Riviera International Academy

Assignment-2077

(Ashwin 13, 2077, Tuesday)

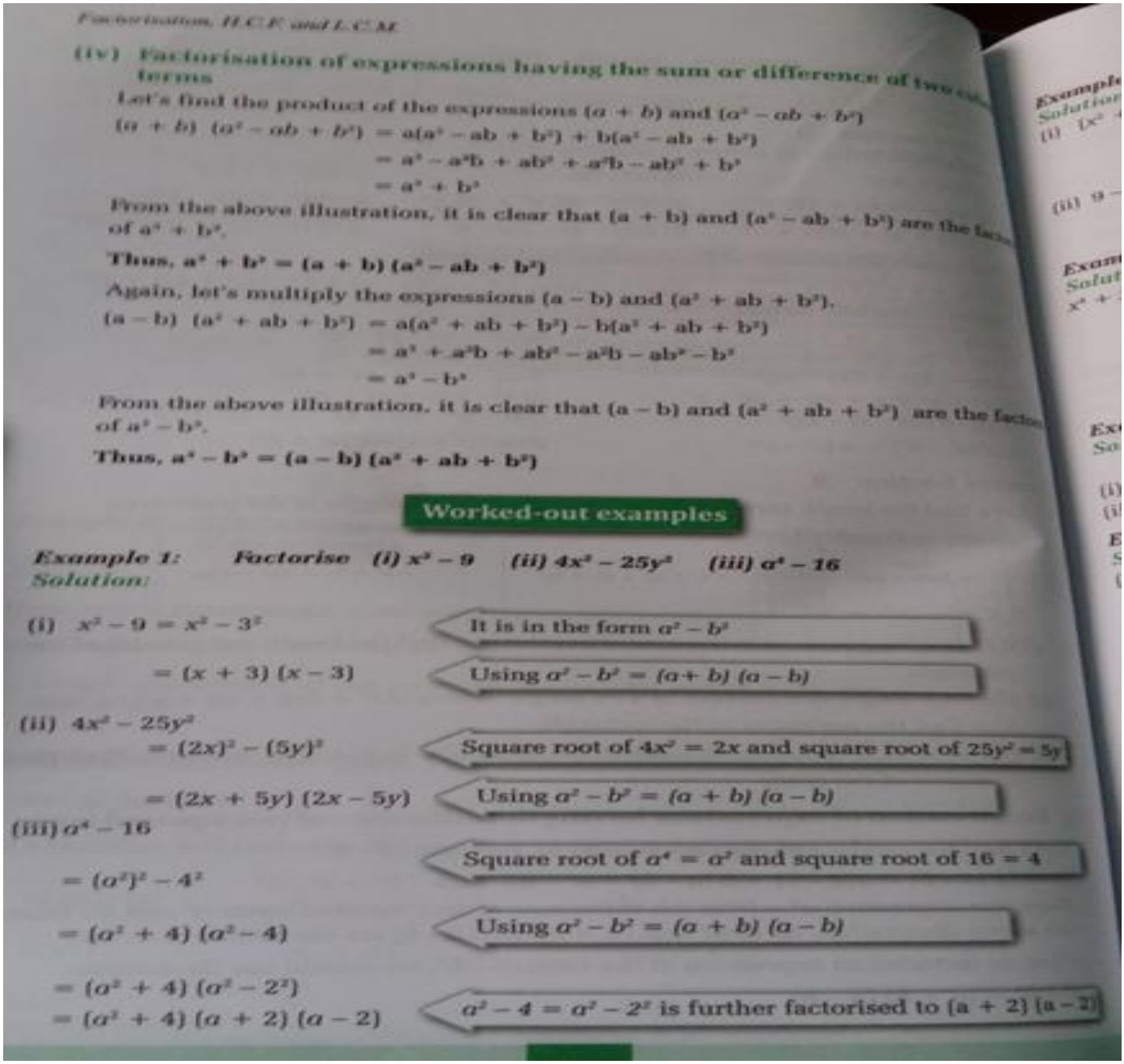
Class: Eight

Subject- Mathematics

Source: Photos of exercises are given below with green boarders.
Work:

- Read & write all examples
- Complete all exercise

Do your work neatly



Factorisation, H.C.F and L.C.M

(iv) Factorisation of expressions having the sum or difference of two cu... terms

Let's find the product of the expressions $(a + b)$ and $(a^2 - ab + b^2)$

$$(a + b)(a^2 - ab + b^2) = a(a^2 - ab + b^2) + b(a^2 - ab + b^2)$$
$$= a^3 - a^2b + ab^2 + a^2b - ab^2 + b^3$$
$$= a^3 + b^3$$

From the above illustration, it is clear that $(a + b)$ and $(a^2 - ab + b^2)$ are the fac... of $a^3 + b^3$.

Thus, $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

Again, let's multiply the expressions $(a - b)$ and $(a^2 + ab + b^2)$.

$$(a - b)(a^2 + ab + b^2) = a(a^2 + ab + b^2) - b(a^2 + ab + b^2)$$
$$= a^3 + a^2b + ab^2 - a^2b - ab^2 - b^3$$
$$= a^3 - b^3$$

From the above illustration, it is clear that $(a - b)$ and $(a^2 + ab + b^2)$ are the factor... of $a^3 - b^3$.

Thus, $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

Worked-out examples

Example 1: ***Factorise*** ***(i) $x^2 - 9$*** ***(ii) $4x^2 - 25y^2$*** ***(iii) $a^4 - 16$***

Solution:

(i) $x^2 - 9 = x^2 - 3^2$ — It is in the form $a^2 - b^2$

$= (x + 3)(x - 3)$ — Using $a^2 - b^2 = (a + b)(a - b)$

(ii) $4x^2 - 25y^2$

$= (2x)^2 - (5y)^2$ — Square root of $4x^2 = 2x$ and square root of $25y^2 = 5y$

$= (2x + 5y)(2x - 5y)$ — Using $a^2 - b^2 = (a + b)(a - b)$

(iii) $a^4 - 16$

$= (a^2)^2 - 4^2$ — Square root of $a^4 = a^2$ and square root of $16 = 4$

$= (a^2 + 4)(a^2 - 4)$ — Using $a^2 - b^2 = (a + b)(a - b)$

$= (a^2 + 4)(a^2 - 2^2)$

$= (a^2 + 4)(a + 2)(a - 2)$ — $a^2 - 4 = a^2 - 2^2$ is further factorised to $(a + 2)(a - 2)$

Example 2: **Factorise** **(i)** $(x^2 + y^2)^2 - x^2y^2$ **(ii)** $9 - (p - q)^2$

Solution:

(i) $(x^2 + y^2)^2 - x^2y^2 = (x^2 + y^2)^2 - (xy)^2$
$= (x^2 + y^2 + xy)(x^2 + y^2 - xy)$
$= (x^2 + xy + y^2)(x^2 - xy + y^2)$

Consider, $x^2 + y^2 = a$ and $xy = b$
Then, $a^2 - b^2 = (a + b)(a - b)$
$(x^2 + y^2)^2 - (xy)^2$
$= (x^2 + y^2 + xy)(x^2 + y^2 - xy)$

(ii) $9 - (p - q)^2 = 3^2 - (p - q)^2$
$= (3 + p - q)[3 - (p - q)]$
$= (3 + p - q)(3 - p + q)$

Example 3: **Resolve into factors** $x^4 + x^2y^2 + y^4$

Solution:

$x^4 + x^2y^2 + y^4 = (x^2)^2 + (y^2)^2 + x^2y^2$
$= (x^2 + y^2)^2 - 2x^2y^2 + x^2y^2$ ← Using $x^2 + y^2 = (x + y)^2 - 2xy$
$= (x^2 + y^2)^2 - x^2y^2$
$= (x^2 + y^2)^2 - (xy)^2$
$= (x^2 + y^2 + xy)(x^2 + y^2 - xy)$
$= (x^2 + xy + y^2)(x^2 - xy + y^2)$

Example 4: **Simplify by factorisation process (i)** $45^2 - 25^2$ **(ii)** 101×99

Solution:

(i) $45^2 - 25^2 = (45 + 25)(45 - 25) = 70 \times 20 = 1400$
(ii) $101 \times 99 = (100 + 1) \times (100 - 1) = 100^2 - 1^2 = 10000 - 1 = 9999$

Example 5: **Factorise (i)** $x^3 + 27y^3$ **(ii)** $64a^3 - 125b^3$

Solution:

(i) $8x^3 + 27y^3 = (2x)^3 + (3y)^3$
$= (2x + 3y)[(2x)^2 - 2x \cdot 3y + (3y)^2]$
$= (2x + 3y)(4x^2 - 6xy + 9y^2)$

(ii) $64a^3 - 125b^3 = (4a)^3 - (5b)^3$
$= (4a - 5b)[(4a)^2 + 4a.5b + (5b)^2]$
$= (4a - 5b)(16a^2 + 20ab + 25b^2)$

EXERCISE 10.2

General Section

1. Let's tell and write the following expressions as the product of their factors.

Expressions	Product of factors
a) $m^2 - n^2$	
b) $m^2 - 4$	
c) $x^2 - y^2$	
d) $x^2 - 9$	
e) $p^2 - 16$	

Expressions	Product of factors
f) $4x^2 - 1$	
g) $9y^2 - 4$	
h) $p^2 - 49$	
i) $a^2 - \frac{1}{4}$	
j) $b^2 - \frac{1}{9}$	

2. **Let's tell and write the differences of these squared numbers as quickly as p**

a) $10^2 - 9^2$ = ... b) $7^2 - 5^2$ = ...

c) $21^2 - 20^2$ = ... d) $50^2 - 49^2$ = ...

e) $20^2 - 10^2$ = ... f) $40^2 - 30^2$ = ...

Creative Section

3. **Let's resolve into factors.**

a) $x^2 - 36$ b) $a^2 - 49$ c) $25 - y^2$ d) $16 - 81p^2$

e) $x^3 - 16x$ f) $2a^2 - 72$ g) $5p^3 - 80p$ h) $3y^3 - 27y$

i) $5a^3 - 20ab^2$ j) $8x^4y - 18x^2y^3$ k) $25x^2 - \frac{1}{49}$ l) $\frac{1}{4x^2} - \frac{1}{81}$

4. **Let's factorise.**

a) $x^4 - 16$ b) $a^4 - 81$ c) $x^4 - y^4$ d) $16p^4 - q^4$

e) $81x^4 - 625$ f) $32y^4 - 162$ g) $a^8 - b^8$ h) $256x^8 - y^8$

5. **Let's factorise.**

a) $(a - b)^2 - 9$ b) $(x + y)^2 - 25$ c) $(a^2 + b^2)^2 - 4$ d) $(a^2 - b^2)^2 - c^2$

e) $16 - (x + y)^2$ f) $49 - (a - b)^2$ g) $(x + 3)^2 - (y + 2)^2$ h) $(a - 5)^2 - (b - c)^2$

6. **Let's resolve into factors.**

a) $x^4 + x^2y^2 + y^4$ b) $x^4 + x^2 + 1$ c) $x^4 + 7x^2y^2 + 16y^4$

d) $a^4 - 7a^2b^2 + b^4$ e) $x^4 - 3x^2y^2 + 9y^4$ f) $a^4 + 6a^2b^2 + 25b^4$

g) $4x^4 + 3x^2y^2 + 9y^4$ h) $25x^4 + 4x^2y^2 + 4y^4$ i) $4a^4 - 13a^2b^2 + 9b^4$

7. **Let's simplify by factorisation process.**

a) $25^2 - 15^2$ b) $64^2 - 44^2$ c) $96^2 - 86^2$ d) $(101)^2 - (100)^2$

e) 51×49 f) 82×78 g) 101×99 h) 103×97

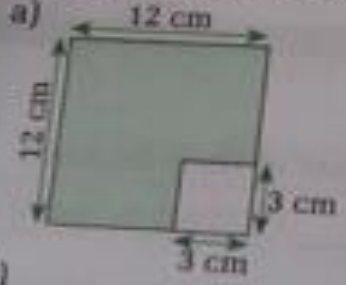
8. **Let's resolve into factors.**

a) $x^3 + 8$ b) $y^3 + 27$ c) $8a^3 + 1$ d) $8x^3 + 27y^3$

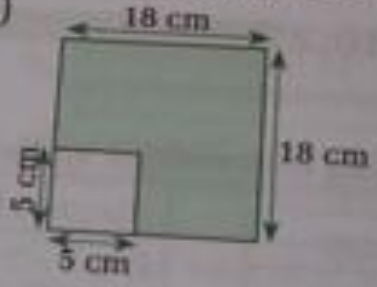
e) $27a^3 + 125b^3$ f) $p^3 - 8$ g) $27m^3 - n^3$ h) $a^3 - 1000b^3$

9. **Let's find the area of the shaded region using $a^2 - b^2 = (a + b)(a - b)$.**

a)

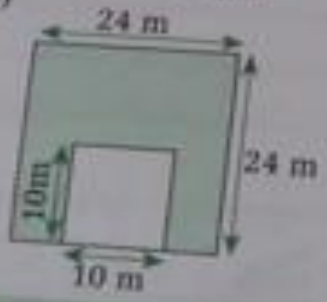


b)

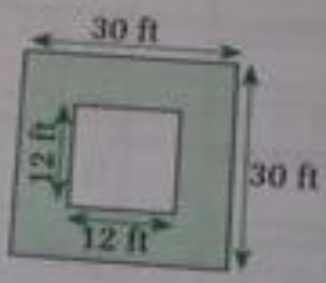


c)

d)



e)



f)

Subject- HPE

1. Do exercise from page no 13 of your book.

Subject-OBTE

6/13 lesson 5

Subject- Science

1. What is the meaning of Mechanical advantage of a simple machine 4?
2. Why velocity has not unit?
3. Why VR is not affected by friction?
4. Write the two differences between MA and efficiency.

The End.