x+10y$$

$$\text{(iii)}\ \tfrac{11}{2}x^2y-\tfrac{9}{4}xy^2+\tfrac{1}{4}xy-\tfrac{1}{14}y^2x+\tfrac{1}{15}yx^2+\tfrac{1}{2}xy$$
$$=\tfrac{11}{2}x^2y+\tfrac{1}{15}yx^2-\tfrac{9}{4}xy^2-\tfrac{1}{14}y^2x+\tfrac{1}{4}xy+\tfrac{1}{2}xy \qquad \text{(Collecting like terms)}$$
$$=\left(\tfrac{165+2}{30}\right)x^2y+\left(\tfrac{-63-2}{28}\right)xy^2+\left(\tfrac{1+2}{4}\right)xy$$
$$=\tfrac{167}{30}x^2y-\tfrac{65}{28}y^2x+\tfrac{3}{2}xy \qquad \text{(Combining like terms)}$$

$$\text{(iv)}\ \left(\tfrac{1}{3}y^2-\tfrac{4}{7}y+11\right)-\left(\tfrac{1}{7}y-3+2y^2\right)-\left(\tfrac{2}{7}y-\tfrac{2}{3}y^2+2\right)$$
$$=\tfrac{1}{3}y^2-\tfrac{4}{7}y+11-\tfrac{1}{7}y+3-2y^2-\tfrac{2}{7}y+\tfrac{2}{3}y^2-2$$
$$=\tfrac{1}{3}y^2-2y^2+\tfrac{2}{3}y^2-\tfrac{4}{7}y-\tfrac{1}{7}y-\tfrac{2}{7}y+11+3-2 \qquad \text{(Collecting like terms)}$$
$$=\left(\tfrac{1-6+2}{3}\right)y^2+\left(\tfrac{-4-1-2}{7}\right)y+12$$
$$=-y^2-7y+12 \qquad \text{(Combining like terms)}$$

$$\text{(v)}\ -\tfrac{1}{2}a^2b^2c+\tfrac{1}{3}ab^2c-\tfrac{1}{4}abc^2-\tfrac{1}{5}cb^2a^2+\tfrac{1}{6}cb^2a-\tfrac{1}{7}c^2ab+\tfrac{1}{8}ca^2b$$
$$=-\tfrac{1}{2}a^2b^2c-\tfrac{1}{5}cb^2a^2+\tfrac{1}{3}ab^2c+\tfrac{1}{6}cb^2a-\tfrac{1}{4}abc^2-\tfrac{1}{7}c^2ab+\tfrac{1}{8}ca^2b \qquad \text{(Collecting like terms)}$$
$$=\left(\tfrac{-5-2}{10}\right)a^2b^2c+\left(\tfrac{2+1}{6}\right)cb^2a^2+\left(\tfrac{-7-4}{28}\right)c^2ab+\tfrac{1}{8}ca^2b$$
$$=-\tfrac{7}{10}a^2b^2c+\tfrac{1}{2}ab^2c-\tfrac{11}{28}abc^2+\tfrac{1}{8}a^2bc \qquad \text{(Combining like terms)}$$

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