EXERCISE 19(D)

1. Divide:
(i) 3a by a
(ii) 15x by 3x
(iii) 16m by 4
(iv) $20x^2$ by 5x
(v) $30p^2$ by $10p^2$
Solution:
(i) 3a by a
3a ÷ a
This can be written as,
3a / a = (3 × a) / a
= 3
Hence, 3a ÷ a = 3
(ii) 15x by 3x
15x ÷ 3x
15x / 3x = (15 × x) / (3x × x)
This can be written as,
= (3 × 5 × x) / (3 × x)
We get,
= 5
Hence, 15x ÷ 3x = 5
(iii) 16m by 4
16m ÷ 4
16m / 4 = (16 × m) / 4
This can be written as,
= (4 × 4 × m) / 4
We get,
= 4m
Hence, 16m ÷ 4 = 4m
(iv) $20x^2$ by 5x
$20x^2$ ÷ 5x
$20x^2$ / 5x = (20 × x^2) / (5 × x)
This can be written as,
= (4 × 5 × x^{2-1}) / 5
= 4 × x
= 4x
Hence, $20x^2$ ÷ 5x = 4x
(v) $30p^2$ by $10p^2$

$30p^2 \div 10p^2 = (30 \times p^2) / (10 \times p^2)$
This can be written as,
$= (3 \times 10 \times p^{2-2}) / 10$
$= 3 \times p^0$
$= 3 \times 1$
$= 3$
Hence, $30p^2 \div 10p^2 = 3$

2. Simplify:
(i) $2x^5 \div x^2$
(ii) $6a^8 \div 3a^3$
(iii) $20xy \div - 5xy$
(iv) $– 24a^2b^2c^2 \div 6ab$
(v) $– 5x^2y \div xy^2$
Solution:
(i) $2x^5 \div x^2$
$= (2 \times x^5) / x^2$
$= 2 \times x^{5-2}$
$= 2 \times x^3$
We get,
$= 2x^3$
Hence, $2x^5 \div x^2 = 2x^3$
(ii) $6a^8 \div 3a^3$
$= (6 \times a^8) / (3 \times a^3)$
This can be written as,
$= (2 \times 3 \times a^{8-3}) / 3$
We get,
$= 2 \times a^5$
$= 2a^5$
Hence, $6a^8 \div 3a^3 = 2a^5$
(iii) $20xy \div - 5xy$
$= (20 \times x \times y) / (- 5 \times x \times y)$
This can be written as,
$= (4 \times 5) / - 5$
We get,
$= - 4$
Hence, $20xy \div - 5xy = - 4$
(iv) $– 24a^2b^2c^2 \div 6ab$

$= (- 24 \times a^2 \times b^2 \times c^2) / (6 \times a \times b)$
This can be written as,
$= (-4 \times 6 \times a^{2-1} \times b^{2-1} \times c^2) / 6$
We get,
$= - 4 \times a \times b \times c^2$
$= - 4abc^2$
Hence, $– 24a^2b^2c^2 \div 6ab = - 4abc^2$
(v) $– 5x^2y \div xy^2$
$= (- 5 \times x^2 \times y) / (x \times y^2)$
This can be written as,
$= (- 5 \times x^{2-1}) / y^{2-1}$
We get,
$= (- 5 \times x) / y$
$= - 5x / y$
Hence, $– 5x^2y \div xy^2 = - 5x / y$

3. Divide:
(i) (- 3m / 4) by 2m
(ii) $– 15p^6q^8$ by $- 5p^6q^7$
(iii) $– 21m^5n^7$ by $14m^2n^2$
(iv) $36a^4x^5y^6$ by $4x^2a^3y^2$
(v) $20x^3a^6$ by 5xy
Solution:
(i) (- 3m / 4) by 2m
$= - 3m / 4 \div 2m = - 3m / 4 \times 1 / 2m$
$= - (3 \times m) / (4 \times 2 \times m)$
We get,
$= - 3 / 8$
Hence, $(- 3m / 4) \div 2m = - 3 / 8$
(ii) $– 15p^6q^8$ by $- 5p^6q^7$
$- 15p^6q^8 \div - 5p^6q^7 = (- 15 \times p^6 \times q^8) / (- 5 \times p^6 \times q^7)$
This can be written as,
$= (3 \times 5 \times q^{8-7}) / 5$
We get,
$= 3 \times q$
$= 3q$
Hence, $- 15p^6q^8 \div - 5p^6q^7 = 3q$
(iii) $– 21m^5n^7$ by $14m^2n^2$
$- 21m^5n^7 \div 14m^2n^2 = (- 21 \times m^5 \times n^7) / (14 \times m^2 \times n^2)$

This can be written as,
$= (- 3 \times 7 \times m^{5-2} \times n^{7-2}) / (2 \times 7)$
$= (- 3 \times m^3 \times n^5) / 2$
We get,
$= - 3m^3n^5 / 2$
Hence, $- 21m^5n^7 \div 14m^2n^2 = - 3m^3n^5 / 2$
(iv) $36a^4x^5y^6$ by $4x^2a^3y^2$
$36a^4x^5y^6 \div 4x^2a^3y^2 = (36 \times a^4 \times x^5 \times y^6) / (4 \times x^2 \times a^3 \times y^2)$
This can be written as,
$= (4 \times 9 \times a^{4-3} \times x^{5-2} \times y^{6-2}) / 4$
$= 9 \times a^1 \times x^3 \times y^4$
We get,
$= 9ax^3y^4$
Hence, $36a^4x^5y^6 \div 4x^2a^3y^2 = 9ax^3y^4$
(v) $20x^3a^6$ by $5xy$
$20x^3a^6 \div 5xy = (20 \times x^3 \times a^6) / (5 \times x \times y)$
This can be written as,
$= (4 \times 5 \times x^{3-1} \times a^6) / (5 \times y)$
We get,
$= (4 \times x^2 \times a^6) / y$
$= 4x^2a^6 / y$
Hence, $20x^3a^6 \div 5xy = 4x^2a^6 / y$

4. Simplify:
(i) $(- 15m^5n^2) / (- 3m^5)$
(ii) $35x^4y^2 / - 15x^2y^2$
(iii) $(- 24x^6y^2) / (6x^6y)$
Solution:
(i) $(-15m^5n^2) / (- 3m^5) = (-15 \times m^5 \times n^2) / (- 3 \times m^5)$
This can be written as,
$= (3 \times 5 \times m^{5-5} \times n^2) / 3$
$= 5 \times m^0 \times n^2$
$= 5 \times 1 \times n^2$
$= 5n^2$
Hence, $(-15m^5n^2) / (- 3m^5) = 5n^2$
(ii) $35x^4y^2 / - 15x^2y^2$
$35x^4y^2 / - 15x^2y^2 = (35 \times x^4 \times y^2) / (- 15 \times x^2 \times y^2)$
This can be written as,
$= - (5 \times 7 \times x^{4-2} \times y^{2-2}) / (3 \times 5)$

$= - (7 \times x^2 \times y^0) / 3$
We get,
$= - 7x^2y / 3$
Hence, $35x^4y^2 / - 15x^2y^2 = - 7x^2y / 3$
(iii) $(- 24x^6y^2) / (6x^6y)$
$(- 24x^6y^2) / (6x^6y) = (- 25 \times x^6 \times y^2) / (6 \times x^6 \times y)$
This can be written as,
$= (- 4 \times 6 \times x^{6-6} \times y^{2-1}) / 6$
$= - 4 \times x^0 \times y^1$
$= - 4y$
Hence, $(- 24x^6y^2) / (6x^6y) = - 4y$

5. Divide:
(i) $9x^3 – 6x^2$ by $3x$
(ii) $6m^2 – 16m^3 + 10m^4$ by $– 2m$
(iii) $15x^3y^2 + 25x^2y^3 – 36x^4y^4$ by $5x^2y^2$
(iv) $36a^3x^5 – 24a^4x^4 + 18a^5x^3$ by $– 6a^3x^3$
Solution:
(i) $9x^3 – 6x^2$ by $3x$
$9x^3 – 6x^2 \div 3x = (9 \times x^3 – 6 \times x^2) / (3 \times x)$
Separating the terms, we get
$= (9 \times x^3) / (3 \times x) – (6 \times x^2) / (3 \times x)$
We get,
$= 3 \times x^{3-1} – 2 \times x^{2-1}$
$= 3x^2 – 2x$
Hence, $9x^3 – 6x^2 \div 3x = 3x^2 – 2x$
(ii) $6m^2 – 16m^3 + 10m^4$ by $– 2m$
$6m^2 – 16m^3 + 10m^4 \div - 2m = (6 \times m^2 - 16 \times m^3 + 10 \times m^4) / - 2 \times m$
Separating the terms, we get
$= (6 \times m^2 / - 2 \times m) – (16 \times m^3) / (- 2 \times m) + (10 \times m^4) / (- 2 \times m)$
$= - 3 \times m^{2-1} + 8 \times m^{3-1} – 5 \times m^{4-1}$
$= - 3 \times m + 8 \times m^2 – 5 \times m^3$
We get,
$= - 3m + 8m^2 – 5m^3$
Hence, $6m^2 – 16m^3 + 10m^4 \div - 2m = - 3m + 8m^2 – 5m^3$
(iii) $15x^3y^2 + 25x^2y^3 – 36x^4y^4$ by $5x^2y^2$
$15x^3y^2 + 25x^2y^3 – 36x^4y^4 \div 5x^2y^2 = (15x^3y^2 + 25x^2y^3 – 36x^4y^4) / (5x^2y^2)$
$= (15 \times x^3 \times y^3) / (5 \times x^2 \times y^2) + (25 \times x^2 \times y^3) / (5 \times x^2 \times y^2) – (36 \times x^4 \times y^4) / (5 \times x^2 \times y^2)$