| | |
|---|---|
| ឈ្មោះ | : មឿន ពុទ្ធសីថា<br>(Moeurn Puthsihta) |
| ថ្នាក់ | : M10 |

**Answer**

Fundamental

I. រកតម្លៃសមមូលប្រព័ន្ធគោល១០៖

a) $(1101011)_2 = (170)_{10}$

$$(1101011)_2 = 1\cdot2^0 + 1\cdot2^1 + 0\cdot2^2 + 1\cdot2^3 + 0\cdot2^4 + 1\cdot2^5 + 1\cdot2^6 = (107)_{10}$$

Result

107

b) $(1010111)_2 = (87)_{10}$

$$(1010111)_2 = 1\cdot2^0 + 1\cdot2^1 + 1\cdot2^2 + 0\cdot2^3 + 1\cdot2^4 + 0\cdot2^5 + 1\cdot2^6 = (87)_{10}$$

Result

87

c) $(1111001)_2 = (121)_{10}$

$$(1111001)_2 = 1\cdot2^0 + 0\cdot2^1 + 0\cdot2^2 + 1\cdot2^3 + 1\cdot2^4 + 1\cdot2^5 + 1\cdot2^6 = (121)_{10}$$

Result

121

d) $(1010110)_2 = (86)_{10}$

$$(1010110)_2 = 0\cdot2^0 + 1\cdot2^1 + 1\cdot2^2 + 0\cdot2^3 + 1\cdot2^4 + 0\cdot2^5 + 1\cdot2^6 = (86)_{10}$$

Result

86

e) $(1110001)_2 = (113)_{10}$

$$(1110001)_2 = 1\cdot2^0 + 0\cdot2^1 + 0\cdot2^2 + 0\cdot2^3 + 1\cdot2^4 + 1\cdot2^5 + 1\cdot2^6 = (113)_{10}$$

Result

113

f) $(1010011)_2 = (83)_{10}$

$$(1010011)_2 = 1\cdot2^0 + 1\cdot2^1 + 0\cdot2^2 + 0\cdot2^3 + 1\cdot2^4 + 0\cdot2^5 + 1\cdot2^6 = (83)_{10}$$

Result

83

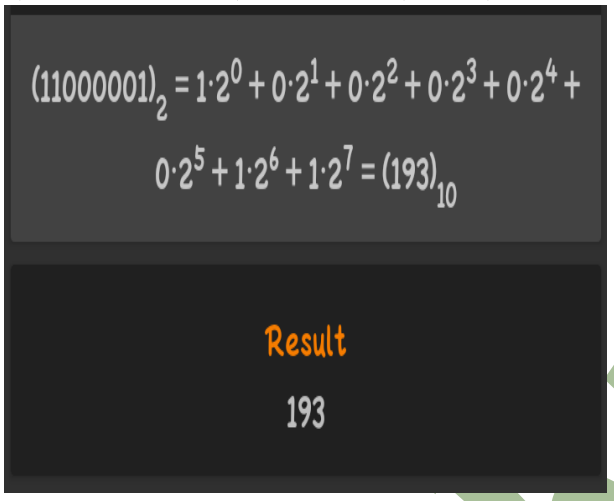
g) $(1000011)_2 = (67)_{10}$

$$(1000011)_2 = 1\cdot2^0 + 1\cdot2^1 + 0\cdot2^2 + 0\cdot2^3 + 0\cdot2^4 + 0\cdot2^5 + 1\cdot2^6 = (67)_{10}$$

Result

67

h)$(11000001)_2$ = $(193)_{10}$




II. បំលែងចំនួនខាងក្រោមជាប្រព័ន្ធគោល១០៖

a) $(1101.111)_2 = (13.875)_{10}$

**Step 1**

Convert integer part of number to decimal system.

$$(1101)_2 = 1 \cdot 2^0 + 0 \cdot 2^1 + 1 \cdot 2^2 + 1 \cdot 2^3 = (13)_{10}$$

**Step 2**

Convert integer part of number to decimal system.

$$(0.111)_2 = 1 \cdot 2^{-1} + 1 \cdot 2^{-2} + 1 \cdot 2^{-3} = (0.875)_{10}$$

**Result**

13.875

b) $(2534)_6 = (634)_{10}$

$$(2534)_6 = 4 \cdot 6^0 + 3 \cdot 6^1 + 5 \cdot 6^2 + 2 \cdot 6^3 = (634)_{10}$$

**Result**

634

c) $(4527)_9$ = $(3346)_{10}$

$$(4527)_9 = 7 \cdot 9^0 + 2 \cdot 9^1 + 5 \cdot 9^2 + 4 \cdot 9^3 = (3346)_{10}$$

Result

3346

d) $(213.231)_7 = (108.3498542)_{10}$

**Step 1**

Convert integer part of number to decimal system.

$$(213)_7 = 3 \cdot 7^0 + 1 \cdot 7^1 + 2 \cdot 7^2 = (108)_{10}$$

**Step 2**

Convert integer part of number to decimal system.

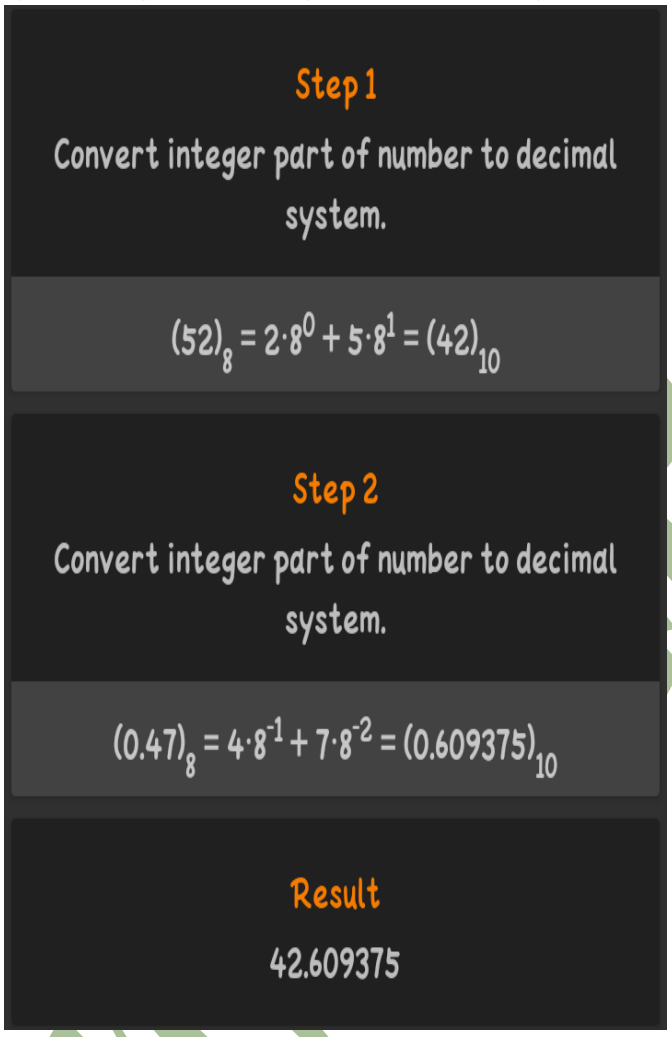
$$(0.231)_7 = 2 \cdot 7^{-1} + 3 \cdot 7^{-2} + 1 \cdot 7^{-3} = (0.3498542)_{10}$$

The result of multiplication is rounded to 7 decimal places.

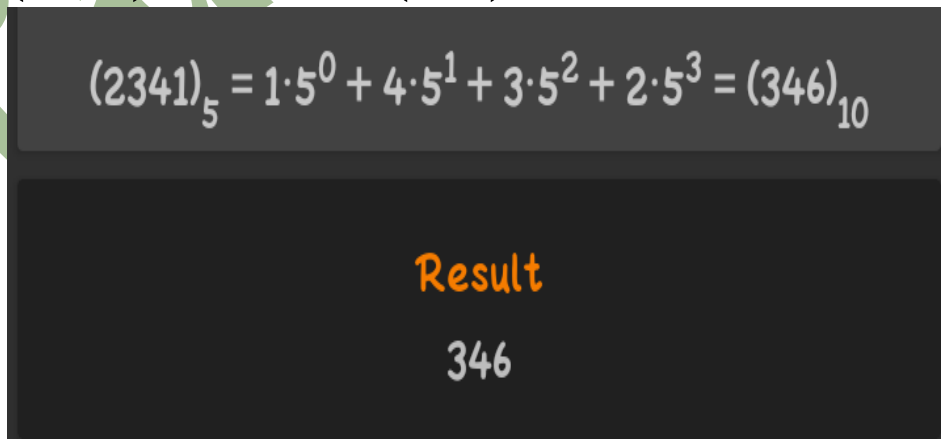
**Result**

108.3498542

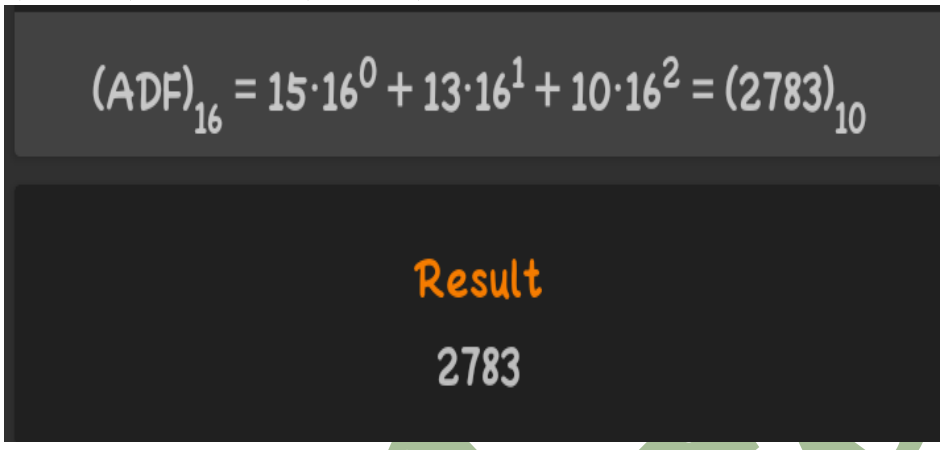
e) $(52.47)_8 = (42.609375)_{10}$



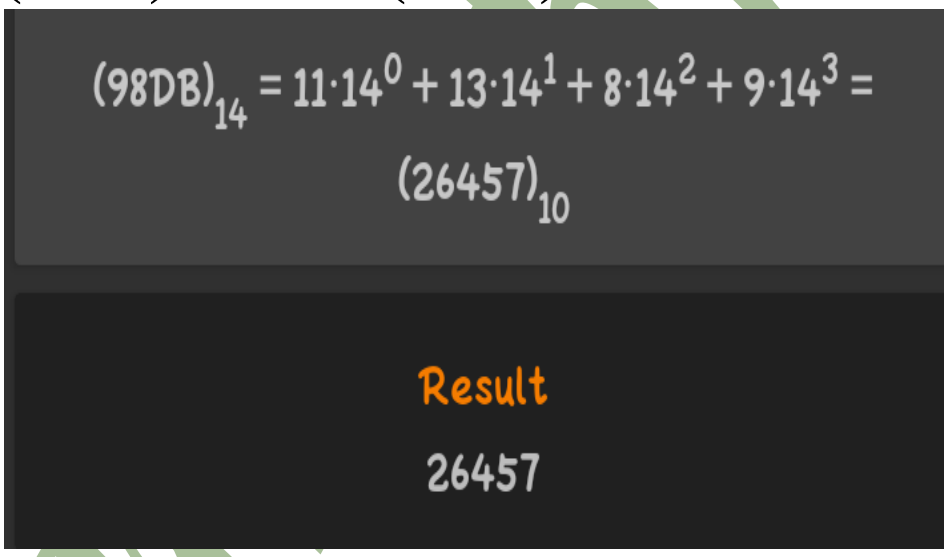

f) $(2341)_5 = (346)_{10}$



g)$(ADF)_{16}$ = $(2783)_{10}$




h)$(98DB)_{14}$ = $(26457)_{10}$



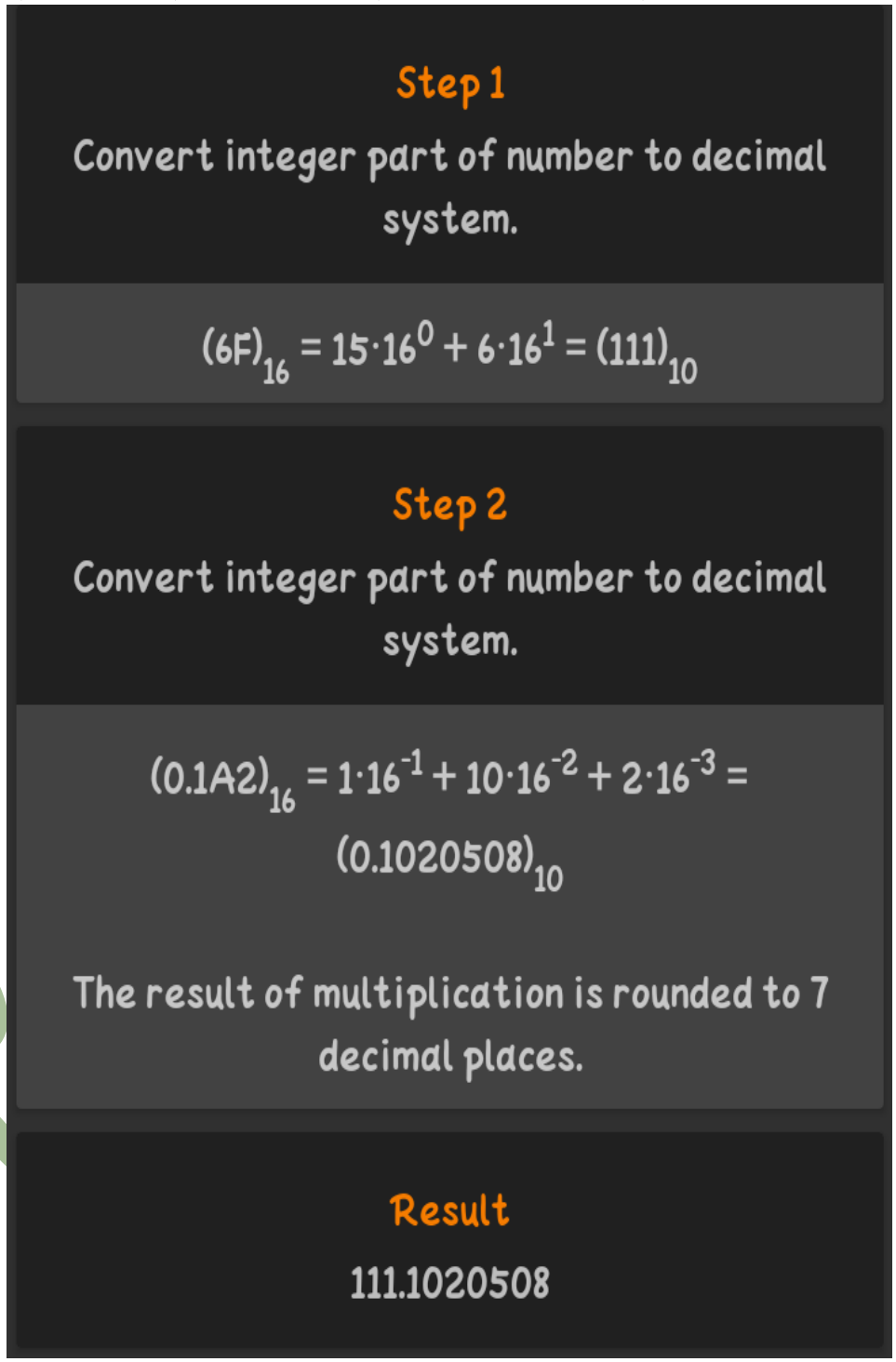
i) $(35EC)_{15}$ = $(11472)_{10}$

$$(35EC)_{15} = 12 \cdot 15^0 + 14 \cdot 15^1 + 5 \cdot 15^2 + 3 \cdot 15^3 = (11472)_{10}$$

Result

11472

j) $(6F.1A2)_{16}$ = $(111.1020508)_{10}$




III. ប្រើ Shortcut បំលែងគោល ២ ទៅ គោល ៨ និង គោល ១៦៖

a) $(110110011)_2$ =$(663)_8$ =$(1B3)_{16}$

b) $(10101111001)_2$ = $(2571)_8$ = $(579)_{16}$

c) $(111100111)_2$ = $(747)_8$ = $(1E7)_{16}$

d) $(10101110010)_2$ = $(2562)_8$ = $(572)_{16}$

e) $(1110110001)_2$ = $(161)_8$ = $(3B1)_{16}$

f) $(11111010011)_2$ = $(3723)_8$ = $(7D3)_{16}$

g) $(1000010011)_2$ = $(1023)_8$ = $(213)_{16}$

h) $(11001100001)_2$ = $(3141)_8$ = $(661)_{16}$

IV. ប្រើ Shortcut បំលែង គោល ៨ និង គោល ១៦ ទៅគោល ២ ៖

a) $(7642)_8$ = $(111110100010)_2$

b) $(89AB)_{16}$ = $(1000100110101011)_2$

c) $(6521)_8$ = $(110101010001)_2$

d) $(FBED)_{16}$ = $(1111101111101101)_2$

e) $(37210)_8$ = $(1111101000100 0)_2$

f) $(76C90)_{16}$ = $(11101101100100 10000)_2$

V. បំលែងគោលចំពោះលេខខាងក្រោម៖

a) $(109.78125)_{10}$ = $(1101101.11001)_2$

**Step 1**

Convert integer part of number from decimal system to base-2 system.

| Dividing | Result |
|---|---|
| 109 : 2 = 54 (1) | 1 |
| 54 : 2 = 27 (0) | 01 |
| 27 : 2 = 13 (1) | 101 |
| 13 : 2 = 6 (1) | 1101 |
| 6 : 2 = 3 (0) | 01101 |
| 3 : 2 = 1 (1) | 101101 |
| 1 : 2 = 0 (1) | 1101101 |

## Step 2

Convert decimal part of number from decimal system to base-2 system.

| Multiplication | Result |
| --- | --- |
| $2 \cdot 0.78125 = 1.5625$ | 1 |
| $2 \cdot 0.5625 = 1.125$ | 11 |
| $2 \cdot 0.125 = 0.25$ | 110 |
| $2 \cdot 0.25 = 0.5$ | 1100 |
| $2 \cdot 0.5 = 1$ | 11001 |

## Result

1101101.11001

b)$(13.6875)_{10}$ = $(1101.1011)_2$

**Step 1**

Convert integer part of number from decimal system to base-2 system.

| Dividing | Result |
|---|---|
| 13 : 2 = 6 (1) | 1 |
| 6 : 2 = 3 (0) | 01 |
| 3 : 2 = 1 (1) | 101 |
| 1 : 2 = 0 (1) | 1101 |

## Step 2

Convert decimal part of number from decimal system to base-2 system.

| Multiplication | Result |
| --- | --- |
| $2 \cdot 0.6875 = 1.375$ | 1 |
| $2 \cdot 0.375 = 0.75$ | 10 |
| $2 \cdot 0.75 = 1.5$ | 101 |
| $2 \cdot 0.5 = 1$ | 1011 |

## Result

1101.1011

c) $(16.345)_{10}$ = $(10000.010110)_2$

**Step 1**

Convert integer part of number from decimal system to base-2 system.

| Dividing | Result |
|---|---|
| 16 : 2 = 8 (0) | 0 |
| 8 : 2 = 4 (0) | 00 |
| 4 : 2 = 2 (0) | 000 |
| 2 : 2 = 1 (0) | 0000 |
| 1 : 2 = 0 (1) | 10000 |

## Step 2

Convert decimal part of number from decimal system to base-2 system.

| Multiplication | Result |
| --- | --- |
| 2·0.345 = 0.69 | 0 |
| 2·0.69 = 1.38 | 01 |
| 2·0.38 = 0.76 | 010 |
| 2·0.76 = 1.52 | 0101 |
| 2·0.52 = 1.04 | 01011 |
| 2·0.04 = 0.08 | 010110 |
| 2·0.08 = 0.16 | 0101100 |

The multiplication has been stopped after 7 digits.

## Result

10000.0101100

d)$(1101.011)_2$ = $(14.3333333)_9$

**Step 1**

Convert integer part of number to decimal system.

$$(1101)_2 = 1 \cdot 2^0 + 0 \cdot 2^1 + 1 \cdot 2^2 + 1 \cdot 2^3 = (13)_{10}$$

**Step 2**

Convert integer part of number to decimal system.

$$(0.011)_2 = 0 \cdot 2^{-1} + 1 \cdot 2^{-2} + 1 \cdot 2^{-3} = (0.375)_{10}$$

**Step 3**

Convert integer part of number from decimal system to base-9 system.

| Dividing | Result |
|---|---|
| 13 : 9 = 1 (4) | 4 |
| 1 : 9 = 0 (1) | 14 |

## Step 4

Convert decimal part of number from decimal system to base-9 system.

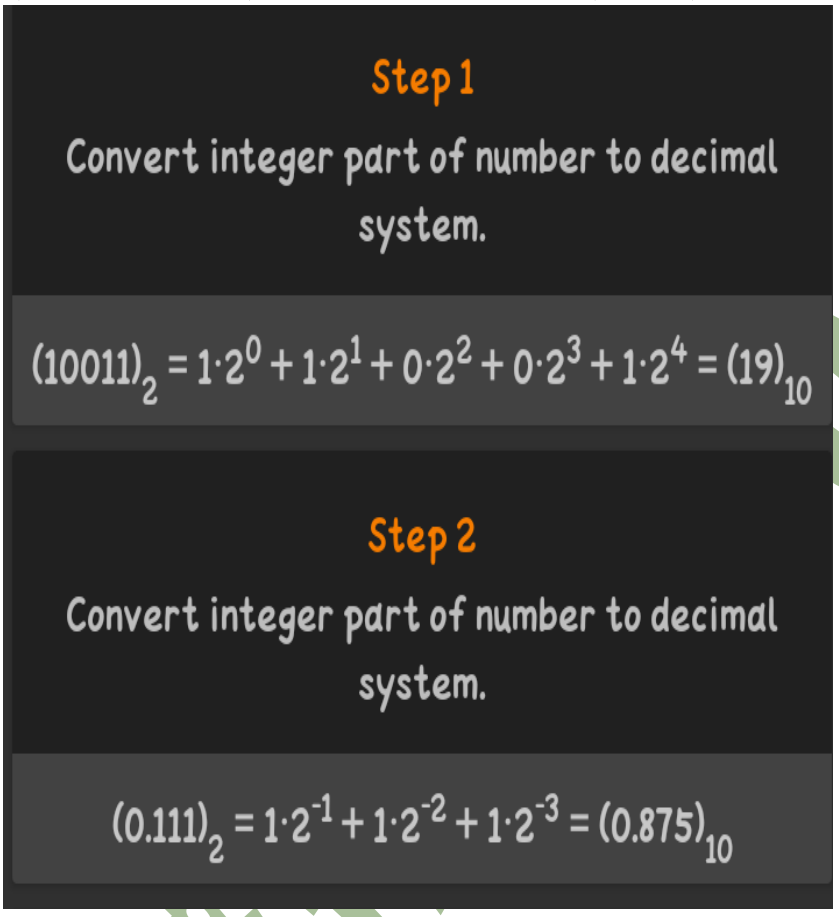
| Multiplication | Result |
|---|---|
| 9·0.375 = 3.375 | 3 |
| 9·0.375 = 3.375 | 33 |
| 9·0.375 = 3.375 | 333 |
| 9·0.375 = 3.375 | 3333 |
| 9·0.375 = 3.375 | 33333 |
| 9·0.375 = 3.375 | 333333 |
| 9·0.375 = 3.375 | 3333333 |

The multiplication has been stopped after 7 digits.

## Result

14.3333333

e) $(10011.111)_2$ = $(25.6)_7$



## Step 3

Convert integer part of number from decimal system to base-7 system.

| Dividing | Result |
| --- | --- |
| 19 : 7 = 2 (5) | 5 |
| 2 : 7 = 0 (2) | 25 |

## Step 4

Convert decimal part of number from decimal system to base-7 system.

| Multiplication | Result |
| --- | --- |
| 7·0.875 = 6.125 | 6 |

The rest has already appeared. There is a period.

## Result

25.6

f) $(234.123)_5$ = $(153.1453552)_6$

**Step 1**

Convert integer part of number to decimal system.

$$(234)_5 = 4 \cdot 5^0 + 3 \cdot 5^1 + 2 \cdot 5^2 = (69)_{10}$$

**Step 2**

Convert integer part of number to decimal system.

$$(0.123)_5 = 1 \cdot 5^{-1} + 2 \cdot 5^{-2} + 3 \cdot 5^{-3} = (0.304)_{10}$$

**Step 3**

Convert integer part of number from decimal system to base-6 system.

| Dividing | Result |
|---|---|
| 69 : 6 = 11 (3) | 3 |
| 11 : 6 = 1 (5) | 53 |
| 1 : 6 = 0 (1) | 153 |

## Step 4

Convert decimal part of number from decimal system to base-6 system.

| Multiplication | Result |
| --- | --- |
| $6 \cdot 0.304 = 1.824$ | 1 |
| $6 \cdot 0.824 = 4.944$ | 14 |
| $6 \cdot 0.944 = 5.664$ | 145 |
| $6 \cdot 0.664 = 3.984$ | 1453 |
| $6 \cdot 0.984 = 5.904$ | 14535 |
| $6 \cdot 0.904 = 5.424$ | 145355 |
| $6 \cdot 0.424 = 2.544$ | 1453552 |

The multiplication has been stopped after 7 digits.

## Result

153.1453552