

ANSWER KEYS

| 1. (2) | 2. (4) | 3. (2) | 4. (1) | 5. (1) | 6. (1) | 7. (4) | 8. (3) | |
|--------|---------|---------------|---------------|---------------|---------------|--------|---------------|--|
| 9. (4) | 10. (4) | | | | | | | |

$$|x-1| \ge |x-3|$$
Squaring both sides, we get $|x-1| \ge (x-3)^2$ mathongo $|x-1| \ge (x-3)^2$ mathongo $|x-1| \ge (x-3)^2$

$$\Rightarrow x^2-2x+1 \geq x^2-6x+9$$
 mathongo /// mathongo // mathongo // mathongo /// mathongo // mathongo // mathongo // mathongo //

$$\Rightarrow 4x \geq 6$$
 $\Rightarrow 6x \geq 6$ $\Rightarrow 6x \geq 2$. $\Rightarrow 6x \geq 6$ $\Rightarrow 6x \geq 2$. $\Rightarrow 6x \geq 6$ $\Rightarrow 6x > 6$ $\Rightarrow 6x >$



Now, we know that if
$$|x| \ge a \Rightarrow x \le -a$$
 or $x \ge a$.

mat Therefore, first we will solve for mathongo
$$\frac{1}{12}$$
 mathongo $\frac{1}{12}$ mathon

$$\frac{x^2+6}{5x} \geq 1$$
///. mather $\frac{x^2+6-5x}{5x} \geq 0$ athongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///.





$$x \in (0,2] \cup [3,\infty) \dots (i)$$
 mathongo y mathongo y mathongo y mathongo y mathongo y mathongo y

$$\frac{x^2+6}{5x} \leq -1$$

$$\Rightarrow \frac{x^2+6+5x}{5x} \leq 0$$

$$\Rightarrow \frac{(x+2)(x+3)}{5x} \leq 0$$

$$\Rightarrow \frac{(x+2)(x+3)}{5x} \leq 0$$

$$\Rightarrow \frac{5x}{5x} \qquad \text{mathongo} \qquad \text{$$

$$\Rightarrow \frac{\stackrel{5x}{(x+2)}\stackrel{-}{(x+3)}}{5x} \leq 0$$

Basics

JEE Main Crash Course

Answer Keys and Solutions

| 3. $\max 2 - \log_2(x^2 + 3x) \ge 0$ | | | | | |
|---|------------|--|--|--|--|
| $(2) \Rightarrow 2 \ge \log_2(x^2 + 3x)$ | | | | | |
| $\Rightarrow x^2 + 3x - 4 \leq 0 \ \Rightarrow (x+4)(x-1) \leq 0$ | | | | | |
| /// mathongo 1/// mathongo /// | | | | | |
| $x\in (-4,1]$ (i) | | | | | |
| Also $x^2 + 3x > 0$ mothongo /// | | | | | |
| $\Rightarrow x(x+3) > 0$ | | | | | |
| ///. $\frac{1}{100} \frac{1}{100} \frac{1}{100} \frac{1}{100} \frac{1}{100}$ mathongo ///. | | | | | |
| $mathongo$ // mathongo // $x \in (-\infty, -3) \cup (0, \infty)$ (ii) | | | | | |
| Combining equations (1) and (2) $x \in (-4, -3) \cup (0, 1]$ | | | | | |
| Hence, (B) is correct. | | | | | |
| 4. (1) Here, it is given that | | | | | |
| $egin{aligned} rac{\log_2\left(x^2-5x+4 ight)}{\log_2\left(x^2+1 ight)} &> 1 \ x^2-5x+4 &> 0 \Rightarrow & (x-4)(x-1) > 0 \end{aligned}$ | | | | | |
| | | | | | |
| $x^2+1>0$ which is true $orall x\in R$. | (2) thongo | | | | |
| $\log_2(x^2 - 5x + 4) > \log_2(x^2 + 1)$ $x^2 - 5x + 4 > x^2 + 1$ | | | | | |
| -5x + 3 > 0 | | | | | |
| /// $x < \frac{3}{5}$ non(3) // mathongo /// | | | | | |
| From equations, (1) , (2) and (3) we get | | | | | |
| $x \in \left(-\infty, \frac{3}{5}\right) - \{0\}$ mathongo | | | | | |
| 5. (1) $\log_{0.2} \frac{x+2}{x} \le 1$ | | | | | |
| $x \Rightarrow \frac{x+2}{x} \ge 0.2$ mothongo $\frac{5(x+2)-x}{x} \ge 0$ | | | | | |
| $ \begin{array}{c} x \\ 4x+10 \\ x \end{array} \ge 0 \text{mathongo} \text{mathongo} $ | | | | | |
| ///. mathongo | | | | | |
| $x \in \left(-\infty, -\frac{5}{2}\right) \cup (0, \infty)$ | | | | | |
| Hence, (A) is correct. | | | | | |
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Basics JEE Main Crash Course

Answer Kevs and Solutions

6. (1)
$$x - \sqrt{1-|x|} < 0$$
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If
$$x \in [-1,0]$$
, inequality will always hold true. Ongo we mathongo we were also we will always hold true.

$$x < \sqrt{1-|x|}$$
 mathongo /// mathongo // ma

Squaring, we get
$$x^2 < 1 - x$$

$$x^2 \le 1 - x$$
 $\Rightarrow x^2 + x = 1 < 0$ mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///

///. math2ngo
$$\frac{-1-\sqrt{5}}{2}$$
 mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///.

Now,
$$f\left(g\left(\frac{8}{5}\right)\right) = f\left(\frac{8}{5}\right) = \left[\frac{8}{5}\right] = 1$$
 mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///

And
$$g\left(f\left(-\frac{8}{5}\right)\right) = g\left(\left[-\frac{8}{5}\right]\right) = g(-2) = 2$$
 mathongo /// mathongo /// mathongo /// mathongo ///

$$y=3[x]+1=4[x-1]-10$$
 mathongo $y=3[x]+1=4[x]-14$; (:: $[X+a]=[X]+a,\ a\in Z$)

$$(x) = 15$$
 and $y = 46$ $(y) = 15$ and $y = 46$ $(y) = 15$ $(y) =$

$$= 107$$

Given,
$$[x]^2 - 5[x] + 6 = 0$$
 mathongo // mathongo //

$$\Rightarrow [x]([x]-3)-2([x]-3)=0$$
/// $matl \Rightarrow ([x]-3)([x]-2)\equiv 0$ ngo /// $mathongo$ // $mathongo$ //

$$\Rightarrow [x] = 3 \text{ or } [x] = 2$$
 $\Rightarrow x \in [3,4) \text{ or } x \in [2,3)$

$$x \in [3,4) \text{ or } x \in [2,3)$$
 mathong we get, $x \in [2,4)$.



| 10. (4) athongo | | | | | | |
|---|---|-----------------|--|--|--|--|
| $y = \{x\}$ We know | $+\{-x\}$ mathongo v that, | | | | | |
| $\{x\}+\{ \{x\}+\{x\}+\{x\}+\{x\}+\{x\}+\{x\}+\{x\}+\{x\}+\{x\}+\{x\}+$ | $\{x\} = 0; x \in I$ $\{-x\} = 1;$ otherwis | e ///. mathongo | | | | |
| /// mat For $x \in [$ | | | | | | |
| $y=0$ at $y=1\ orall\ z$ | $egin{aligned} x &= -1, \ 0, \ 1, \ 2 \ x &\in [-1, \ 2] - \{-1, \ 2\} \end{aligned}$ | , 0, 1, 2} | | | | |
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