

Unit 1**1-Approximation**

1) Approximate each of the following to the nearest hundredth:

a) $56.026 \simeq \dots\dots\dots$

f) $0.9953 \simeq \dots\dots\dots$

b) $2.6743 \simeq \dots\dots\dots$

g) $23\frac{3}{8} = \dots\dots\dots \simeq \dots\dots\dots$

c) $564.296 \simeq \dots\dots\dots$

h) $5\frac{6}{250} = \dots\dots\dots \simeq \dots\dots\dots$

d) $109.998 \simeq \dots\dots\dots$

i) $42\frac{7}{125} = \dots\dots\dots \simeq \dots\dots\dots$

e) $45\frac{6}{1000} = \dots\dots\dots \simeq \dots\dots\dots$

j) $67.434 \simeq \dots\dots\dots$

2) Approximate each of the following to the nearest thousandth:

a) $0.3642 \simeq \dots\dots\dots$

e) $0.0474 \simeq \dots\dots\dots$

b) $0.9986 \simeq \dots\dots\dots$

f) $19.9996 \simeq \dots\dots\dots$

c) $0.0003 \simeq \dots\dots\dots$

g) $21.3495 \simeq \dots\dots\dots$

d) $20\frac{78}{10000} = \dots\dots\dots \simeq \dots\dots\dots$

h) $\frac{86479}{10000} = \dots\dots\dots \simeq \dots\dots\dots$

3) Approximate each of the following:

- a) 345 \simeq to the nearest ten
- b) 535 \simeq to the nearest hundred
- c) 8351 \simeq to the nearest thousand
- d) 543.21 \simeq to the nearest unit
- e) 3.321 \simeq to the nearest tenth
- f) 53.214 \simeq to the nearest hundredth
- g) 5.3178 \simeq to the nearest hundredth
- h) 3.4578 \simeq to the nearest thousandth
- i) 5.4543 \simeq to the nearest $\frac{1}{1000}$
- j) 3.7314 \simeq to the nearest $\frac{1}{100}$
- k) 5.375 \simeq to the nearest 0.1
-

4) Write: The greatest decimal fraction and the smallest one which consists of the digits 5 , 8 , 1 and 3 then approximate it to the nearest hundredth

The greatest = \simeq

The smallest = \simeq

5) Complete with suitable digits:

a) $4.6 \square 8 \simeq 4.70$ (to the nearest hundredth)

b) $70.28 \square 5 \simeq 70.285$ (to the nearest thousandth)

6) Complete:

a) The number $635.281 \simeq 635.3$ (to the nearest)

b) The number $143.23 \simeq 140$ (to the nearest)

c) The number $3659.284 \simeq 3659.28$ (to the nearest)

d) The number $143.23 \simeq 143$ (to the nearest)

7) Choose the correct answer:

a) $\simeq 34.26$ (to the nearest hundredth)

(34.265 – 34.254 – 33.256 – 34.255)

b) $52.8695 \simeq$ (to the nearest $\frac{1}{1000}$)

(52.87 – 52.8610 – 52.869 – 52.679)

c) $\simeq 45.5$ (to the nearest 0.01)

(45.523 – 45.496 – 45.555 – 45.492)

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8) Find the result then approximate:

a) $2.345 + 31.504 = \dots \simeq \dots$ (to the nearest $\frac{1}{10}$)

b) $3.408 + 3.051 = \dots \simeq \dots$ (to the nearest $\frac{1}{100}$)

c) $0.3145 + 2.3143 = \dots \simeq \dots$ (to the nearest $\frac{1}{1000}$)

d) $5.345 + 3.214 = \dots \simeq \dots$
(to the nearest 2 decimal places)

e) $5.345 + 3.401 = \dots \simeq \dots$
(to the nearest unit)

f) $2.253 + 12.564 = \dots \simeq \dots$
(to the nearest $\frac{1}{100}$)

g) $251.76 + 38\frac{1}{8} = \dots \simeq \dots$
(to the nearest 0.01)

h) $17\frac{3}{4} + 71.0075 = \dots \simeq \dots$
(to the nearest 3 decimal places)

9) Complete:

a) $3.235 \text{ m} \simeq \dots \text{ m}$

b) $250 \text{ hours} \simeq \dots \text{ days}$

c) $58 \text{ days} \simeq \dots \text{ weeks}$

d) $50 \text{ months} \simeq \dots \text{ years}$

2-Comparing fractions

1) Put the suitable sign (<, > or =):

a) $\frac{7}{13}$ $\frac{5}{13}$

d) $\frac{3}{5}$ $\frac{6}{10}$

b) $\frac{3}{7}$ 1

e) $\frac{8}{25}$ $\frac{8}{18}$

c) $\frac{3}{5}$ $\frac{3}{8}$

f) $\frac{3}{8}$ 0.5

2) Arrange ascendingly:

a) $\frac{1}{2}$, $\frac{1}{3}$, $\frac{3}{4}$

The order: , ,

b) $\frac{2}{9}$, $\frac{5}{6}$, 1 , $\frac{1}{3}$

The order: , ,

3) Arrange descendingly:

a) $\frac{7}{9}$, $\frac{2}{3}$, $\frac{5}{6}$

The order: , ,

b) $4\frac{7}{12}$, $4\frac{7}{18}$, $4\frac{7}{9}$

The order: , ,

c) $\frac{1}{4}$, 0.2 , $\frac{1}{2}$, 0.6 , $\frac{3}{4}$

The order: , , , ,

3-Multiplying decimal numbers by 10, 100 and 1000

1) Multiply:

a) $3.54 \times 10 = \dots\dots\dots$

h) $0.000531 \times 1000 = \dots\dots\dots$

b) $8.321 \times 100 = \dots\dots\dots$

i) $532.014 \times 10 = \dots\dots\dots$

c) $0.543 \times 1000 = \dots\dots\dots$

j) $3.0514 \times 100 = \dots\dots\dots$

d) $36.5 \times 10 = \dots\dots\dots$

k) $5.3 \times 100 = \dots\dots\dots$

e) $4.02 \times 10 = \dots\dots\dots$

l) $0.8 \times 1000 = \dots\dots\dots$

f) $8.306 \times 10 = \dots\dots\dots$

m) $3.46 \times 1000 = \dots\dots\dots$

g) $0.46 \times 100 = \dots\dots\dots$

n) $0.471 \times 1000 = \dots\dots\dots$

2) Put the suitable sign (<, > or =):

a) $3.24 \times 10 \dots\dots\dots 32.4 \times 100$

b) $5.321 \times 100 \dots\dots\dots 53.21 \times 10$

c) $8.314 \times 1000 \dots\dots\dots 83.14 \times 10$

d) $0.73 \times 1000 \dots\dots\dots 7.3 \times 10$

e) $42.16 \times 10 \dots\dots\dots 0.04216 \times 1000$

f) $6.63 \times 10 \dots\dots\dots 0.663 \times 100$

3) Complete:

a) $1.5 \text{ km} = \dots\dots\dots \text{ m}$

c) $0.8 \text{ dm}^3 = \dots\dots\dots \text{ cm}^3$

b) $0.04 \text{ m}^2 = \dots\dots\dots \text{ dm}^2$

d) $0.1 \text{ cm} = \dots\dots\dots \text{ mm}$

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4-Multiplying a decimal numbers by an integer**1) Find the product:**

a) $3.14 \times 8 = \dots\dots\dots$

b) $1.25 \times 7 = \dots\dots\dots$

c) $0.36 \times 9 = \dots\dots\dots$

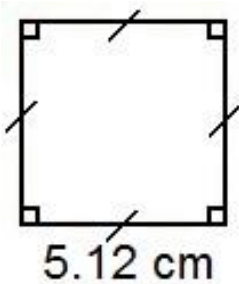
d) $15.25 \times 15 = \dots\dots\dots$

e) $98.35 \times 12 = \dots\dots\dots$

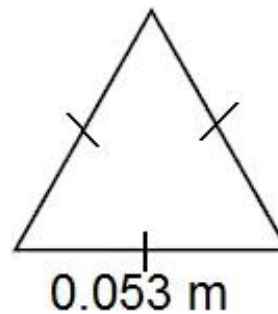
f) $0.07 \times 5 = \dots\dots\dots$

g) $37 \times 0.002 = \dots\dots\dots$

h) $7.2 \times 75 = \dots\dots\dots$

2) Find the perimeter of the following shapes:

P=



P=

5-Multiplying common fractions

Find the product:

a) $\frac{4}{9} \times \frac{5}{6} = \dots\dots\dots$

b) $\frac{3}{8} \times \frac{16}{39} = \dots\dots\dots$

c) $\frac{1}{6} \times \frac{2}{7} \times \frac{7}{9} = \dots\dots\dots$

d) $\frac{5}{6} \times \frac{3}{4} \times \frac{4}{5} = \dots\dots\dots$

e) $\frac{1}{6} \times 4 = \dots\dots\dots$

f) $27 \times \frac{4}{7} = \dots\dots\dots$

g) $1\frac{1}{3} \times 4 = \dots\dots\dots$

h) $1\frac{1}{4} \times 3 = \dots\dots\dots$

i) $5\frac{1}{4} \times 3\frac{1}{3} = \dots\dots\dots$

j) $6\frac{3}{4} \times 2\frac{2}{9} = \dots\dots\dots$

k) $3\frac{1}{2} \times 2\frac{4}{5} = \dots\dots\dots$

l) $\frac{1}{3}$ of $\frac{1}{2} = \dots\dots\dots$

m) $\frac{3}{5}$ of an hour = $\dots\dots\dots$ min.

n) $\frac{3}{4}$ of a pound = $\dots\dots\dots$ Pt.

o) $3\frac{9}{20}$ metres = $\dots\dots\dots$ cm.

p) $2\frac{5}{6}$ day = $\dots\dots\dots$ hours

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6-Multiplying decimal fractions**1) Find the product of each of the following:**

a) 3.2

$\times 4.5$

.....

b) 3.8

$\times 4.6$

.....

c) 9.3

$\times 8.5$

.....

d) 3.57

$\times 8.6$

.....

e) 4.05

$\times 0.9$

.....

f) 5.84

$\times 2.3$

.....**2) Estimate the following product then compare your estimation to the actual result:**

a) $3.1 \times 5.91 = \dots\dots\dots$ Estimated result $\dots\dots\dots$ actual result $\dots\dots\dots$

b) $4.7 \times 5.3 = \dots\dots\dots$ Estimated result $\dots\dots\dots$ actual result $\dots\dots\dots$

c) $6.1 \times 11.8 = \dots\dots\dots$ Estimated result $\dots\dots\dots$ actual result $\dots\dots\dots$

3) Story problems:

a) The monthly salary of an employee is L.E 2562.75.

Find his salary in 7 months.

.....

b) If the price of one meter of cloth is L.E 23.5

Find the price of $4\frac{1}{2}$ meters of it.

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c) Nader bought $3\frac{3}{4}$ kilograms of oranges for L.E 4 each and 2.5 kilograms of banana for L.E 3 each.

Find the money he paid.

.....
.....
.....

4) Find the product:

a) $3.14 \times 8 = \dots\dots\dots$

b) $37 \times 0.002 = \dots\dots\dots$

c) $1.25 \times 0.7 = \dots\dots\dots$

d) $7.2 \times 7.5 = \dots\dots\dots$

e) $0.36 \times 9 = \dots\dots\dots$

f) $12.84 \times 2.6 = \dots\dots\dots$

g) $15.25 \times 0.01 = \dots\dots\dots$

h) $3.78 \times 1.29 = \dots\dots\dots$

i) $98.35 \times 0.12 = \dots\dots\dots$

j) $2.3 \times 0.004 = \dots\dots\dots$

k) $0.07 \times 0.5 = \dots\dots\dots$

l) $4.6 \times 0.08 = \dots\dots\dots$

7-Dividing Fractions**1) Complete :**a) The reciprocal of $\frac{1}{5}$ is

b) The reciprocal of 2 is

c) $\frac{3}{4}$ is The reciprocal ofd) The reciprocal of $1\frac{1}{2}$ is**2) Find the quotient:**

a) $\frac{3}{5} \div \frac{1}{10} = \dots\dots\dots$

b) $\frac{4}{3} \div \frac{2}{9} = \dots\dots\dots$

c) $\frac{3}{2} \div \frac{3}{4} = \dots\dots\dots$

d) $\frac{3}{4} \div 3 = \dots\dots\dots$

e) $8\frac{1}{7} \div 7 = \dots\dots\dots$

f) $4\frac{2}{3} \div \frac{1}{3} = \dots\dots\dots$

g) $16 \div 2\frac{2}{5} = \dots\dots\dots$

h) $\frac{9}{14} \div \frac{6}{35} = \dots\dots\dots$

i) $4\frac{2}{3} \div \frac{7}{8} = \dots\dots\dots$

j) $18 \div 2\frac{1}{4} = \dots\dots\dots$

3) Complete:

a) $7\frac{1}{5} \div \dots = 1\frac{1}{2}$

b) $\dots \div 3\frac{1}{2} = 1$

c) $1\frac{3}{4} \div \dots = \frac{5}{8}$

d) $\dots \div 5\frac{1}{2} = \frac{7}{11}$

e) $\frac{5}{6} \times \dots = \frac{2}{3}$

f) $\frac{3}{4} \times \dots = \frac{7}{8}$

g) $\dots \times \frac{3}{5} = 24$

h) $4\frac{1}{4} \times \dots = 11$

i) $\frac{6}{5} \times \dots = 4$

j) $\frac{3}{8} \times \dots = 1$

k) $2\frac{1}{2} \times \dots = 1$

8-Dividing decimals by 10, 100 and 1000:**1) Find the result of each of the following:**

a) $42.5 \div 10 = \dots\dots\dots$

g) $8 \div 1000 = \dots\dots\dots$

b) $6.3 \div 10 = \dots\dots\dots$

h) $4.1 \div 1000 = \dots\dots\dots$

c) $5 \div 10 = \dots\dots\dots$

i) $0.4 \div 1000 = \dots\dots\dots$

d) $98.1 \div 100 = \dots\dots\dots$

j) $27.6 \div 1000 = \dots\dots\dots$

e) $7.45 \div 100 = \dots\dots\dots$

k) $70.5 \div 1000 = \dots\dots\dots$

f) $20 \div 100 = \dots\dots\dots$

l) $100.1 \div 1000 = \dots\dots\dots$

2) Complete:

a) $105 \text{ pt} = \dots\dots\dots \text{ L.E}$

b) $200 \text{ cm} = \dots\dots\dots \text{ m}$

c) $12.4 \text{ kg} = \dots\dots\dots \text{ ton}$

d) $44.3 \text{ gm} = \dots\dots\dots \text{ kg}$

3) Put the suitable sign (<, > or =):

a) $0.6 \times 100 \dots\dots\dots 605.2 \div 100$

b) $34.6 \div 100 \dots\dots\dots 0.0364 \times 10$

c) $1.78 \div 10 \dots\dots\dots 0.0178 \times 100$

d) $200 \text{ pt} \dots\dots\dots 1.5 \text{ L.E}$

4) Complete: a) $\dots\dots\dots \div 10 = 4.225$ b) $\dots\dots\dots \times 100 = 6.3$

c) $0.5 \times \dots\dots\dots = 50$ d) $1 \div \dots\dots\dots = 0.001$

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(9-10) Finite and Infinite division:**1) Find the quotient of each of the following:**

a) $180 \div 5 = \dots\dots\dots$

b) $5112 \div 9 = \dots\dots\dots$

c) $7740 \div 36 = \dots\dots\dots$

d) $6848 \div 214 = \dots\dots\dots$

e) $13975 \div 215 = \dots\dots\dots$

f) $21125 \div 325 = \dots\dots\dots$

g) $30672 \div 852 = \dots\dots\dots$

h) $36844 \div 152 = \dots\dots\dots \simeq \dots\dots\dots$ (to the nearest hundredth)

i) $24 \div 108 = \dots\dots\dots$

$\simeq \dots\dots\dots$ (to the nearest 1 decimal place)

j) $285 \div 7 = \dots\dots\dots$

$\simeq \dots\dots\dots$ (to the nearest 2 decimal places)

k) $7 \div 9 = \dots\dots\dots$

$\simeq \dots\dots\dots$ (to the nearest tenth)

l) $172.8 \div 2.16 = \dots\dots\dots$

m) $36.18 \div 0.09 = \dots\dots\dots$

n) $1.32 \div 1.1 = \dots\dots\dots$

2) The area of a rectangle is 25.65 cm^2 , and its length is 6.2 cm . find its width then approximate the result to the nearest hundredth of centimeter.

.....

.....

3) The area of a rectangle is 28.6 cm^2 , and its width is 4.4 cm . find its length and perimeter.

.....

.....

4) The side length of a square is 3.05 m . find its area approximating it to the nearest hundredth.

.....

.....

5) The perimeter of a square is $\frac{4}{5} \text{ m}$, Find the length of its side and its area.

.....

.....

6) Find the area of the rectangle if its dimensions are 3.5 cm , 6.5 cm then approximate the result to the nearest tenth

.....

Unit 2: Sets

1-What is a set?

The set: is a collection of well-defined objects and they have a certain property in common.

1) State which of the following is a set and which is not a set:

- a) The digits of the number 5321.
- b) Tall men in Egypt.
- c) The beautiful girls in your school.
- d) The factors of number 8.
- e) Seasons of the year.
- f) Clever people living in your country.
- g) Prime numbers between 5 and 30.
- h) Rainbow colours.

Elements of the sets:

Example:

Write the elements of the set of digits of the number 314.

Solution: The elements are 3, 1 and 4.

2) Write two elements only of each of the following sets:

- a) The months of the Christian year.
- b) The set of even numbers.
- c) Geometric figures.
- d) The whole numbers between 4 and 10.
- e) The factors of 10.
- f) The set of odd numbers.

2- Mathematical expression of a Set

Express a set by listing method and description (words) method.

1) Express each of the following sets by listing method:

- a) A= The set of digits in the number 5432. A=.....
- b) B= The set of letters in the word "Arabic". B=.....
- c) C= The set of days in the week.
- d) D= The set of first 7 prim numbers.
- e) E = The set of digits of the number 8350.
- f) F= The set of multiples of 3 between 3 and 18.

2) Express each of the following sets by in words:

- a) A= { White , Red , Black}
- b) B= { 1 , 2 , 3 , 4}
- c) C= { Summer , Winter , Autumn , Spring }

3) List the elements of each of the following sets:

- a) { $a < 5$ where a is a whole number } A={ }
- b) { $6 < x < 10$ where x is a whole number } X={ }
- c) { $5 < y < 11$ where y is a whole number } Y={ }

Representing sets by Venn diagram

1) Represent each of the following sets by Venn diagram:

a) $X = \{ 5, 7, 8 \}$

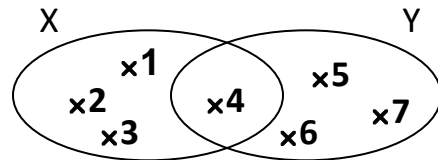
b) $Y =$ The set of whole numbers smaller than 7

c) $Z =$ The set of letters in the word "Happy"

2) List the elements of each of the following:

$X = \{ \quad \quad \quad \}$

$Y = \{ \quad \quad \quad \}$



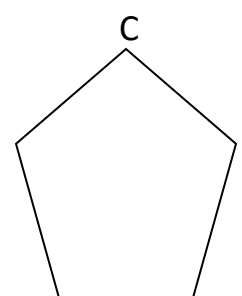
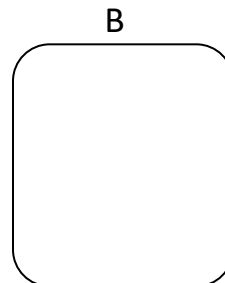
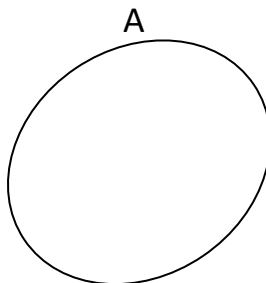
3) Complete the opposite figure to be a Venn diagram

for the two sets A and B:

$A = \{ 5, 6, 7, 8 \}$

$B = \{ 3, 2, 4, 1 \}$

$C = \{ a, b, c, d \}$



3- Belonging of an element to a Set

The symbol \in : means (is an element of) or (Belongs to)

The symbol \notin : means (is not an element of) or (doesn't Belong to)

1) Put the suitable sign \in or \notin :

- a) 3 { 1, 3, 5}
- b) 5 {2, 0}
- c) 21..... {1, 2, 21}
- d) 15 {1, 5}
- e) 7 the set of odd numbers.
- f) 9 the set of prime numbers.
- g) April the set of the days of the week.

2) Complete using a suitable number:

- a) If $3 \in \{1, x, 5\}$ then $x = \dots\dots\dots$
- b) If $4 \in \{2, S+2, 6\}$ then $S = \dots\dots\dots$
- c) If $6 \in \{Y-4, 12\}$ then $Y = \dots\dots\dots$
- d) $\in \{1, 2, 3\}$ and belongs also to the set of even numbers
- e) $\in \{2, 3, 5\}$ and belongs also to the set of the factors of the number 9.

3) If $P =$ all the prime numbers, which of the following statements are true:

- | | |
|-----------------------|-----------------------|
| a) $8 \in P$ (.....) | d) $4 \in P$ (.....) |
| b) $51 \in P$ (.....) | e) $80 \in P$ (.....) |
| c) $50 \in P$ (.....) | f) $17 \in P$ (.....) |

4-Types of sets

- 1) The null set (empty set) : is a set that has no element
and denoted by { } or \emptyset which is read "Fai"
- 2) The finite set : is a set that has a countable (limited) number of elements.
- 3) The infinite set: contains an uncountable (unlimited) number of elements.

1) State which of the following is "empty" or "not empty":

- a) The set of pupils in your school.
 - b) The set of Arabic countries in USA.
 - c) The set of even numbers between 5 and 15.
 - d) The set of odd numbers between 9 and 11
 - e) The set of triangles having 4 sides.
 - f) The set of odd numbers which are divisible by 2.
-

2) State which of the following is "finite" or "infinite":

- a) The set of rivers in your country.
- b) The set of whole numbers greater than 5.
- c) The set of prime numbers.
- d) The set of multiples of the number 2.
- e) The set of whole numbers smaller than 5.
- f) The set of Arabic countries.

5- Equal sets

Equal sets: The sets which contain the same elements exactly.

1) Complete by using the suitable symbol of = or ≠:

- a) $\{ 5 \}$ $\{ 5, 1 \}$
- b) $\{ 51 \}$ $\{ 51 \}$
- c) $\{ 8, 3, 7 \}$ $\{ 7, 8, 3 \}$
- d) $\{ A, B, C \}$ $\{ C, A, B \}$
- e) $\{ Ahmed \}$ $\{ A, h, m, e, d \}$

2) Mark (✓) or (*):

- a) $\{ 3, 5, 7 \} =$ The set of the odd numbers between 1 and 9 (....)
- b) $\{ 0, 1, 5 \} =$ The set of the digits of the number 110512 (....)
- c) The set of letters in the word "line" and the set of letters
in the word " Nile" (....)
- d) The set of digits in the number 345 and the set of digits
in the number 43534 (....)

3) Find the value of x and y in each of the following:

- a) $\{ 3, 7 \} = \{ 7, x \}$
- b) $\{ 5, 3, 2 \} = \{ 3, y, 2 \}$
- c) $\{ 8, 5, 9 \} = \{ x+2, 5, 8 \}$

6- Inclusion and Subsets

The symbol \subset : means (is a subset of) or (is included in)

The symbol $\not\subset$: means (is not a subset of) or (is not included in)

\in, \notin (relation between an element and a set)

$\subset, \not\subset$ (relation between two sets)

1) Put the suitable sign \in, \notin, \subset or $\not\subset$:

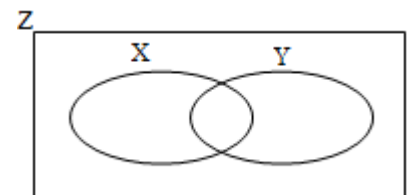
- a) 7 { 5 , 7 , 3 }
- b) 15 { 15 , 13 , 10 }
- c) { 1 , 2 } { 1 , 3 , 5 , 2 }
- d) { 2 , 1 , 3 } { 1 , 2 , 3 , 5 }
- e) \emptyset { 0 , 2 , 3 }
- f) { 3 , 2 } { 32 , 53 }
- g) { 9 } { 3 , 9 , 6 }
- h) { 5 , 2 , 0 } { 5 , 1 , 3 , 2 , 0 }
- i) { 5 } The set of odd numbers.
- j) { 1 , 2 , 7 } The set of Prime numbers.

2) Write all subsets of the following sets:

- a) $A = \{4\}$
- b) $B = \{1, 3, 5\}$
- c) $X = \{6, 8\}$

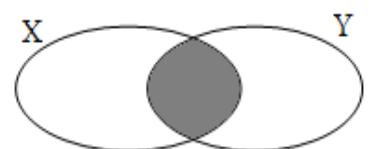
3) Mark (\checkmark) or (\times):

- | | |
|-----------------------------|---------------------------------|
| a) $X \subset Z$ (....) | e) $Z \subset Y$ (....) |
| b) $X \not\subset Y$ (....) | f) $Z \not\subset X$ (....) |
| c) $Y \not\subset Z$ (....) | g) $\emptyset \subset X$ (....) |
| d) $Z \subset Z$ (....) | h) $Z \subset \emptyset$ (....) |



Operations on sets

7- Intersection of two sets



The intersection " \cap ": **$X \cap Y$ = The set of all common elements in the sets X and Y .*****1) Find each of the following:***

a) $\{3, 5, 7\} \cap \{3, 6, 9\} = \dots\dots\dots$

b) $\{3, 10, 9, 5\} \cap \{5, 9, 8, 11\} = \dots\dots\dots$

c) $\{7, 3, 2, 5\} \cap \{3\} = \dots\dots\dots$

d) $\{3, 2, 5, 9, 10\} \cap \{1, 4, 6, 7\} = \dots\dots\dots$

e) $\emptyset \cap \{1, 4, 6, 7\} = \dots\dots\dots$

Properties of intersection:

- $X \cap Y = Y \cap X$ (Commutative Property)
- $X \cap \emptyset = \emptyset \cap X = \emptyset$
- $(X \cap Y) \cap Z = Y \cap (X \cap Z)$ (Associative Property)
- If $X \subset Y$ then $X \cap Y = X$
- If $X = Y$ then $X \cap Y = X = Y$

8- Union of two sets

The union " \cup ": **$X \cup Y$ = The set of all elements which belong to X or Y****2) Find each of the following:**

a) $\{3, 5, 7\} \cup \{3, 6, 9\} = \dots\dots\dots$

b) $\{2, 5, 8\} \cup \{1, 2, 9, 6\} = \dots\dots\dots$

c) $\{5, 1, 8, 9\} \cup \{2, 1, 3, 0, 15\} = \dots\dots\dots$

d) $\{53, 21\} \cup \{2, 3, 5, 1\} = \dots\dots\dots$

f) $\{1, 3, 0\} \cup \emptyset = \dots\dots\dots$

3) If $X = \{1, 2, 3\}$, $Y = \{2, 0, 4\}$ find :

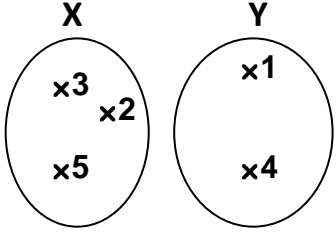
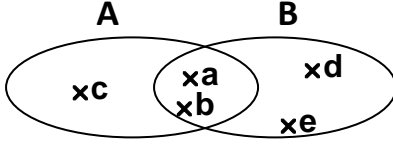
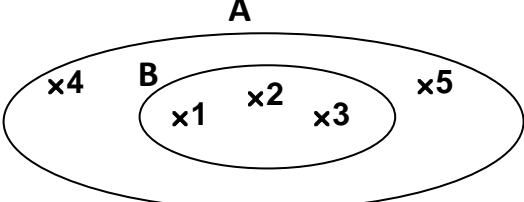
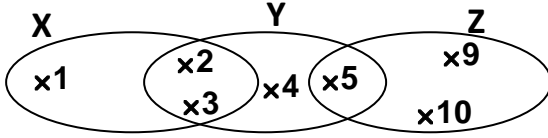
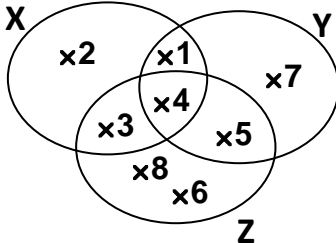
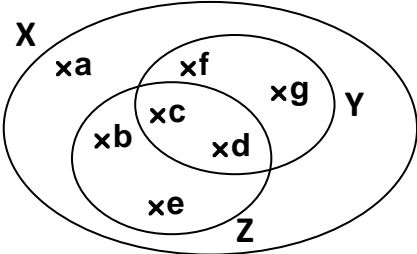
a) $X \cup Y = \dots\dots\dots$

b) $X \cap Y = \dots\dots\dots$

Properties of union:

- $X \cup Y = Y \cup X$ (Commutative Property)
- $X \cup \emptyset = \emptyset \cup X = X$
- $(X \cup Y) \cup Z = Y \cup (X \cup Z)$ (Associative Property)
- If $X \subset Y$ then $X \cup Y = Y$
- If $X = Y$ then $X \cup Y = X = Y$

4) Complete:

<p>a) $X \cap Y = \dots\dots\dots$</p> <p>$X \cup Y = \dots\dots\dots$</p> 	<p>b) $A \cap B = \dots\dots\dots$</p> <p>$A \cup B = \dots\dots\dots$</p> 
<p>c) $A \cap B = \dots\dots\dots$</p> <p>$A \cup B = \dots\dots\dots$</p> 	<p>d) $X \cap Y \cap Z = \dots\dots\dots$</p> <p>$X \cup Y \cup Z = \dots\dots\dots$</p> 
<p>e) $X \cap Y \cap Z = \dots\dots\dots$</p> <p>$X \cup Y \cup Z = \dots\dots\dots$</p> 	<p>f) $X \cap Y \cap Z = \dots\dots\dots$</p> <p>$X \cup Y \cup Z = \dots\dots\dots$</p> 

5) Complete using sign \in , \notin , \subset or $\not\subset$:

- | | |
|---|--------------------------|
| a) If $A = \{1, 3, 5, 7\} \cap \{2, 3, 5\}$ | then 3 A |
| b) If $B = \{2, 5, 6\} \cup \{5\}$ | then $\{5, 6\}$ B |
| c) If $Z = \{5, 10, 15\} \cap \{1, 2, 3\}$ | then $\{5, 10\}$ Z |
| d) If $X = \{c, f, g\} \cup \{a, b, c, d\}$ | then e X |

9- The universal set "U"

The universal set "U":

It is the mother set which includes all the given subsets.

1) Write a suitable universal set for the following subsets:

a) $A = \{ \text{April, May, June} \}$

$B = \{ \text{January, April, September} \}$

$U = \dots\dots\dots$

b) $X = \{ 2, 4, 6 \}$

$Y = \{ 6, 8, 10, 12 \}$

$U = \dots\dots\dots$

c) $C = \{ \text{Asia, Africa, Australia} \}$

$U = \dots\dots\dots$

d) $X = \{ \text{Sunday, Monday} \}$

$Y = \{ \text{Friday, Sunday} \}$

$U = \dots\dots\dots$

e) $E = \{ \text{Winter, Autumn} \}$

$F = \{ \text{Summer} \}$

$U = \dots\dots\dots$

f) $Y = \{ 1, 2, 3 \}$

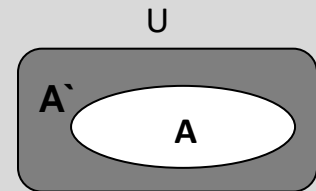
$Z = \{ 2, 6 \}$

$U = \dots\dots\dots$

10- The complement of a set

The complement of the set A:

A^c (All elements in the universal set U that are not in A)



Notes:

- $(A^c)^c = A$
- $A \cup A^c = U$
- $A \cap A^c = \emptyset$

Ex.: If $U = \{ 1, 5, 7, 8, 10, 12, 15 \}$ and $A = \{ 1, 5, 7 \}$

Then $A^c = \{ 8, 10, 12, 15 \}$

1) From the figure opposite if U is the universal set complete:

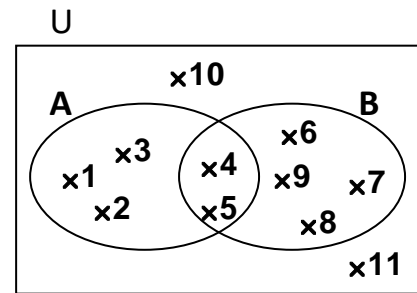
$A^c =$

$B^c =$

$A^c \cup B^c =$

$A \cap B =$

$(A \cap B)^c =$



2) Complete:

a) $(A^c)^c =$

b) If $U = \{1, 2, 3, 4, 5, 6\}$, $X = \{1, 2, 3\}$ then $X^c =$

c) $X \cap X^c =$

d) $X \cup X^c =$

11- The difference of two sets

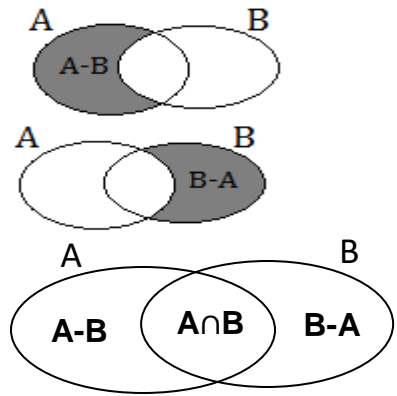
The difference:

- $A-B$ (All elements in A but not in B)
- $B-A$ (All elements in B but not in A)

Notes:

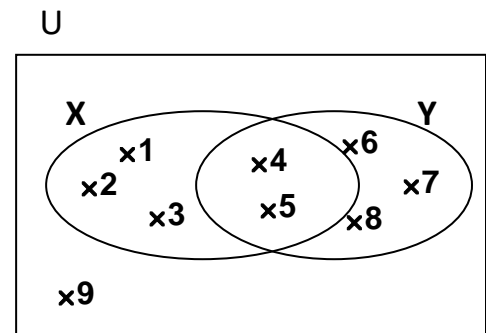
- $A-B \neq B-A$
- $A-A = \emptyset$
- $A-\emptyset = A$
- $\emptyset - A = \emptyset$
- $U-A = A'$

Ex.: If $A = \{3, 4, 5, 6, 7\}$ and $B = \{3, 5, 2, 8\}$
 Then $A-B = \{4, 6, 7\}$
 $B-A = \{2, 8\}$



1) Complete using the opposite Venn diagram:

- a) $X = \dots\dots\dots$
- b) $Y = \dots\dots\dots$
- c) $X \cup Y = \dots\dots\dots$
- d) $X \cap Y = \dots\dots\dots$
- e) $X - Y = \dots\dots\dots$
- f) $Y - X = \dots\dots\dots$
- g) $Y' = \dots\dots\dots$
- h) $X' = \dots\dots\dots$



2) Complete:

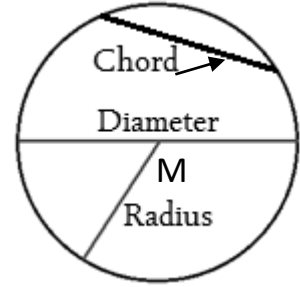
- a) If $X-Y = \{1\}$, $Y-X = \{3\}$ and $X \cap Y = \{2, 4\}$ then $X \cup Y = \{\dots\dots\dots\}$
- b) $X-X = \dots\dots\dots$
- c) $U-X = \dots\dots\dots$
- d) $X-\emptyset = \dots\dots\dots$

Unit 3:

The circle

The circle: is a closed curve, all the points on it having the same distance from the centre.

(It is drawn by the compasses and named by its centre)



The radius "r": is the line segment that joins any point on the circle and the centre of the circle.

The chord: is the line segment that joins any two points on the circle.

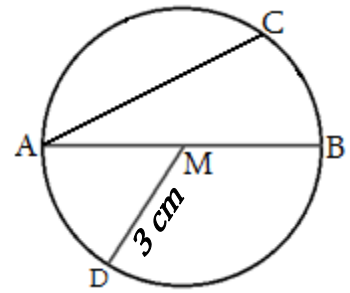
The diameter "d": is the line segment that passes through the centre of the circle and joining two points on the circle.

Notes:

- The diameter = twice the radius $d = 2 \times r = 2r$
- The radius = half the diameter $r = d \div 2$
- The diameter is a chord passing through the centre of the circle.
- The diameter is the longest chord in the circle.
- The circle has infinite number of diameters.
- All the radii of a circle are equal in length.
- All the diameters of a circle are equal in length.

1) **In the opposite figure:**

- a) \overline{AB} is a of the circle
- b) \overline{AC} is a of the circle
- c) M is a of the circle
- d) \overline{MD} is a of the circle
- e) $AB = \dots\dots\dots$ cm
- f) $MD = \frac{1}{2} \dots\dots\dots$
- g) The longest chord in the circle is

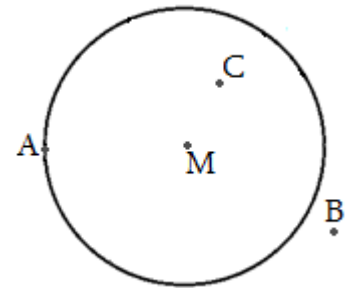


2) In the opposite figure:

There is a circle M of a radius r

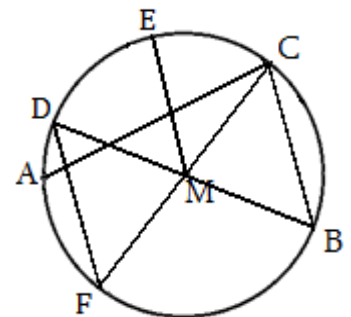
Complete using “on, inside or outside”, “> , < or =”:

- a) Point A is located the circle M and $MA \dots\dots\dots r$
- b) Point B is located the circle M and $MB \dots\dots\dots r$
- c) Point C is located the circle M and $MC \dots\dots\dots r$



3) In the opposite figure:

- a) The radii of the circle are,,,,
- b) The diameters of the circle are,
- c) The chords of the circle are,,,,



4) Draw:

- a) A circle M with radius 3 cm.
- b) A circle X with diameter 8 cm.
- c) A circle A with radius 4.5 cm.
- d) A line segment with the length 5 cm, Use it as a radius to construct a circle.
- e) The circle of centre M with radius 5 cm, Draw the diameter \overline{AB} then draw the chord \overline{BC} with length 6 cm, then draw \overline{AC} , What is the type of the triangle ABC according to the measure of its angles?

5) ***Complete:***

- a) All radii of the circle are
- b) Any chord passes through the centre of the circle is called
- c) The length of the radius in the circle= the length of its diameter.
- d) If the length of the radius of a circle is 4 cm then the length of the longest chord is cm.
- e) If M is a circle whose radius is 4 cm where $MA = 3$ cm then the point A is located the circle.
- f) If M is a circle whose diameter is 4 cm where $MX = 3$ cm then the point X is located the circle
- g) If M is a circle whose radius is 5 cm where $MB = 5$ cm then the point B is located the circle.
- h) The midpoint of any diameter is

2-Drawing a triangle given the lengths of its three sides

- 1) Draw the triangle ABC with $AB=5$ cm, $BC=4$ cm and $CA=3$ cm
- 2) Draw the triangle XYZ in which $XY=8$ cm, $YZ=5$ cm and $XZ=6$ cm, Find the type of this triangle according to the measure of its angles.
- 3) Draw the triangle ABC in which $m(\angle A)=50^\circ$, $m(\angle B)=70^\circ$ and $AB=6$ cm
- 4)
- 5) Draw a circle whose diameter is 8 cm long and its centre is A, \overline{XY} is a diameter of this circle. Draw the triangle XYZ where $XY=YZ=ZC=8$ cm.

3- Drawing the altitudes of the triangle

- 1) Draw the triangle ABC in which $AB=4$ cm, $BC=5$ cm and $CA=3$ cm. Draw the altitudes of this triangle then measure their length.
- 2) Draw ΔABC in which $AB=8$ cm, $BC=9$ cm and $CA=5.5$ cm, Draw the altitudes of this triangle then measure their length.
- 3) Draw the line segment \overline{BC} , where $BC=6$ cm, D is the midpoint of \overline{BC} , Draw \overline{DA} perpendicular to \overline{BC} where $DA=7$ cm, Measure the length of each of \overline{AB} and \overline{AC} .
- 4) Draw ΔXYZ in which $XZ=ZY=XY=6$ cm, Draw the altitudes of this Δ then measure the length of altitudes of the triangle.
- 5) **Complete:**

- a) In the acute triangle the three altitudes intersect at one point the triangle.
- b) Any triangle has altitudes.
- c) The altitudes of the -angled triangle intersect at one point outside the triangle.
- d) The altitudes of the right -angled triangle intersect at the vertex of the angle.

1) Complete:

- a) The probability of the impossible event is
- b) The probability of the certain event is
- c) A basket contains cards numbered from 1 to 20. If a card was drawn randomly, then the probability that the number written on the card is divisible by 5 is
- d) The probability of choosing the letter "d" from the letters of the word "Duck" is
- e) The probability of an event is always or or a number between and
-

2) A bag contains 5 white balls, 7 black balls and 3 red balls. All of which are of equal size. When a ball is drawn randomly from the box,

Find the probability of:

- a) Black ball b) Yellow ball c) White ball or red ball
-

3) A box contains 20 cards numbered from 1 to 20. A card is drawn randomly

Calculate the probability of:

- a) The drawn card carries a prime number between 4 and 15.
- b) The drawn card carries a number divisible by 7.
-

4) A fair die was thrown once, the probability of appearing:

- An odd number greater than 2
 - A number greater than 6.
 - An even prime number.
 - A number divisible by 2.
-

Test 1

1) Choose the correct answer:

- a) $3.75 \times 1000 = \dots\dots\dots$ (375 - 0.375 - 3.75 - 3750)
- b) $\{4\} \dots\dots\dots \{3, 5, 7\}$ (\in - \notin - \subset - $\not\subset$)
- c) The length of the radius in the circle = $\dots\dots\dots$ the length of its diameter
($\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{5}$, $\frac{1}{2}$)
- d) Any triangle has $\dots\dots\dots$ altitudes. (1, 2, 3, 4)
- e) The number $325.271 \simeq 325.3$ to the nearest $\dots\dots\dots$
(tens - tenth - hundredth - hundred)
- f) $6.76 \div 0.26 = 676 \div \dots\dots\dots$ (2.6 - 0.26 - 26 - 260)
- g) Any line segment which joins two points on the circle is called a
 $\dots\dots\dots$ (chord , radius, diameter)

2) Complete:

- a) The probability of the certain event is $\dots\dots\dots$
- b) Prime numbers $\cap \{6, 7, 8, 9, 10, 11\} = \dots\dots\dots$
- c) If $\{1,3\} \cap \{x+1, 4\} = \{3\}$, then $x = \dots\dots\dots$
- d) $1.27 \times 2.5 = 12.7 \times \dots\dots\dots$
- e) The longest chord in a circle is called $\dots\dots\dots$

3) a) Draw a circle M whose diameter is 5 cm, then draw its diameter \overline{AB} , then draw the chord \overline{BC} with length 3 cm, then draw \overline{AC} and draw $\overline{CD} \perp \overline{AB}$, find the length of \overline{AC} , \overline{CD} .

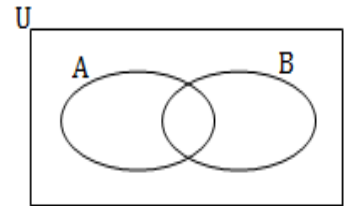
b) Find the area of the rectangle of 10.5 cm length and 6.2 cm width.

4) a) Arrange in a descending order: $2\frac{1}{2}$, $2\frac{5}{8}$, $2\frac{3}{4}$ and $2\frac{5}{16}$

b) The product of two numbers is 598 if one of them is 23 then what is the other number?

5) a) Represent each of the following sets by Venn diagram:

$$U = \{1, 2, 3, 4, 5, 6, 7\}, A = \{2, 4, 7\}, B = \{1, 3, 7\}$$



Then Use the Venn diagram to list the following sets:

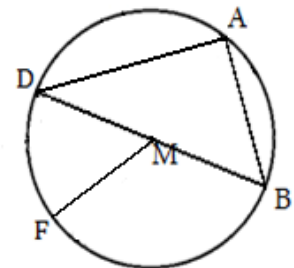
- 1) $A \cap B$ 2) $A \cup B$ 3) A^c, B^c 4) $A - B$

b) A box contains 30 cards numbered from 1 to 30 if a card is drawn randomly calculate the probability that the drawn card carries :

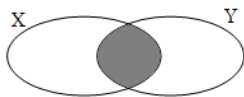
- An even number.
- A number divisible by 6.
- A number divisible by 3 or 5.
- An even prime number.
- A number less than 9.

6) a) **In the opposite figure:**

- a) The radii of the circle are,,
- b) The longest chord in the circle is
- c) The chords of the circle are,,



b) Write what is represented by shaded part in each diagram.



.....



.....



.....

Test 2

1) Choose the correct answer:

- a) The probability of the impossible event is ($\frac{1}{4}, 0, 1, \frac{1}{2}$)
- b) If the length of the radius of a circle is 2 cm then the length of the longest chord is cm (6, 2, 3, 4)
- c) $663.9 \div 1000 = \dots\dots\dots$ (66.39 - 6.639 - 0.6639 - 6639)
- d) $3 \dots\dots\dots \{3, 6, 9\}$ ($\in - \notin - \subset - \not\subset$)
- e) The altitudes of the -angled triangle intersect at one point outside the triangle. (right, acute, obtuse)
- f) If a fair die is thrown once, then the probability of appearing a number smaller than 7 is ($\frac{1}{3}, 0, 1, \frac{5}{6}$)
- g) 57 days \simeq weeks (6, 2, 8, 4)

2) Complete:

- a) A metallic coin was thrown once, the probability of appearing a head is
- b) The set of all factors of the number $4 \cap \{1, 3, 5\} = \dots\dots\dots$
- c) If $\{5, 10\} = \{y-2, 5\}$, then $y = \dots\dots\dots$
- d) $2 \frac{2}{5} \div 1 \frac{1}{10} = \dots\dots\dots$
- e) The number $639.8365 \simeq 639.837$ to the nearest
- f) The altitudes of the right -angled triangle intersect at

- 3) a) Draw the equilateral triangle ABC whose side length = 4 cm, then draw $\overline{AD} \perp \overline{BC}$ then find the perimeter of ΔABC .

b) Find the area of the rectangle if its dimensions are 3.5 cm , 6.5 cm then approximate the result to the nearest tenth.

4) a) Write all subsets of the set $Y = \{ 1, 2 \}$

b) If the price of one meter of cloth is 6.25 pounds find the price of 2.5 meter?

5) a) If $X = \{ 1, 2, 3, 4, 5 \} \cap \{ 2, 4, 6 \}$, Complete using (\in - \notin - \subset - $\not\subset$):

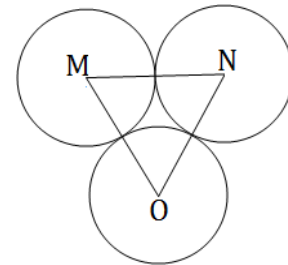
- | | | | |
|-------------------|---|----------------------|---|
| • $\{ 6 \}$ | X | • 5 | X |
| • 2 | X | • $\{ 2, 4 \}$ | X |

b) A fair die was thrown once, the probability of appearing :

- | | |
|-------------------------|----------------------------|
| • An odd number | • A number greater than 5. |
| • An even prime number. | • A number divisible by 3. |

6)a) In the opposite figure:

Three circles of centers M, N and O of radius length 5 cm for each, Find the perimeter of the triangle MNO.



b) Write what is represented by shaded part in each diagram:

