Ultimate KCET Crash Course 2026

Maths

DPP: 02

Domain and Range

Q1 The domain of the real valued function defined by $f(x)=\sqrt{x^2-1}+\sqrt{x^2+1}$ is
(A) 1 < x < ∞
(B) -∞ < x < ∞
(C) -∞ < x < -1
(D) (-∞,∞) - (-1,1)

Q2 Domain of the function $\frac{1}{\sqrt{x^2-1}}$ is.
(A) (-∞, -1) ∪ (1, ∞)

(B) (-∞, -1] ∪ (1, ∞)

(C) (-∞, -1] ∪ [1, ∞)

(D) none of these

Q3 The domain of the real valued function, $f(x)=\sqrt{5-4x-x^2}+x^2\log(x+4)$ is
(A) (-5, 1)
(B) (-4, 1)
(C) (-4, 1]
(D) ϕ

Q4 The domain of the function f(x) = $\log_2(\log_3(\log_4 x))$ is
(A) $(-\infty,\ 4)$
(B) $(4,\ \infty)$
(C) (0, 4)
(D) $(1,\ \infty)$

Q5 The domain of the function $f(x)=\frac{x}{1+|x|}$ is
(A) [-1, 1]
(B) *R*
(C) (-1, 1)
(D) *R* – {0}

Q6 The domain of the definition of the function $f(x)=\frac{1}{4-x^2}+\log_{10}(x^3-x)$ is
(A) (-2, -1) ∪ (-1, 0) ∪ (2, ∞)
(B) (1, 2) ∪ (2,∞)
(C) (-1, 0) ∪ (1, 2) ∪ (2,∞)
(D) (-1, 0) ∪ (1, 2) ∪ (3,∞)

Q7 If $f(x)=\sec^2 x+2\tan x+5$ find the range of f(x)
(A) $(-\infty,-5)$
(B) $(-\infty,5)$
(C) $(5,\infty)$
(D) $[5,\infty)$

Q8 The range of $f(x)=\sqrt{x^2+4x+29}$ is
(A) (–∞, ∞)
(B) (0, ∞)
(C) [5, ∞)
(D) (0, 5)

Q9 Find x if f(x) = $\log_{x+2} 4$
(A) (-2, ∞) – {-1}
(B) (-2, ∞)
(C) (2, ∞)
(D) (2, ∞) – {1}

Q10 The domain of the function f given by $f(x)=\frac{x^2+2x+1}{x^2-x-6}$ is
(A) *R* – {3, -2}
(B) *R* – {-3, 2}
(C) *R* – [-2, 3]
(D) *R* – (-2, 3}

Q11 If f(x) = $[x]^2$ - 5[x] + 6 = 0, where [.] denote the greatest integer function, then
(A) $x\in[3,\ 4]$
(B) $x\in(2,\ 3]$
(C) $x\in[2,\ 3]$
(D) $x\in[2,\ 4)$

Q12 The domain of the function $f(x)=\sqrt{(2-2x-x^2)}$ is
(A) $-1\le x\le\sqrt{3}$
(B) $-1-\sqrt{3}\le x\le-1+\sqrt{3}$
(C) $-2\le x\le 2$
(D) $-1-\sqrt{3}\le x\le 1+\sqrt{3}$

Q13 Find x if $f(x)=\sqrt{x^2-3x-5}$
(A) $\left[\frac{3-\sqrt{29}}{2},\ \frac{3+\sqrt{29}}{2}\right]$
(B) $\left(-\infty,\ \frac{3-\sqrt{29}}{2}\right]\cup\left[\frac{3+\sqrt{29}}{2},\ \infty\right)$
(C) $(-\infty,\ \infty)$
(D) $\left[0,\ \frac{3+\sqrt{29}}{2}\right]$

Q14 The range of the function $f(x)=\sqrt{3-x}+\sqrt{2+x}$ is
(A) $[2\sqrt{2},\ \sqrt{11}]$
(B) $[\sqrt{5},\ \sqrt{10}]$
(C) $[\sqrt{5},\ \sqrt{13}]$
(D) $[\sqrt{2},\ \sqrt{7}]$

Q15 Let f : R → R be defined by $f(x)=\frac{x}{1+x^2},\ x\in R$. Then the range of f is
(A) (-1,1) - {0}
(B) R - [-1,1]
(C) $\left[-\frac{1}{2},\ \frac{1}{2}\right]$
(D) $R-\left[-\frac{1}{2},\ \frac{1}{2}\right]$

Vernacular

Q16 The domain of the function $f(x)=\sqrt{x-x^2}+\sqrt{4+x}+\sqrt{4-x}$ is

(A) [-4,∞) (B) [-4, 4]
(C) [0, 4] (D) [0, 1]

Q17 The domain of the function $\mathrm{f(x)=\log_4\left(\log_5\left(\log_3\left(18x-x^2-77\right)\right)\right)}$ is

(A) (4,5) (B) (0,10)
(C) (8,10) (D) (8,10]

Q18 Range of $f(x)=\frac{x^2+34}{x^2+2}$ is

(A) (1, 17] (B) [17, ∞)
(C) (5, 9) (D) None of these

Q19 Find the domain of the function $f(x)=\sqrt{[x]-x}$, where [.] denotes greatest integer function.

(A) ϕ (B) {0,1}
(C) R (D) *Z*

Q20 If $f(x)=sin^2x+cos^4x$ find the range of f(x)

(A) $\left[\frac{3}{4},1\right]$ (B) $\left(\frac{3}{4},\ 1\right]$
(C) $\left[\frac{3}{4},1\right)$ (D) $\left(\frac{3}{4},1\right)$

Q21 Find the domain of function $\sqrt{2x^2-5x+3}$

(A) $(-\infty,\ 1)\cup\left[\frac{3}{2},\ \infty\right)$
(B) $(-\infty,\ 1]\cup\left(\frac{3}{2},\ \infty\right)$
(C) $(-\infty,\ 1)\cup\left(\frac{3}{2},\ \infty\right)$
(D) $(-\infty,\ 1]\cup\left[\frac{3}{2},\ \infty\right)$

Q22 Let $f:R-\{2,6\}\rightarrow R$ be real valued function defined as $f(x)=\frac{x^2+2x+1}{x^2-8x+12}$. Then range of f is

(A) $\left(-\infty,-\frac{21}{4}\right]\cup\left[\frac{21}{4},\infty\right)$
(B) $\left(-\infty,-\frac{21}{4}\right]\cup[0,\infty)$
(C) $\left(-\infty,-\frac{21}{4}\right)\cup(0,\infty)$
(D) $\left(-\infty,-\frac{21}{4}\right]\cup[1,\infty)$

Q23 Find x if $f(x)=\log_2(x^2+3x+2)$

(A) (-1, ∞)
(B) (-∞, -1)
(C) (-∞, -2)
(D) (-∞, -2) ∪ (-1, ∞)

Q24 The range of the function $f(x)=\sqrt{\frac{\pi^2}{9}-x^2}$ is

(A) [0, π]
(B) [0, π/3]
(C) [-π/3, π/3]
(D) [$\sqrt{3}$, 3]

Q25 Range of $f(x)=\frac{x^2+34x-71}{x^2+2x-7}$ is

(A) [5,9]
(B) (-∞,5] ∪ [9,∞)
(C) (5,9)
(D) None of these

Q26 Find *x* if $[x]^2+6[x]+5=0$

(A) [5, 4] ∪ [1, 0]
(B) [5, 4) ∪ [1, 0)
(C) [-5, -4) ∪ [-1, 0)
(D) [-5, -4] ∪ [-1, 0]

Q27 The domain for which the functions defined by $f(x)=3x^2-1$ and g(x)=3+x are equal, is

(A) $\left\{-1,\frac{4}{3}\right\}$
(B) $\left\{1,\frac{4}{3}\right\}$
(C) $\left\{-1,-\frac{4}{3}\right\}$
(D) $\left\{-2,-\frac{4}{3}\right\}$

Q28 Domain of $\cos^{-1}[x]$ is, where [ ] denotes a greatest integer function

(A) (–1, 2]
(B) [–1, 2]
(C) (–1, 2)
(D) [–1, 2)

Q29 Find the range of the function $f(x)=\frac{1+x^2}{x^2}$ is

(A) $(0,1)$ (B) $[0,1]$
(C) $(1,\infty)$ (D) $[1,\infty)$

Q30 The range of the following function

$$\mathrm{f(x)}=\sqrt{(1-\cos x)\sqrt{(1-\cos x)\sqrt{(1-\cos x)\sqrt{\ldots\infty}}}}$$

is

(A) [0,1] (B) [0,2]
(C) [0,1/2] (D) none of these

Answer Key

Q1	(D)
Q2	(A)
Q3	(C)
Q4	(B)
Q5	(C)
Q6	(C)
Q7	(D)
Q8	(C)
Q9	(A)
Q10	(A)
Q11	(D)
Q12	(B)
Q13	(B)
Q14	(B)
Q15	(C)
Q16	(D)
Q17	(C)
Q18	(A)
Q19	(D)
Q20	(A)
Q21	(D)
Q22	(B)
Q23	(D)
Q24	(B)
Q25	(B)
Q26	(C)
Q27	(A)
Q28	(D)
Q29	(C)
Q30	(B)

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Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

$f(x) = \sqrt{x^2 - 1} + \sqrt{x^2 + 1} \Rightarrow f(x) = y_1 + y_2$

$y_1 = \sqrt{x^2 - 1}$ is defined if $x^2 - 1 \geq 0$

$\Rightarrow x^2 \geq 1$

$x \in (-\infty,\ \infty) - (-1,\ 1).$

So domain of y_1 is $(-\infty,\ \infty) - (-1,\ 1)$ and domain of y_2 is real number.

$\therefore$ Domain of $f(x) = (-\infty,\ \infty) - (-1,\ 1).$

Video Solution:

Q2 Text Solution:

$f(x) = \frac{1}{\sqrt{x^2 - 1}} = \frac{1}{\sqrt{(x-1)(x+1)}}$

f(x) is not defined at x=-1,1.

Also, for x<-1,f(x) is positive, for x>1,f(x) is positive and for x∈(-1,1),f(x) is not defined.

∴ x∈(-∞,-1)∪(1,∞)

Video Solution:

Q3 Text Solution:

We have,

$f(x) = \sqrt{5 - 4x - x^2} + x^2 \log(x + 4),$

which will be well defined 5 - 4x - $x^2 \geq 0$ and x + 4 > 0, (x + 5) (x - 1) $\leq$ 0 and x > -4

$\Rightarrow\ -5 \leq x \leq 1$ and $x > -4\ \Rightarrow -4 < x \leq 1$

Video Solution:

Q4 Text Solution:

$f(x) = \log_2(\log_3(\log_4 x))$ is defined if $\log_3 \log_4(x) > 0$

$\Rightarrow\ \log_4(x) > 3^0 = 1\ \Rightarrow \log_4(x) > 1$

$\Rightarrow x > 4^1$

$\therefore$ domain is $(4,\ \infty)$

Video Solution:

Q5 Text Solution:

When $x \geq 0,$ then $|x| = x\ \Rightarrow f(x) = \frac{x}{1+x}$

Now, $0 \leq x < x + 1\ \Rightarrow 0 \leq \frac{x}{x+1} \leq 1$

$\Rightarrow\ 0 \leq f(x) < 1$

When $x < 0,$ then $|x| = -x\ \Rightarrow f(x) = \frac{x}{1-x}$

Since $x < 0\ \therefore -1 + x < x < 0\ \Rightarrow -(1 - x) < x < 0$

$\Rightarrow\ -1 < \frac{x}{1-x} < 0 = -1 < f(x) < 0$

Combining the two cases, -1 < f(x) < 1

$\therefore R_f = (-1,\ 1)$

Video Solution:

Q6 Text Solution:

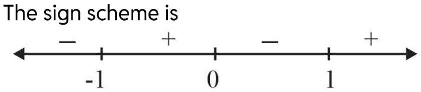
Given, $f(x) = \frac{1}{4-x^2} + \log_{10}(x^3 - x)$

For existence of the given function, $4 - x^2 \neq 0$

$\therefore\ x \in R - \{-2,\ 2\}$

Also, $x^3 - x > 0\ \Rightarrow x(x-1)(x+1) > 0$

The sign scheme is



$\therefore x \in (-1,\ 0) \cup (1,\ \infty)$

$\therefore$ Required domain is $x \in (-1,\ 0) \cup (1,\ 2) \cup (2,\ \infty)$

Video Solution:

Q7 Text Solution:

$5 \leq (\tan x + 1)^2 + 5 \leq \infty$

$5 \leq f(x) \leq \infty$

Range$= [5, \infty)$

Video Solution:

Q8 Text Solution:

By definition: The range of the function is the set of all possible values that *x* can take under the mapping *f*. Now, letting the function *y* = *f*(*x*), and the expressing *x* in terms of *y* and naming the obtained function as *g*(*y*). Now finding the domain of *g*(*y*) will give the range of the function *f*(*x*).

Video Solution:

Q9 Text Solution:

g(x) = 4 > 0

h(x) = x + 2

x + 2 > 0 and x + 2 $\neq$ 1

x > -2 x $\neq$ -1

$\Rightarrow\ x \in (-2,\ \infty)$ and $x \neq -1$

$\Rightarrow\ x \in (-2,\ \infty) - \{-1\}$

Video Solution:

Q10 Text Solution:

Given, $f(x) = \frac{x^2+2x+1}{x^2-x-6}$

For domain of $f(x),\ x^2 - x - 6 \neq 0$

$\therefore (x-3)(x+2) \neq 0 \quad \Rightarrow x \neq 3,\ \ -2$

$\therefore$ Domain of $f(x)$ is $R - \{3,\ \ -2\}$

Video Solution:

Q11 Text Solution:

Given, $f(x) = [x]^2 - 5[x] + 6 = 0$

$\Rightarrow\ [x]^2 - 3[x] - 2[x] + 6 = 0$

$\Rightarrow\ ([x] - 3)([x] - 2) = 0$

$\Rightarrow\ [x] = 3$ or $[x] = 2,\ 3 \leq x < 3 + 1$

$= 4$ or $2 \leq x < 2 + 1$

$\Rightarrow\ x \in [3,\ 4)$ or $x \in [2,\ 3)$

$\therefore\ x \in [3,\ 4) \cup [2, 3) \quad \Rightarrow x \in [2,\ 4)$

Video Solution:

Q12 Text Solution:

$f(x) = \sqrt{2 - 2x - x^2}$ is defined for all x for which, $2 - 2x - x^2 \geq 0$

i.e., for which

$x^2 + 2x - 2 \leq 0$. Consider $x^2 + 2x - 2 = 0$

$\Rightarrow\ x = \frac{-2 \pm \sqrt{4+8}}{2} \ \Rightarrow x = -1 \pm \sqrt{3}$

Thus,

$x^2 + 2x - 2 \leq 0,$ for $-1 - \sqrt{3} \leq x \leq -1 + \sqrt{3}$

$[ax^2 + bx + c \leq 0$ for $\alpha \leq x \leq \beta$, where α and β are the roots of $ax^2 + bx + c = 0,\ \alpha < \beta]$

Video Solution:

Q13 Text Solution:

$x^2 - 3x - 5 \geq 0$

$x^2 - 2 \times \frac{3}{2} \times x + \frac{9}{4} - \frac{9}{4} - 5 \geq 0$

$\left(x - \frac{3}{2}\right)^2 - \frac{29}{4} \geq 0$

$\left(x - \frac{3}{2}\right)^2 \geq \frac{29}{4}$

$\left|x - \frac{3}{2}\right| \geq \sqrt{\frac{29}{4}} \quad \Rightarrow x - \frac{3}{2} \geq \frac{\sqrt{29}}{2}$

and $x - \frac{3}{2} \leq -\frac{\sqrt{29}}{2}$

$\Rightarrow \ x \geq \frac{3+\sqrt{29}}{2}$ and $x \leq \frac{3-\sqrt{29}}{2}$

Video Solution:

Q14 Text Solution:

Given, $f(x) = \sqrt{3-x} + \sqrt{2+x}$

Let $y = \sqrt{3-x} + \sqrt{2+x}$

$\Rightarrow y^2 = 3 - x + 2 + x + 2\sqrt{3-x}\sqrt{2+x}$

$= 5 + 2\sqrt{6 + x - x^2} = 5$

$+ 2\sqrt{\frac{25}{4} - \left(x - \frac{1}{2}\right)^2}$

$y^2_{\max}$ when $\left(x - \frac{1}{2}\right)^2 = 0$

$\therefore y^2_{\max} = 5 + 2 \times 5/2 = 10 \Rightarrow y_{\max} = \sqrt{10}$

$y^2_{\min}$ when $\sqrt{\frac{25}{4} - \left(x - \frac{1}{2}\right)^2} = 0 \quad ; y_{\min}$

$= \sqrt{5}$

Range of $f(x) = \left[\sqrt{5}, \sqrt{10}\right]$

Video Solution:

Q15 Text Solution:

Here, $f(x) = \frac{x}{1+x^2} \ \therefore f(0) = 0$

Now, when x > 0, $f(x) = \frac{1}{x+\frac{1}{x}} \in \left(0, \ \frac{1}{2}\right]$

When x < 0, $f(x) = \frac{1}{x+\frac{1}{x}} \in \left[-\frac{1}{2}, \ 0\right)$

$\therefore$ Range of $f(x)$ is $\left[-\frac{1}{2}, \ \frac{1}{2}\right]$

Video Solution:

Q16 Text Solution:

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

Clearly f(x) is defined, if $4 + x \geq 0 \ \Rightarrow x \geq -4$

$4 - x \geq 0 \ \Rightarrow x \leq 4$

$x(1-x) \geq 0 \ \Rightarrow x \geq 0$ and $x \leq 1$

$\therefore$ Domain of $f = (-\infty, \ 4] \cap [-4, \ \infty)$

$\cap [0, \ 1] = [0, \ 1]$

Video Solution:

Q17 Text Solution:

Since $\log x$ is defined $\forall x > 0$

$\therefore \ f(x)$

$= \log_4\left(\log_5\left(\log_3\left(18x - x^2 - 77\right)\right)\right)$

is defined if $\log_5\left(\log_3\left(18x - x^2 - 77\right)\right) > 0$

$\Rightarrow \ \log_3\left(18x - x^2 - 77\right) > 5^0$

$\Rightarrow \log_3\left(18x - x^2 - 77\right) > 1$

$\Rightarrow \ 18x - x^2 - 77 > 3^1 \Rightarrow (x-8)(x-10)$

< 0

$\Rightarrow 8 < x < 10 \therefore x \in (8, 10)$

Video Solution:

Q18 Text Solution:

Let $\frac{x^2+34}{x^2+2} = y \ \Rightarrow x^2 + 34 = x^2y + 2y$

$\Rightarrow \ x^2(1-y) = 2y - 34$

$\Rightarrow \ x^2 = \sqrt{\frac{2y-34}{1-y}} \ \Rightarrow x = \pm\sqrt{\frac{2y-34}{1-y}}$

$\because$ x is defined for $2y - 34 \leq 0$and1 - y < 0

$\Rightarrow \ y \leq 17$ and $y > 1$

Video Solution:

Q19 Text Solution:

We have, $f(x) = \sqrt{[x] - x}$

$\therefore [x] - x \geq 0 \ \Rightarrow [x] \geq x$

but we know that [x] $\leq$ x $\quad \therefore [x] = x$

Hence, domain is $Z \ \Rightarrow x \in Z$

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Video Solution:

Q20 Text Solution:

$\sin^2 x = 1 - \cos^2 x$

$f(x) = 1 - \cos^2 x + \cos^4 x$

Put $\text{cm}^2\, x = t$

$f(x) = t^2 - t + 1$

$= \left(t - \frac{1}{2}\right)^2 + \frac{3}{4}$

$f(x) = \left(\cos^2 x - \frac{1}{2}\right)^2 + \frac{3}{4}$

W.R.T $0 \quad \le \cos^2 x \le 1$

$-\frac{1}{2} \le \cos^2 x - \frac{1}{2} \le \frac{1}{2}$

$0 \le \left(\cos^2 x - \frac{1}{2}\right)^2 \le \frac{1}{4}$

$\frac{3}{4} \le f(x) \le 1$

Range $= \left[\frac{3}{4}, 1\right]$

Video Solution:

Q21 Text Solution:

$f(x) = \sqrt{2x^2 - 5x + 3}$

$\Rightarrow \ 2x^2 - 5x + 3 \ge 0$

$2x^2 - 2x - 3x + 3 \ge 0$

$2x(x-1) - 3(x-1) \ge 0$

$(x-1)(2x-3) \ge 0$

$x \le 1 \ \text{ and } \ x \ge \frac{3}{2}$

Video Solution:

Q22 Text Solution:

Let $y = \frac{x^2+2x+1}{x^2-8x+12}$

By cross multiplying, we get

$yx^2 - 8xy + 12y - x^2 - 2x - 1 = 0$

$\Rightarrow x^2(y-1) - x(8y+2) + (12y-1) = 0$

Case I, when $y \ne 1; D \ge 0$

$\Rightarrow (8y+2)^2 - 4(y-1)(12y-1$

$\Rightarrow y(4y+21$

$y \in \left(-\infty, \frac{-21}{4}\right] \cup [0, \infty)$ -

$x^2 + 2x + 1 = x^2 - 8x + 12 \Rightarrow 10x = 11$

$\Rightarrow x = \frac{11}{10}$

So, y ca be 1 . Hence, $y \in \left(-\infty, \frac{-21}{4}\right] \cup [0, \infty)$

Video Solution:

Q23 Text Solution:

$g(x) = x^2 + 3x + 2$

W.K.T. $g(x) > 0$

$x^2 + 3x + 2 > 0$

$x^2 + 2 \times \frac{3}{2}x + \frac{9}{4} - \frac{9}{4} + 2 > 0$

$\left(x + \frac{3}{2}\right)^2 - \frac{1}{4} > 0$

$\left(x + \frac{3}{2}\right)^2 > \frac{1}{4}$

$x + \frac{3}{2} > \frac{1}{2} \ \text{ and } \ x + \frac{3}{2} < -\frac{1}{2}$

$x > -1 \qquad x < -2$

$\Rightarrow \ x \in (-\infty, \ -2) \cup (-1, \ \infty)$

Video Solution:

Q24 Text Solution:

We have, $f(x) = \sqrt{\frac{\pi^2}{9} - x^2}$

f(x) is real valued function when $\frac{\pi^2}{9} - x^2 \ge 0$

$\Rightarrow x^2 \le \frac{\pi^2}{9} \Rightarrow x \in \left[-\frac{\pi}{3}, \frac{\pi}{3}\right]$

$\therefore \frac{-\pi}{3} \le x \le \frac{\pi}{3} \Rightarrow 0 \le x^2 \le \frac{\pi^2}{9} \Rightarrow \frac{-\pi^2}{9} \le -x^2 \le 0$

$\Rightarrow 0 \le \frac{\pi^2}{9} - x^2 \le \frac{\pi^2}{9} \Rightarrow 0 \le \sqrt{\frac{\pi^2}{9} - x^2} \le \frac{\pi}{3}$

$\therefore$ Range of the function $= [0, \pi/3]$

Video Solution:

Q25 Text Solution:

Let $\frac{x^2+34x-71}{x^2+2x-7}=y$

$\Rightarrow \quad x^2+34x-71=x^2y+2xy-7y$

$\Rightarrow \quad x^2(1-y)+2(17-y)x+(7y-71)=0$

For real value of x, discriminant, $D \geq 0$

$\therefore 4(17-y)^2-4\left(1-y\right)\left(7y-71\right) \geq 0$

$\Rightarrow \quad y^2-14y+45 \geq 0 \Rightarrow y \geq 9, y \leq 5.$

$\therefore y \in (-\infty, 5) \cup [9, \infty)$

$\therefore$ Range of $f(x)=(-\infty, 5] \cup [9, \infty)$

Video Solution:

Q26 Text Solution:

$[x]^2+6\left[x\right]+5=0$

$[x]^2+\left[x\right]+5\left[x\right]+5=0$

$[x]([x]+1)+5([x]+1)=0$

$([x]+1)([x]+5)=0$

$[x]+1=0 \quad [x]+5=0$

$[x]=-1 \quad [x]=-5$

$x \in [-1, 0) \quad x \in [-5, -4).$

$x \in [-5, -4) \cup [-1, 0)$

Video Solution:

Q27 Text Solution:

$\text{We have, } f(x)=g(x)$

$\therefore 3x^2-1=3+x \Rightarrow 3x^2-x-4=0$

$\Rightarrow 3x^2-4x+3x-4=0 \Rightarrow x(3x-4)+1\left(3x-4\right)=0$

$\Rightarrow (3x-4)(x+1)=0$

$\Rightarrow \quad x=\frac{4}{3} \text{ or } x=-1$

$\therefore$ Domain is $\left\{-1, \frac{4}{3}\right\}$.

Video Solution:

Q28 Text Solution:

We know that

$0 \leq \cos^{-1}[x] \leq \pi$

$\Rightarrow \quad -1 \leq [x] \leq 1$

$\Rightarrow \quad -1 \leq x < 2$

$\therefore x \in [-1, \ 2)$

Video Solution:

Q29 Text Solution:

$f\left(x\right)=\frac{1}{x^2}+1$

Here $x \neq 2$ and x > 0

$x \neq 0$

$\frac{1}{x^2}>0$

Video Solution:

Q30 Text Solution:

Given

$$f(x)=\sqrt{(1-\cos x)\sqrt{(1-\cos x)\sqrt{(1-\cos x)\sqrt{\ldots\infty}}}}$$

$$=(1-\cos x)^{\frac{1}{2}}(1-\cos x)^{\frac{1}{4}}(1-\cos x)^{\frac{1}{8}}\ldots\infty$$

$$=(1-\cos x)^{\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\ldots\infty}$$

$$=(1-\cos x)^{\frac{1/2}{1-(1/2)}}$$

$$=1-\cos x$$

Thus, the range of f(x) is [0, 2].

Video Solution:

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