KIGALI CITY
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ES KANOMBE KANOMBE/EFOTEC

MODEL QUETIONs OF MATHEMATICS S1 ALL

1.With using example define a set

2.List down the set G of vowels in the word " **algebra"**

3. A set C has 5 elements .How many subsets does it have

4. Given set B= ,,, and D = 1,, 2,, 3 list all the subsets of set B and set D

5. Given sets J = {1, 2, 3, 4}, K = {2, 3,5, 7}, L = {1, 2, 5, 8}, M ={3, 4, 5, 8} and N = {9, 10}, Find:

(a) J ∩ L (b) J ∩ K

(c) K ∩ L (d) M ∩ N

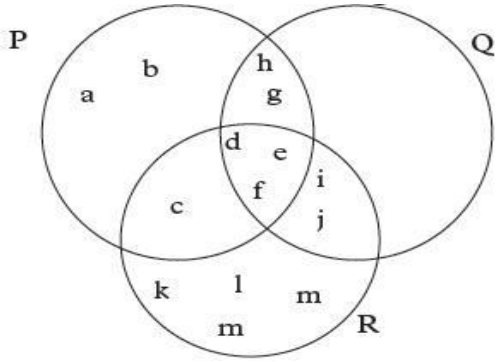
(e) J ∩ K ∩ L (f) K ∩ L ∩ M

6. Given sets A = {2, 4, 6, 8, 10, 12}, B = {3, 6, 9, 12, 15} and C = {9, 10, 11, 12, 13, 14, 15, 16, 17}, draw Venn diagrams to represent the following sets:

(a) A ∩ B (b) A ∩ C

(c) B ∩ C (d) A ∩ B ∩ C

7. Look at the Venn diagram below.

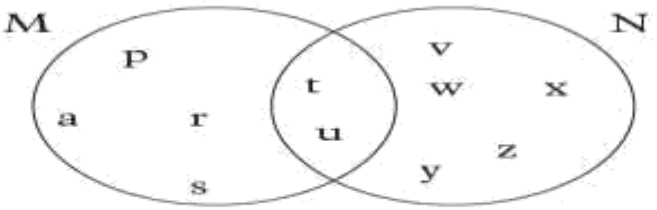


Write down the elements in:

(a) P ∩ Q (b)R ∩ Q

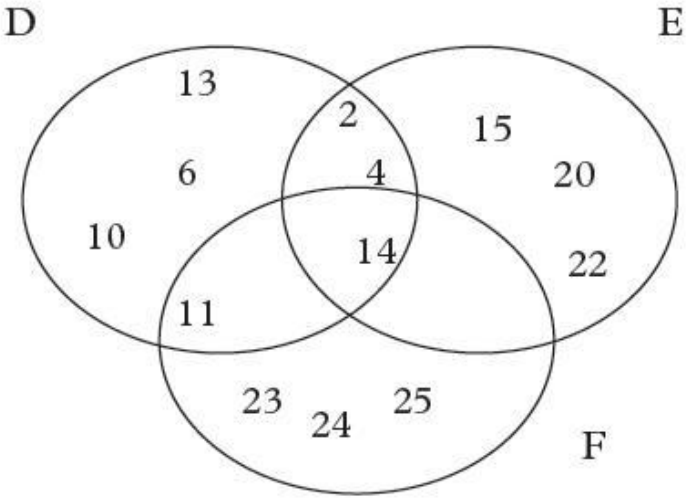
8. Set A = {a, b, c, d, e, f, i, j} and set B = {a, e, i}. Draw a Venn diagram.

Consider the Venn diagram below.



List the elements of set M and N.
What are the elements of $M \cap N$.

Consider the Venn diagram below.



(a) List the elements of sets D, E and F.
(b) List the elements of:
(i) $D \cap E$ (ii) $D \cap F$ (iii) $E \cap F$ (iv) $D \cap E \cap F$

9.Find the cartesian products of the following sets:

(a) Set A(a, b), Set B(2, 3)

(b) Set C(m, n), Set F (5, 6, 7)

(c) Set D(p, q r), Set E(1, 2, 3)

10. Write in set notation the relation between the following pair of sets Set A ={2,3,4}, Set B{4,6,8}

11.Given the domain={0, 1, 2, 3, 4, 5}, list the elements of the range and draw the graph to represent the given relation in each case.

(a) Multiply by 3.

(b) Multiply by 2 and add 1.

(c) Multiply by 3 and subtract 2.

12. Draw a graph for the relation $x \rightarrow 4x$ for the domain $\{0, 1, 2, 3, 4\}$.

13. Given the domain $\{x : -3 \leq x \leq 3\}$, use the relation "square " to list the element of the domain and the range. Map the relations.

14. If P= {1, 2 ,3, 4, 5, 6, 7, 8, 9, 10}, write down the ordered pair to illustrate each of the relation Q on set P.

(a) Q: $x \rightarrow x^2$

(b) Q: $x \rightarrow x + 5$

(c) Q : $x \rightarrow x - 3$

15. Find the inverse of the following functions

1. $f(x) = x - 6$ 2. $f(x) = x + 2$
3. $g(x) = 2x + 3$ 4. $g(x) = 3x - 1$
5. $f(x) = x^2 + 2$ 6. $f(x) = 3x^2 - 1$
7. $h(x) = 2x$ 8. $h(x) = 4 - 9x^2$
9. $h(x) = 12x$ 10. $f(x) = 13x^2 - 1$
11. $g(x) = x$ 12. $g(x) = 1x$

17. Given the function f(x) = 4x and g(x) = x – 2, find:

(a) gf(x) (b) fg(x)

18. Given that f(x) = 3x – 1 and g(x) = 2x + 5, find:

(a) fg(x) (b) gf(x)

19. If g(x) = xz and f(x) = 3x,
find: (a) gf(x) (b) fg(x)

20. Given the following functions, find fg(x):

(a) f(x) = 2x, g(x) = x + 3

(b) f(x) = 2x + 1, g(x) = x – 3

(c) f(x) = x – 1, g(x) = $2x^2$ – 3

(d) f(x) = x^2 – 1, g(x) = x + 1

21. Given that f(x) = 3x + 4 and g(x) = x – 1, find:

(a) fg(x) (b) gf(x)

(c) gf(2)

22. If f(x) = x^2 + 1 and g(x) = 2x, find:

(a) fg(x) (b) gf(x)

(c) gf(2) (d) fg(2)

23. If f(x) = 3x and g(x) = x^2 + 3, find the value of *x* for which, gf(x) = fg(x).

24. If f(x) = 2x + 3 and g(x) = 3x, find fg(x).

25. The function f(x) = 2x – 1 and g(x) = x + 5, find fg(x).

26. Given that f(x) = 3x + 1, g(x) = 2x – 5 and h(x) = x^2 – 4, find:

(a) fgh(x) (b) hgf(x)

27. If f(x) = 3x + 1, find f^2 (x).

28. The function f(x) = 2x – 5, find f^2(x).

29. Given that ε = {-4 to +22}, show on a Venn diagram the subsets P, E and D. Given that P = {prime numbers}

E = {even numbers}

D = {odd numbers}

30. Given ε = {-6 to +28} and

Sets E = {even numbers}, D = {odd numbers} and N = {natural numbers P = {prime numbers}

show in a Venn diagram

(a) subsets E, D and N

(b) subsets P, D and N.

31.Work out the following fractions

(a) $\frac{1}{4} + \frac{1}{3}$ (b) $\frac{2}{5} + \frac{1}{5}$

(c) $\frac{3}{5} + \frac{2}{3} + \frac{4}{9}$ (d) $1\frac{1}{3} + 3\frac{1}{2}$

(e) $2\frac{4}{5} + 1\frac{6}{7}$

32. Work out the following fractions

(a) $(2\frac{1}{2} \div 1\frac{1}{2}) + \frac{2}{3}$

(b) $2\frac{1}{2} + (\frac{3}{4} \times 1\frac{1}{4}) - 1\frac{1}{8}$

(c) $(2\frac{1}{2} \div 7\frac{1}{2}) + \frac{1}{4})$

(d) $2\frac{1}{2} \div \frac{4\frac{1}{3} - 2\frac{1}{2}}{4\frac{1}{6}}$

(e) $\frac{3\frac{1}{2} - 1\frac{5}{6} \times \frac{3}{11}}{1\frac{3}{4} + 7\frac{2}{3} \div 3\frac{5}{6}}$

33.Express the following fractions into decimals

(a) $\frac{3}{8}$ (b) $\frac{8}{9}$ (c) $\frac{1}{7}$

(d) $\frac{4}{9}$ (e) $\frac{7}{12}$ (f) $\frac{10}{7}$

(g) $\frac{5}{4}$ (h) $\frac{13}{10}$

34.Convert the following decimals to fractions.

(a) 0.2 (b) 0.62 (c) 0.012

(d) 0.001 (e) 1.4 (f) 1.2

35.Convert the following recurring decimals to fractions.

(a) $0.\dot{5}$ (b) $0.7\dot{2}$ (c) $0.1\dot{3}$

(d) $0.\dot{7}1\dot{7}$ (e) $0.1\dot{2}$ (f) $0.48\dot{6}$

(g) $0.3038\dot{}$ (h) $1.1\dot{3}$

36.Write down a set of all prime numbers less than 30.

37.Use the following number lines to determine the results.

(a)

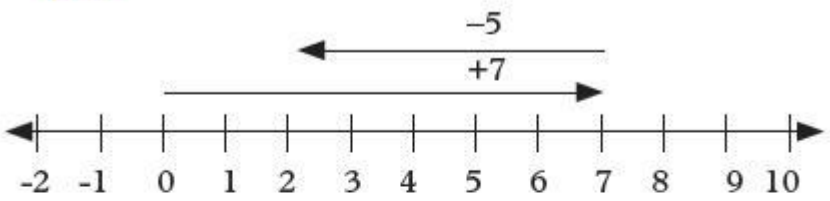


Fig. 2.28

(b)

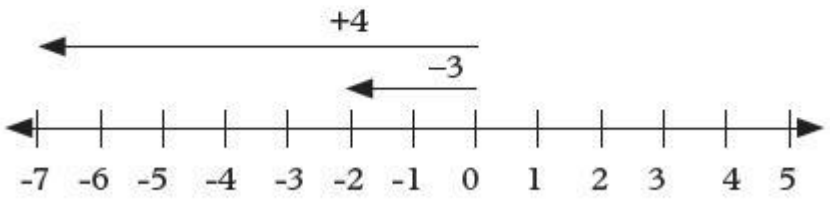


Fig. 2.29

38.Find the values of;

(a) $\{9 + (-2) \times (-15)\} \times (-2 + 7) \div 3$

(b) $\dfrac{-6 + (-5) + 8 \times -2}{-4 + (-2)}$

(c) $-3 \times 23 + (-5) \times (-1) - 8 \times (-4)$

(d) $\dfrac{9 \times -2}{-4 - (-2)}$