

EXAMPLE 6 From the sum of $2y^2 + 3yz$, $-y^2 - yz - z^2$ and $yz + 2z^2$, subtract the sum of $3y^2 - z^2$ and $-y^2 + yz + z^2$.

SOLUTION We first add $2y^2 + 3yz$, $-y^2 - yz - z^2$ and $yz + 2z^2$.

$$\begin{array}{r}
 2y^2 + 3yz \\
 - y^2 - yz - z^2 \\
 + yz + 2z^2 \\
 \hline
 y^2 + 3yz + z^2
 \end{array} \quad (1)$$

We then add $3y^2 - z^2$ and $-y^2 + yz + z^2$

$$\begin{array}{r}
 3y^2 - z^2 \\
 - y^2 + yz + z^2 \\
 \hline
 2y^2 + yz
 \end{array} \quad (2)$$

Now we subtract sum (2) from the sum (1):

$$\begin{array}{r}
 y^2 + 3yz + z^2 \\
 2y^2 + yz \\
 - \\
 \hline
 -y^2 + 2yz + z^2
 \end{array}$$

EXERCISE 12.2

1. Simplify combining like terms:

- $21b - 32 + 7b - 20b$
- $-z^2 + 13z^2 - 5z + 7z^3 - 15z$
- $p - (p - q) - q - (q - p)$
- $3a - 2b - ab - (a - b + ab) + 3ab + b - a$
- $5x^2y - 5x^2 + 3yx^2 - 3y^2 + x^2 - y^2 + 8xy^2 - 3y^2$
- $(3y^2 + 5y - 4) - (8y - y^2 - 4)$

2. Add:

- $3mn, -5mn, 8mn, -4mn$
- $t - 8tz, 3tz - z, z - t$
- $-7mn + 5, 12mn + 2, 9mn - 8, -2mn - 3$
- $a + b - 3, b - a + 3, a - b + 3$
- $14x + 10y - 12xy - 13, 18 - 7x - 10y + 8xy, 4xy$
- $5m - 7n, 3n - 4m + 2, 2m - 3mn - 5$
- $4x^2y, -3xy^2, -5xy^2, 5x^2y$



- (viii) $3p^2q^2 - 4pq + 5, -10p^2q^2, 15 + 9pq + 7p^2q^2$
 (ix) $ab - 4a, 4b - ab, 4a - 4b$
 ✓(x) $x^2 - y^2 - 1, y^2 - 1 - x^2, 1 - x^2 - y^2$

3. Subtract:

- (i) $-5y^2$ from y^2
 ✓(ii) $6xy$ from $-12xy$
 (iii) $(a - b)$ from $(a + b)$
 ✓(iv) $a(b - 5)$ from $b(5 - a)$
 (v) $-m^2 + 5mn$ from $4m^2 - 3mn + 8$
 ✓(vi) $-x^2 + 10x - 5$ from $5x - 10$
 (vii) $5a^2 - 7ab + 5b^2$ from $3ab - 2a^2 - 2b^2$
 ✓(viii) $4pq - 5q^2 - 3p^2$ from $5p^2 + 3q^2 - pq$

4. (a) What should be added to $x^2 + xy + y^2$ to obtain $2x^2 + 3xy$?
 (b) What should be subtracted from $2a + 8b + 10$ to get $-3a + 7b + 16$?
 5. What should be taken away from $3x^2 - 4y^2 + 5xy + 20$ to obtain $-x^2 - y^2 + 6xy + 20$?
 6. (a) From the sum of $3x - y + 11$ and $-y - 11$, subtract $3x - y - 11$.
 (b) From the sum of $4 + 3x$ and $5 - 4x + 2x^2$, subtract the sum of $3x^2 - 5x$ and $-x^2 + 2x + 5$.



12.7 FINDING THE VALUE OF AN EXPRESSION

We know that the value of an algebraic expression depends on the values of the variables forming the expression. There are a number of situations in which we need to find the value of an expression, such as when we wish to check whether a particular value of a variable satisfies a given equation or not.

We find values of expressions, also, when we use formulas from geometry and from everyday mathematics. For example, the area of a square is l^2 , where l is the length of a side of the square. If $l = 5$ cm., the area is 5^2 cm² or 25 cm²; if the side is 10 cm, the area is 10^2 cm² or 100 cm² and so on. We shall see more such examples in the next section.

EXAMPLE 7 Find the values of the following expressions for $x = 2$.

- (i) $x + 4$ (ii) $4x - 3$ (iii) $19 - 5x^2$
 (iv) $100 - 10x^3$

SOLUTION Putting $x = 2$

- (i) In $x + 4$, we get the value of $x + 4$, i.e.,
 $x + 4 = 2 + 4 = 6$