Decimals

Grade 4

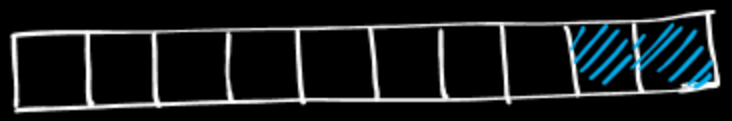
Decimals.

Decimal fraction

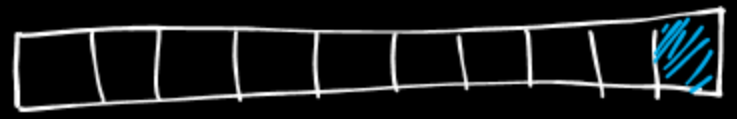
⇒ A fractions in which the denominators are 10, 100, 1000, etc. are k/a decimal fractions.

ex: $\frac{4}{10}$, $\frac{7}{100}$, $\frac{9}{1000}$, $\frac{98}{10000}$, etc.

$\frac{2}{10}$



$\frac{2}{10}$ (two - tenths) ⇒ we denote this by 0.2 (decimal two) or (point two)



$\frac{1}{10}$ (one - tenths) ⇒ 0.1 (decimal one) or (point one)

(Seven - tenths) = $\frac{7}{10}$

$\frac{7}{10}$ ⇒ 0.7 (decimal seven) or (point seven)

Fractional no.	common fraction	decimal fraction	Read as.
• 1 tenth	$\frac{1}{10}$	0.1	decimal one or point one
• 2 tenths	$\frac{2}{10}$	0.2	
3 tenths	$\frac{3}{10}$	0.3	
4 tenths	$\frac{4}{10}$	0.4	
5 tenths	$\frac{5}{10}$	0.5	
6 tenths	$\frac{6}{10}$	0.6	
7 tenths	$\frac{7}{10}$	0.7	
8 tenths	$\frac{8}{10}$	0.8	
9 tenths	$\frac{9}{10}$	0.9	

1 hundredth	$\frac{1}{100}$	0.01
2 hundredths	$\frac{2}{100}$	0.02
3 hundredths	$\frac{3}{100}$	0.03
6 hundredths	$\frac{6}{100}$	0.06
19 hundredths	$\frac{19}{100}$	0.19
22 hundredths	$\frac{22}{100}$	0.22
98 hundredths	$\frac{98}{100}$	0.98

Decimal representation

point zero three

point one nine or decimal one nine

Decimal numbers

$\frac{78}{100} = 0.78$

$\frac{19}{10} = 1.9 \Rightarrow$ one point nine

$\frac{78}{10} = 7.8$

$\frac{128}{10} = 12.8$

$\frac{99}{100} = 0.99$

$\frac{128}{100} = 1.28$

$\frac{128}{10} = 12.8$

$\frac{111}{1000} = .111$

One - thousandth $\frac{001}{1000}$ 0.001

three - thousandths $\frac{3}{1000}$ 0.003

100 - thousandths $\frac{100}{1000}$ 0.100

623 - thousandths $\frac{623}{1000}$ 0.623

$1 = 001$

$1 \neq 100$

999 - thousandths $\frac{999}{1000}$ 0.999

Zero point nine nine nine

$$\frac{1249}{1000} = 1.249$$

$$12.3 = \frac{123}{10}$$

$$\frac{1.249.}{1000} = 1.249$$

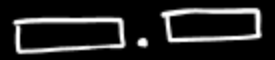
$$0.007 = \frac{7}{1000}$$

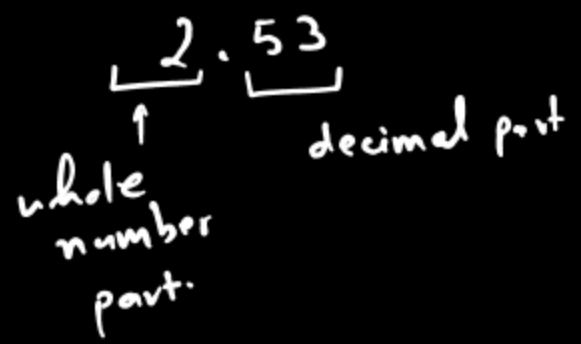
$$\frac{22326}{1000} = 22.326$$

22.326 as fraction $\Rightarrow \frac{22326}{1000}$

Decimal number

↳ consist of whole number part (left to the decimal) and decimal part (right to the decimal)





→ In absence of any of the parts, we write 0 (zero).

Eg. (i) .53 is written as 0.53

(ii) 71 is written as 71.0

21	=	21.0
.21	=	0.21

159.347 ⇒ One hundred fifty nine point three four seven.

Decimal places

⇒ "the number of digit(s) after the decimal point is known as the number of decimal places."

k/a

Eg: (i) 429.59 — two digits after decimal point / it has two decimal places / two places of decimal.

(ii) 11.305 has three places of decimal.

Rules for converting decimals into common fractions.

Eg: Convert 3.7 into common fraction.

$$3.7 = \frac{37}{10}$$

$$2.31 = \frac{231}{100}$$

$$0.009 = \frac{9}{1000}$$

(i) Numerator => write the given no. without decimal point.

(ii) Denominator => "form a number by putting as many zeros to the right of 1, as in the no. of decimal places".

(i) $\frac{5}{1000} = 0.0005 = 0.005$

(ii) $\frac{43}{10000} = 0.0043$

(iii) $\frac{581}{1000} = 0.0581 = 0.581$

(iv) $\frac{37}{100} = 0.37$

(v) $\frac{243}{10} = 24.3$

(vi) $\frac{7}{16000} = 0.0007$

#11 - Decimal to common fraction.

(i) $0.6 = \frac{6}{10}$

(ii) $0.05 = \frac{5}{100}$

(iii) $6.25 = \frac{625}{100}$

(iv) $10.019 = \frac{10019}{1000}$

(v) $24.50 = \frac{2450}{100} = \frac{245}{10}$

(vi) $24.5 = \frac{245}{10}$

(vii) $307.092 = \frac{307092}{1000}$

- $\frac{25}{1000} = 0.025$

$\frac{24}{2} = 12.0$

$\frac{24}{20} = \frac{24}{2 \times 10} = \frac{12}{10} = 1.2$

$\frac{24}{10} = 2.4$

$\frac{15}{30}$ into decimals.

$\frac{15}{30} = \frac{\cancel{15}^{5}}{\cancel{3}^{1} \times 10} = \frac{5}{1 \times 10} = \boxed{\frac{5}{10}} = 0.5$

$0.05 = \boxed{\frac{5}{100}}$

$0.5 = \boxed{\frac{5}{10}}$

$01 = 1$

no meaning.

$10 = 10$

$.005$

has meaning.

$.5$

$.50$

no meaning

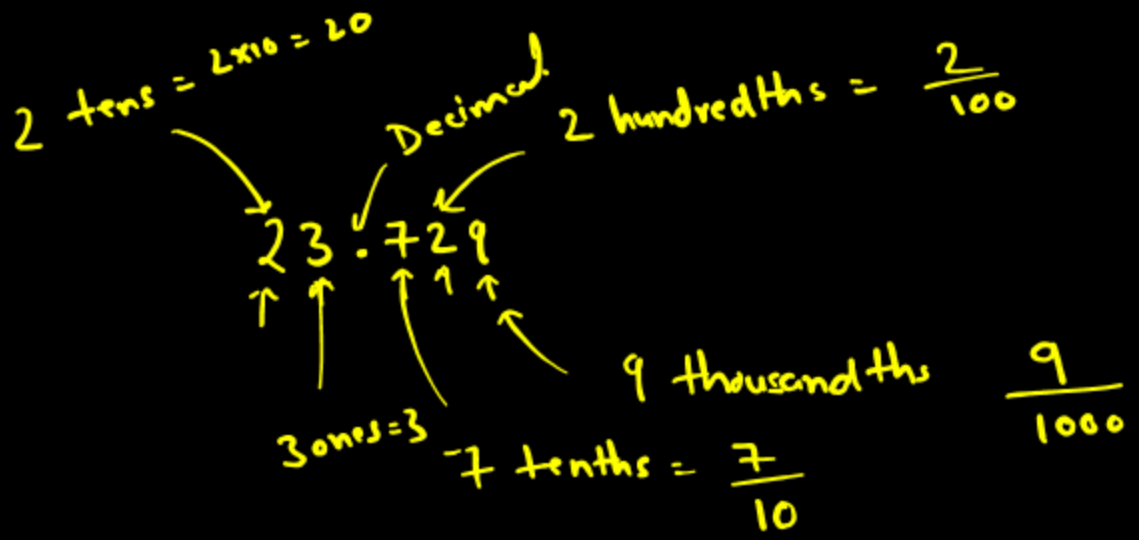
$.5000$

do not have meaning.

0.5 and 0.50 are same

Decimal fractions in Place value chart.

T.H.	Thousands	Hundreds	Tens	ones	Decimal	Tenths	Hundredths	Thousandths
10,000	1000	100	10	1	.	$\frac{1}{10}$ (0.1)	$\frac{1}{100}$ (0.01)	$\frac{1}{1000}$ (0.001)



$\frac{1}{10} = 0.01$

₹ 1 = p. 100

1$ = ₹ 85 = p 85 x 100

= p 8500

745.326 in expanded form using place value of each digits.

745.326 = 7 hundreds + 4 tens + 5 ones + 3 tenths + 2 hundredths + 6 thousandths

$= 700 + 40 + 5 + \frac{3}{10} + \frac{2}{100} + \frac{6}{1000}$

Q. Write the short form of the following decimal.

(i) $200 + 80 + 9 + \frac{3}{10} + \frac{5}{100} + \frac{4}{1000}$

Sol: 289.354

(ii) $400 + 70 + 2 + \frac{6}{100} + \frac{9}{1000} = 400 + 70 + 70 + \frac{0}{10} + \frac{6}{100} + \frac{9}{1000}$

$\boxed{472.069}$

(iii) $600 + 2 + \frac{2}{10} + \frac{7}{1000} = \underline{602.207}$

(iv) $4000 + 9 + \frac{4}{10} + \frac{6}{100} = 469.460 = \underline{4009.46}$

Q $16.745 = 10 + 6 + \frac{7}{10} + \frac{4}{100} + \frac{5}{1000} + \frac{0}{10000}$

$=$

$10.083 = 10 + 0 + \frac{0}{10} + \frac{8}{100} + \frac{3}{1000}$

$=$

$\frac{10}{0}$ Not defined

$\frac{0}{5} = 0$

$\frac{5}{0} \neq 0$ Not defined

Q. $\frac{9}{10} + \frac{3}{1000}$ $\Rightarrow$ 9n decimal no.

Expand form of

$256.139 = 200 + 50 + 6 + \frac{1}{10} + \frac{3}{100} + \frac{9}{1000}$

$6.132 = 6 + \frac{1}{10} + \frac{3}{100} + \frac{2}{1000}$

$\underbrace{0}_{\text{whole part}}.\underbrace{932}_{\text{decimal part}} = 0 + \frac{9}{10} + \frac{3}{100} + \frac{2}{1000}$

.932

$0.309 = \frac{3}{10} + \frac{9}{1000}$

$\frac{0}{100}$

$\frac{3}{10} + \frac{9}{1000} = 0.309$

$\frac{9}{10} + \frac{3}{1000} = 0.903$

$900 + 90 + \frac{9}{10} + \frac{9}{100} = 990.99$ ✓

$8 + 70 + \frac{5}{100} = 78.05$

	Dan	$\frac{1}{10}$	$\frac{1}{100}$
	0	0	0

$\frac{5}{100} = 0.05$

67.052 pka value of 5

620.84 = 2 → tens 8 → tenths

Mixed numeral.

$6\frac{5}{3}$

$4\frac{10}{18}$

whole part

fraction.

eg. $83.\frac{7}{10}$ in decimals.

$\frac{7}{10} = 0.07 = .7$

$83.70000000000\ldots$

$\times$ may not be meaningful.

$71\frac{9}{100} = 71.09$

$\frac{9}{100} = 0.009\times$

$= 0.09\checkmark$

$29\frac{11}{1000} = 29.011$

$138\frac{213}{1000} = 138.213$

$75\frac{3}{1000} = \underline{75.003}$

		$\frac{1}{10}$	$\frac{1}{100}$		$\frac{1}{1000}$
Ones	Decimal	tenths	hundredths	Thousandths	
	.	I decimal place	II decimal places	III decimal places	

write it down into decimals

(i) 7 tenths 2 hundredths 5 thousandths = $\underline{0.725}$

(ii) 8 tenths 3 thousandths = 0.803

(iii) 4 hundredths 9 thousandths = $\underline{0.049}$

(i) $\frac{6037}{1000} = 6.037$

$\frac{6037}{10000} = 0.6037$

$\frac{6037}{10} = 603.7$

$60\frac{37}{100} = 60.37$

$603\frac{7}{1000} = 603.007$

$603\frac{7}{10} = 603.7$

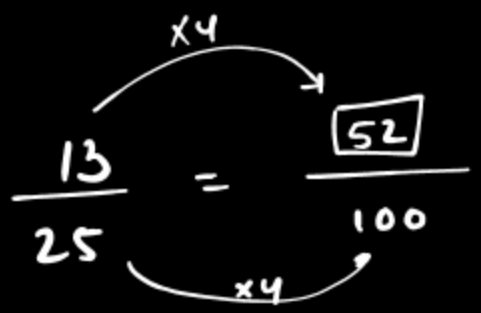
$6\frac{37}{1000} = 6.037$

$$\left[\frac{310}{50} = \frac{310 \times 2}{50 \times 2} = \frac{620}{100} = 6.20 = \underline{6.2}\right.$$

$$\frac{}{10} \qquad \frac{}{100} \qquad \frac{}{1000} \qquad \frac{}{10000}$$

$$\frac{3}{5} \times 2 = \frac{6}{10}$$

Q. $\frac{13}{25}$ in decimal



10 100 1000

$\frac{13 \times 4}{25 \times 4} = \frac{52}{100} = 0.52$

Q1. ① $\frac{20}{500}$

$\frac{20 \times 2}{500 \times 2} = \frac{40}{1000} = 0.040 = 0.04$

Time

a.m. and p.m.

12 hour clock

11th September

7:22 pm → (1 hr) 8:22 pm → (1 hr) 9:22 pm → (2 hr)

11th sep. 11th sep. 11th sep.

11:22 pm → 11:30 pm

11th sept. 11th sep.

11:40 pm 11:55 pm

12th Sept

11:59 pm ⇒ 11:60 ⇒ 00:00 am = 00:00

12 hr clo (Midnight) 24 hr.

1:15 am ⇒ 01:15 hrs.

6:05 am 06:05 hrs.

7:00 am 07:00 hrs

11:55 am
.
11:56 am
11:57 am
11:58 am
11:59 am
12:00 noon
12:01 pm

12:30 pm ⇒ 12:30 hrs

(24 hrs.)

12 and 23:59

00:00

24 hr → 00:00 → 11:59 am

(mid-night)

17:30 hrs.

-12

15:30 hr.

21:30 hrs

-2

19:30

AM | PM

Ante meridiem (before noon)

Post meridiem (after noon)

12 hr clock		24 hr clock
12 midnight	→	00 00 hours. (start of the day)
12:45 am	→	1245 hours
7:33 pm	→ +12	~~19:33~~ 1933 hours.
5:24 am	→	0524 hrs.
11:33 pm	←	2333 hrs
12:00 noon	←	1200 hrs.
12:24 pm	←	1224 hrs.

12 hr clock

12:00 midnight → 24 hr clock

0000 hr.

12:00 noon → 1200 hr.

12:01 pm → 1201 hr

0136 hrs.

1:48 pm ← 13:48 hr

12 hr.

24 hr clock

2231 hrs.

8th nov.

4 hrs.

1:36 am time

9th

friends hrs

2359 hrs → 11:59 pm

Add 6 hours 50 minutes to 9:15 am and write the time in 24 hr clock system.

9:15 am + 6 h → 3:15 pm + 50 min.

= 3 pm + 15 min + 50 min

= 3 pm + 65 min.

= 4 pm + 5 min

= 4:05 pm

= 1605 hours

Add 38 minutes 46 seconds and 10 minutes 38 seconds.

48 min and 85 second.

60 seconds + 25 seconds

1 m.

38 min + 46 second.

49 min 25 seconds

2 min 60 seconds

1 min.

1

3 mins

Expanded form.

$$239.087 = 200 + 30 + 9 + \frac{8}{100} + \frac{7}{1000}$$

$$400 + 9 + \frac{7}{10000} = 409.00007 \quad X$$

$$= 409.0007$$

$0.085 \Rightarrow$ decimal fraction $= \frac{085}{1000} = \frac{85}{1000}$

$0.3 = \frac{3}{10}$

$1.3 = \frac{13}{10}$

$0.13 = \frac{13}{100}$

$\frac{1259}{100} = 12.59$

End of the chapter