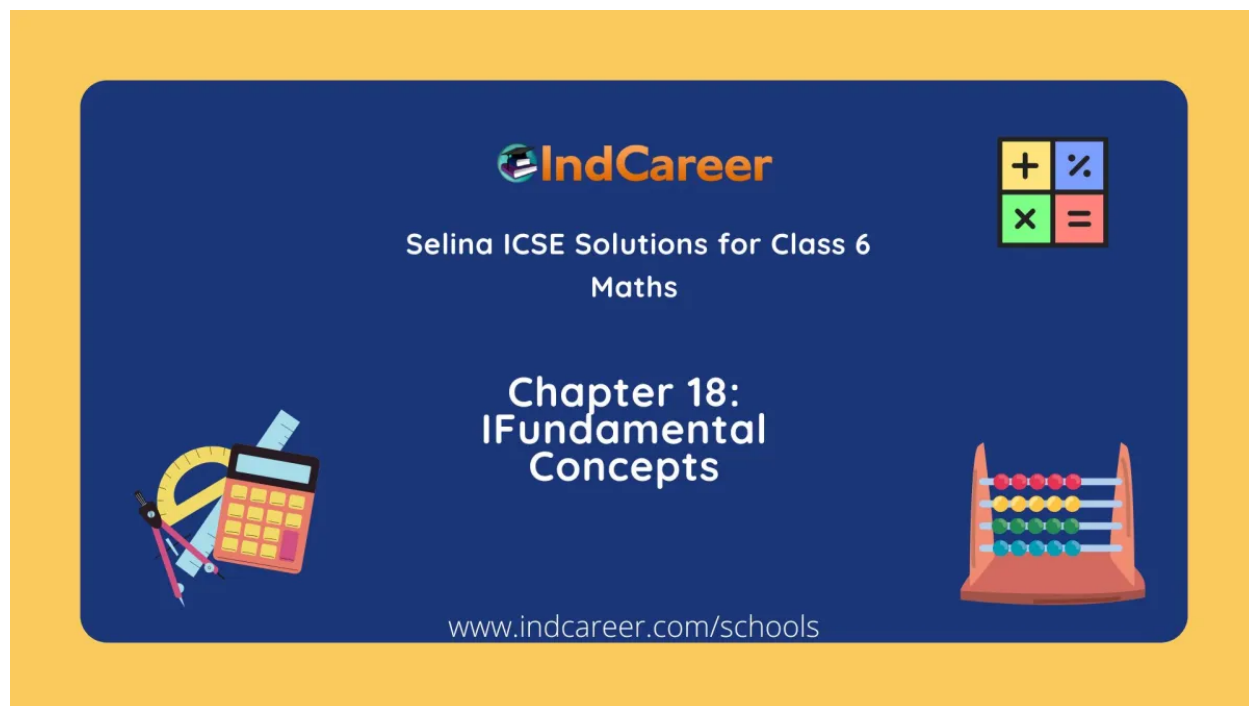


Selina Class 6 ICSE Solutions Mathematics : Chapter 18- Fundamental Concepts



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Chapter 18- Fundamental Concepts

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Exercise 18(A)

1. Express each of the following statements in algebraic form:

- (i) The sum of 8 and x is equal to y .
- (ii) x decreased by 5 is equal to y .
- (iii) The sum of 2 and x is greater than y .
- (iv) The sum of x and y is less than 24.
- (v) 15 multiplied by m gives $3n$.
- (vi) Product of 8 and y is equal to $3x$.
- (vii) 30 divided by b is equal to p .
- (viii) z decreased by $3x$ is equal to y .
- (ix) 12 times of x is equal to $5z$.
- (x) 12 times of x is greater than $5z$.
- (xi) 12 times of x is less than $5z$.

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(xii) $3z$ subtracted from 45 is equal to y .

(xiii) $8x$ divided by y is equal to $2z$.

(xiv) $7y$ subtracted from $5x$ gives $8z$.

(xv) $7y$ decreased by $5x$ gives $8z$.

Solution:

(i) The sum of 8 and x is equal to y in algebraic form is written as,

$$8 + x = y$$

(ii) x decreased by 5 is equal to y in algebraic form is written as,

$$x - 5 = y$$

(iii) The sum of 2 and x is greater than y in algebraic form is written as,

$$2 + x > y$$

(iv) The sum of x and y is less than 24 in algebraic form is written as,

$$x + y < 24$$

(v) 15 multiplied by m gives $3n$ in algebraic form is written as,

$$15 \times m = 3n$$

(vi) Product of 8 and y is equal to $3x$ in algebraic form is written as,

$$8 \times y = 3x$$

(vii) 30 divided by b is equal to p in algebraic form is written as,

$$30 \div b = p$$

(viii) z decreased by $3x$ is equal to y in algebraic form is written as,

$$z - 3x = y$$

(ix) 12 times of x is equal to $5z$ in algebraic form is written as,

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$$12 \times x = 5z$$

(x) 12 times of x is greater than 5z in algebraic form is written as,

$$12 \times x > 5z$$

(xi) 12 times of x is less than 5z in algebraic form is written as,

$$12 \times x < 5z$$

(xii) 3z subtracted from 45 is equal to y in algebraic form is written as,

$$45 - 3z = y$$

(xiii) 8x divided by y is equal to 2z in algebraic form is written as,

$$8x \div y = 2z$$

(xiv) 7y subtracted from 5x gives 8z in algebraic form is written as,

$$5x - 7y = 8z$$

(xv) 7y decreased by 5x gives 8z in algebraic form is written as,

$$7y - 5x = 8z$$

2. For each of the following algebraic expressions, write a suitable statement in words:

(i) $3x + 8 = 15$

(ii) $7 - y > x$

(iii) $2y - x < 12$

(iv) $5 \div z = 5$

(v) $a + 2b > 18$

(vi) $2x - 3y = 16$

(vii) $3a - 4b > 14$

(viii) $b + 7a < 21$

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(ix) $(16 + 2a) - x > 25$

(x) $(3x + 12) - y < 3a$

Solution:

(i) The algebraic expression $3x + 8 = 15$ in words is expressed as,

3x plus 8 is equal to 15

(ii) The algebraic expression $7 - y > x$ in words is expressed as,

7 decreased by y is greater than x

(iii) The algebraic expression $2y - x < 12$ in words is expressed as,

2y decreased by x is less than 12

(iv) The algebraic expression $5 \div z = 5$ in words is expressed as,

5 divided by z is equal to 5

(v) The algebraic expression $a + 2b > 18$ in words is expressed as,

a increased by 2b is greater than 18

(vi) The algebraic expression $2x - 3y = 16$ in words is written as,

2x decreased by 3y is equal to 16

(vii) The algebraic expression $3a - 4b > 14$ in words is written as,

3a decreased by 4b is greater than 14

(viii) The algebraic expression $b + 7a < 21$ in words is written as,

b increased by 7a is less than 21

(ix) The algebraic expression $(16 + 2a) - x > 25$ in words is written as,

The sum of 16 and 2a decreased by x is greater than 25

(x) The algebraic expression $(3x + 12) - y < 3a$ in words is written as,

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The sum of $3x$ and 12 decreased by y is less than $3a$

Exercise 18(B)

1. Separate the constants and the variables from each of the following:

$6, 4y, -3x, 5/4, (4/5)xy, az, 7p, 0, 9x/y, 3/4x, -xz/3y$

Solution:

$6, 5/4$ and 0 are the constants

$4y, -3x, (4/5)xy, az, 7p, 9x/y, 3/4x$ and $-xz/3y$ are the variables

2. Group the like terms together:

(i) $4x, -3y, -x, (2/3)x, (4/5)y$ and y .

(ii) $(2/3)xy, -4yx, 2yz, (-2/3)yz, zy/3$ and yx .

(iii) $-ab^2, b^2a^2, 7b^2a, -3a^2b^2$ and $2ab^2$

(iv) $5ax, -5by, by/7, 7xa$ and $2ax/3$

Solution:

(i) $4x, -3y, -x, (2/3)x, (4/5)y$ and y .

Here, the like term are as follows

$4x, -x, (2/3)x$ and $-3y, (4/5)y, y$

(ii) $(2/3)xy, -4yx, 2yz, (-2/3)yz, zy/3$ and yx .

Here, the like terms are as follows

$(2/3)xy, -4yx, yx$ and $2yz, (-2/3)yz, zy/3$

(iii) $-ab^2, b^2a^2, 7b^2a, -3a^2b^2$ and $2ab^2$

Here, the like terms are as follows

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$-ab^2$, $7b^2a$, $2ab^2$ and b^2a^2 , $-3a^2b^2$

(iv) $5ax$, $-5by$, $by / 7$, $7xa$ and $2ax / 3$

Here, the like terms are as follows

$5ax$, $7xa$, $2ax / 3$ and $-5by$, $by / 7$

3.State whether true or false:

(i) 16 is a constant and y is a variable but $16y$ is variable

(ii) $5x$ has two terms 5 and x

(iii) The expression $5 + x$ has two terms 5 and x

(iv) The expression $2x^2 + x$ is a trinomial

(v) $ax^2 + bx + c$ is a trinomial

(vi) $8 \times ab$ is a binomial

(vii) $8 + ab$ is a binomial

(viii) $x^3 - 5xy + 6x + 7$ is a polynomial

(ix) $x^3 - 5xy + 6x + 7$ is a multinomial

(x) The coefficient of x in $5x$ is 5

(xi) The coefficient of ab in $-ab$ is -1

(xii) The coefficient of y in $-3xy$ is -3

Solution:

(i) 16 is a constant and y is a variable but $16y$ is variable

The given statement is **true**

(ii) $5x$ has two terms 5 and x

The given statement is **false**

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(iii) The expression $5 + x$ has two terms 5 and x

The given statement is **true**

(iv) The expression $2x^2 + x$ is a trinomial

The given statement is **false**

(v) $ax^2 + bx + c$ is a trinomial

The given statement is **true**

(vi) $8 \times ab$ is a binomial

The given statement is **false**

(vii) $8 + ab$ is a binomial

The given statement is **true**

(viii) $x^3 - 5xy + 6x + 7$ is a polynomial

The given statement is **true**

(ix) $x^3 - 5xy + 6x + 7$ is a multinomial

The given statement is **true**

(x) The coefficient of x in $5x$ is $5x$

The given statement is **false**

(xi) The coefficient of ab in $-ab$ is -1

The given statement is **true**

(xii) The coefficient of y in $-3xy$ is -3

The given statement is **false**

4. State the number of terms in each of the following expressions:

(i) $2a - b$

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(ii) $3 \times x + a / 2$

(iii) $3x - x / p$

(iv) $a \div x \times b + c$

(v) $3x \div 2 + y + 4$

(vi) $xy \div 2$

(vii) $x + y \div a$

(viii) $2x + y + 8 \div y$

(ix) $2 \times a + 3 \div b + 4$

Solution:

(i) $2a - b$

The number of terms in given expression is two

(ii) $3 \times x + a / 2$

The number of terms in given expression is two

(iii) $3x - x / p$

The number of terms in given expression is two

(iv) $a \div x \times b + c$

The number of terms in given expression is two

(v) $3x \div 2 + y + 4$

The number of terms in given expression is three

(vi) $xy \div 2$

The number of terms in given expression is one

(vii) $x + y \div a$

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The number of terms in given expression is two

(viii) $2x + y + 8 \div y$

The number of terms in given expression is three

(ix) $2 \times a + 3 \div b + 4$

The number of terms in given expression is three

5. State whether true or false:

(i) xy and $-yx$ are like terms.

(ii) x^2y and $-y^2x$ are like terms.

(iii) a and $-a$ are like terms.

(iv) $-ba$ and $2ab$ are unlike terms.

(v) 5 and $5x$ are like terms.

(vi) $3xy$ and $4xyz$ are unlike terms.

Solution:

(i) xy and $-yx$ are like terms

Yes, xy and $-yx$ are like terms. Hence, the given statement is **true**

(ii) x^2y and $-y^2x$ are like terms

No, x^2y and $-y^2x$ are not like terms. Hence, the given statement is **false**

(iii) a and $-a$ are like terms.

Yes, a and $-a$ are like terms. Hence, the given statement is **true**

(iv) $-ba$ and $2ab$ are unlike terms.

No, $-ba$ and $2ab$ are like terms. Hence, the given statement is **false**

(v) 5 and $5x$ are like terms.

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No, 5 and $5x$ are not like terms. Hence, the given statement is **false**

(vi) $3xy$ and $4xyz$ are unlike terms.

Yes, $3xy$ and $4xyz$ are unlike terms. Hence, the given statement is **true**

6. For each expression, given below, state whether it is a monomial, or a binomial or a trinomial.

(i) xy

(ii) $xy + x$

(iii) $2x \div y$

(iv) $-a$

(v) $ax^2 - x + 5$

(vi) $-3bc + d$

(vii) $1 + x + y$

(viii) $1 + x \div y$

(ix) $x + xy - y^2$

Solution:

(i) xy

Here xy has one term

Therefore, xy is a **monomial**

(ii) $xy + x$

Here $xy + x$ has two terms

Therefore, $xy + x$ is a **binomial**

(iii) $2x \div y$

Here $2x \div y$ has one term

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Therefore, $2x \div y$ is **monomial**

(iv) $-a$

Here $-a$ has one term

Therefore, $-a$ is a **monomial**

(v) $ax^2 - x + 5$

Here $ax^2 - x + 5$ has three terms

Therefore, $ax^2 - x + 5$ is a **trinomial**

(vi) $-3bc + d$

Here $-3bc + d$ has two terms

Therefore, $-3bc + d$ is a **binomial**

(vii) $1 + x + y$

Here $1 + x + y$ has three terms

Therefore, $1 + x + y$ is a **trinomial**

(viii) $1 + x \div y$

Here $1 + x \div y$ has two terms

Therefore, $1 + x \div y$ is a **binomial**

(ix) $x + xy - y^2$

Here $x + xy - y^2$ has three terms

Therefore, $x + xy - y^2$ is a **trinomial**

7. Write down the coefficient of x in the following monomial:

(i) x

(ii) $-x$

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(iii) $-3x$

(iv) $-5ax$

(v) $\frac{3}{2}xy$

(vi) ax / y

Solution:

(i) x

The coefficient of x in the given monomial x is 1

(ii) $-x$

The coefficient of x in the given monomial $-x$ is -1

(iii) $-3x$

The coefficient of x in the given monomial $-3x$ is -3

(iv) $-5ax$

The coefficient of x in the given monomial $-5ax$ is $-5a$

(v) $\frac{3}{2}xy$

The coefficient of x in the given monomial is $(\frac{3}{2})y$

(vi) ax / y

The coefficient of x in the given monomial is (a / y)

8. Write the coefficient of:

(i) x in $-3xy^2$

(ii) x in $-ax$

(iii) y in $-y$

(iv) y in $(\frac{2}{a})y$

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(v) xy in $-2xyz$

(vi) ax in $-axy^2$

(vii) x^2y in $-3ax^2y$

(viii) xy^2 in $5axy^2$

Solution:

(i) x in $-3xy^2$

$-3y^2$ is the coefficient of x in $-3xy^2$

(ii) x in $-ax$

$-a$ is the coefficient of x in $-ax$

(iii) y in $-y$

-1 is the coefficient of y in $-y$

(iv) y in $(2/a)y$

$(2/a)$ is the coefficient of y in $(2/a)y$

(v) xy in $-2xyz$

$-2z$ is the coefficient of xy in $-2xyz$

(vi) ax in $-axy^2$

$-y^2$ is the coefficient of ax in $-axy^2$

(vii) x^2y in $-3ax^2y$

$-3a$ is the coefficient of x^2y in $-3ax^2y$

(viii) xy^2 in $5axy^2$

$5a$ is the coefficient of xy^2 in $5axy^2$

9. State the numeral coefficient of the following monomials:

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(i) $5xy$

(ii) abc

(iii) $5pqr$

(iv) $-2x / y$

(v) $(2 / 3) xy^2$

(vi) $-15xy / 2z$

(vii) $-7x \div y$

(viii) $-3x \div (2y)$

Solution:

(i) $5xy$

The numeral coefficient of the given monomial is 5

(ii) abc

The numeral coefficient of the given monomial is 1

(iii) $5pqr$

The numeral coefficient of the given monomial is 5

(iv) $-2x / y$

The numeral coefficient of the given monomial is -2

(v) $(2 / 3) xy^2$

The numeral coefficient of the given monomial is $(2 / 3)$

(vi) $-15xy / 2z$

The numeral coefficient of the given monomial is $(-15 / 2)$

(vii) $-7x \div y$

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The numeral coefficient of the given monomial is $-7 \div 1 = -7$

(viii) $-3x \div (2y)$

The numeral coefficient of the given monomial is $-3 \div 2$ i.e. $(-3 / 2)$

10. Write the degree of each of the following polynomials:

(i) $x + x^2$

(ii) $5x^2 - 7x + 2$

(iii) $x^3 - x^8 + x^{10}$

(iv) $1 - 100x^{20}$

(v) $4 + 4x - 4x^3$

(vi) $8x^2y - 3y^2 + x^2y^5$

(vii) $8z^3 - 8y^2z^3 + 7yz^5$

(viii) $4y^2 - 3x^3 + y^2x^7$

Solution:

(i) $x + x^2$

The degree of the polynomial is the greatest of sums of degree of two or more variables of the given polynomial

Therefore, the degree of the given polynomial $x + x^2$ is 2

(ii) $5x^2 - 7x + 2$

The degree of the polynomial is the greatest of sums of degree of two or more variables of the given polynomial

Therefore, the degree of the given polynomial $5x^2 - 7x + 2$ is 2

(iii) $x^3 - x^8 + x^{10}$

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The degree of the polynomial is the greatest of sums of degree of two or more variables of the given polynomial

Therefore, the degree of the given polynomial $x^3 - x^8 + x^{10}$ is 10

(iv) $1 - 100x^{20}$

The degree of the polynomial is the greatest of sums of degree of two or more variables of the given polynomial

Therefore, the degree of the given polynomial $1 - 100x^{20}$ is 20

(v) $4 + 4x - 4x^3$

The degree of the polynomial is the greatest of sums of degree of two or more variables of the given polynomial

Therefore, the degree of the given polynomial $4 + 4x - 4x^3$ is 3

(vi) $8x^2y - 3y^2 + x^2y^5$

The degree of the polynomial is the greatest of sums of degree of two or more variables of the given polynomial

Therefore, the degree of the given polynomial $8x^2y - 3y^2 + x^2y^5$ is 7

(vii) $8z^3 - 8y^2z^3 + 7yz^5$

The degree of the polynomial is the greatest of sums of degree of two or more variables of the given polynomial

Therefore, the degree of the given polynomial $8z^3 - 8y^2z^3 + 7yz^5$ is 6

(viii) $4y^2 - 3x^3 + y^2x^7$

The degree of the polynomial is the greatest of sums of degree of two or more variables of the given polynomial

Therefore, the degree of the given polynomial $4y^2 - 3x^3 + y^2x^7$ is 9

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