Cambridge INTERNATIONAL SCHOOL
A LWES MANAGED SCHOOL
PALAHI ROAD, PHAGWARA

CAMBRIDGE International Examinations
Cambridge International School

HOLIDAYS HOMEWORK

CLASS-XI

SUBJECT-MATHS

TOPIC-SETS

TOPIC-RELATIONS AND FUNCTION

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK)

1. Find a and b if $(a - 1, b + 5) = (2, 3)$

   If A = {1,3,5}, B = {2,3} find : (Question-2, 3)

2. $A \times B$

3. $B \times A$

   Let A = {1,2}, B = {2,3,4}, C = {4,5}, find (Question- 4,5)

4. $A \times (B \cap C)$

5. $A \times (B \cup C)$

6. If P = {1,3}, Q = {2,3,5}, find the number of relations from A to B

7. If A = {1,2,3,5} and B = {4,6,9},

   $R = \{(x, y) : |x - y| \text{ is odd}, x \in A, y \in B\}$

   Write R in roster form

   Which of the following relations are functions. Give reason. (Questions 8 to 10)

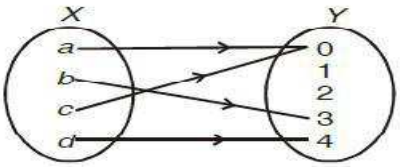
8. R = { (1,1), (2,2), (3,3), (4,4), (4,5)}

9. R = { (2,1), (2,2), (2,3), (2,4)}

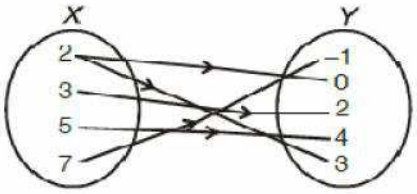
10. R = { (1,2), (2,5), (3,8), (4,10), (5,12), (6,12)}

Which of the following arrow diagrams represent a function? Why? (Question- 11,12)

11.



12.



Let f and g be two real valued functions, defined by, $f(x) = x^2$, $g(x) = 3x + 2$, find : (Question 13 to 16)

13. $(f + g)(-2)$

14. $(f - g)(1)$

15. $(fg)(-1)$

16. $\left(\frac{f}{g}\right)(0)$

17. If $f(x) = x^3$, find the value of,

$$\frac{f(5) - f(1)}{5 - 1}$$

18. Find the domain of the real function,

$$f(x) = \sqrt{x^2 - 4}$$

19. Find the domain of the function, $f(x) = \frac{x^2 + 2x + 3}{x^2 - 5x + 6}$

Find the range of the following functions, (Question- 20,21)

20. $f(x) = \frac{1}{1 - x^2}$

21. $f(x) = x^2 + 2$

22. Find the domain of the relation,

$R = \{(x, y) : x, y \in Z, xy = 4\}$

Find the range of the following relations : (Question 23, 24)

23. $R = \{(a,b) : a, b \in N \text{ and } 2a + b = 10\}$

24. $R = \left\{\left(x, \frac{1}{x}\right) : x \in Z, 0 < x < 6\right\}$

SHORT ANSWER TYPE QUESTIONS (4 MARKS)

25. Let $A = \{1,2,3,4\}$, $B = \{1,4,9,16,25\}$ and R be a relation defined from A to B as,

$$R = \{(x, y) : x \in A, y \in B \text{ and } y = x^2\}$$

(a) Depict this relation using arrow diagram.

(b) Find domain of R.

(c) Find range of R.

(d) Write co-domain of R.

26. Let $R = \{(x, y) : x, y \in N \text{ and } y = 2x\}$ be a relation on N. Find :

(i) Domain

(ii) Codomain

(iii) Range

Is this relation a function from N to N?

27. Let $f(x) = \begin{cases} x^2, \text{ when } 0 \le x \le 2. \\ 2x, \text{ when } 2 \le x \le 5 \end{cases}$

$$g(x) = \begin{cases} x^2, \text{ when } 0 \le x \le 3. \\ 2x, \text{ when } 3 \le x \le 5 \end{cases}$$

Show that f is a function while g is not a function.

28. Find the domain and range of,

$$f(x) = |2x - 3| - 3$$

TOPIC-TRIGONOMETRY

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK)

1. Find the radian measure corresponding to 5° 37' 30"
2. Find the degree measure corresponding to $\left(\frac{11}{16}\right)^c$
3. Find the length of an arc of a circle of radius 5 cm subtending a central angle measuring 15°
4. Find the value of $\tan\frac{19\pi}{3}$
5. Find the value of $\sin(-1125°)$
6. Find the value of $\tan 15°$
7. If $\sin A = \frac{3}{5}$ and $\frac{\pi}{2} < A < \pi$, find $\cos A$
8. If $\tan A = \frac{a}{a+1}$ and $\tan B = \frac{1}{2a+1}$ then find the value of $A + B$.
9. Express $\sin 12\theta + \sin 4\theta$ as the product of sines and cosines.
10. Express $2\cos 4x \sin 2x$ as an algebraic sum of sines or cosines.

11. Write the range of $\cos\theta$

12. What is domain of $\sec\theta$?

13. Find the principal solutions of $\cot x = -\sqrt{3}$

14. Write the general solution of $\cos\theta = 0$

15. If $\sin x = \frac{\sqrt{5}}{3}$ and $0 < x < \frac{\pi}{2}$ find the value of $\cos 2x$

16. If $\cos x = \frac{-1}{3}$ and x lies in quadrant III, find the value of $\sin\frac{x}{2}$

SHORT ANSWER TYPE QUESTIONS (4 MARKS)

17. A horse is tied to a post by a rope. If the horse moves along a circular path, always keeping the rope tight and describes 88 metres when it traces 72° at the centre, find the length of the rope.

18. It the angles of a triangle are in the ratio 3:4:5, find the smallest angle in degrees and the greatest angle in radians.

19. If $\sin x = \frac{12}{13}$ and x lies in the second quadrant, show that $\sec x + \tan x = -5$

20. If $\cot \alpha = \frac{1}{2}$, $\sec \beta = \frac{-5}{3}$ where $\pi < \alpha < \frac{3\pi}{2}$ and $\frac{\pi}{2} < \beta < \pi$, find the value of $\tan(\alpha + \beta)$

Prove the following Identities

21. $\frac{\tan 5\theta + \tan 3\theta}{\tan 5\theta - \tan 3\theta} = 4 \cos 2\theta \cos 4\theta$

22. $\frac{\cos x + \sin x}{\cos x - \sin x} - \frac{\cos x - \sin x}{\cos x + \sin x} = 2 \tan 2x$

23. $\frac{\cos 4x \sin 3x - \cos 2x \sin x}{\sin 4x \sin x + \cos 6x \cos x} = \tan 2x$

24. $\frac{1 + \sin\theta - \cos\theta}{1 + \sin\theta + \cos\theta} = \tan\frac{\theta}{2}$

25. $\tan\alpha . \tan(60° - \alpha) . \tan(60° + \alpha) = \tan 3\alpha$

26. Show that $\cos 20° \cos 40° \cos 80° = \frac{1}{8}$

27. Show that $\sqrt{2 + \sqrt{2 + 2\cos 4\theta}} = 2\cos\theta$

28. Pr ove that $\frac{\cos x}{1 - \sin x} = \tan\left(\frac{\pi}{4} + \frac{x}{2}\right)$

29. Draw the graph of cosx in $[0, 2\pi]$

Find the general solution of the following equations (Q.No. 30 to Q. No. 33)

30. $\cos\left(x + \frac{\pi}{10}\right) = 0$

31. $\sin 7x = \sin 3x$

32. $\sqrt{3}\cos x - \sin x = 1$

33. $3 \tan x + \cot x = 5 \operatorname{cosec} x$

34. In any triangle ABC, prove that

$$a(\sin B - \sin C) + b(\sin C - \sin A) + c(\sin A - \sin B) = 0$$