10 August 2023 09:13

If $f(x) = x^2 - 7x$ and $\boxed{g(x) = x + 3}$, then the minimum value of $\boxed{f(g(x)) - 3x}$ is

function

$y = x + 2$. y is a function of x.

$\boxed{f(x) = x + 2}$

if $x = 3$ $f(x) = 3 + 2 = 5$

if $x = -1$ $f(x) = -1 + 2 = 1$

$f(p) = p + 2$.

$f(x) = x^2 - 7x$.

$f(\boxed{g(x)}) = [g(x)]^2 - 7[g(x)]$

$= [x+3]^2 - 7[x+3]$

$= x^2 + 6x + 9 - 7x - 21$

$= x^2 - x - 12$.

$(a+b)^2 = a^2 + 2ab + b^2$

$(x+3)^2 = x^2 + 6x + 9$.

$\boxed{f[g(x)] - 3x} = x^2 - x - 12 - 3x$.

$= \boxed{x^2 - 4x} - 12$.

$x^2 - 4x = x^2 - 2 \times 2 \times x$

$(a-b)^2 = a^2 - 2ab + b^2$

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

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

$= \boxed{(x-2)^2 - 4} - 12$

$= (x-2)^2 - 16$.

≥ 0

$\boxed{R^2 \geq 0}$

$(x-2)^2 \geq 0$

min value of $(x-2)^2 = 0$

min value of $f[g(x)] - 3x$ is -16

If $3x + 2|y| + y = 7$ and $x + |x| + 3y = 1$, then $\boxed{x + 2y}$ is

(+ve)

$|y|$ = absolute value of y.

$|2| = 2$ $|-2| = 2$. $|-2| = -(-2)$

$|y| = y$ when $y \geq 0$

$= -y$ when $y < 0$.

Case 1 $\boxed{y \geq 0}$, $|y| = y$

$3x + 2y + y = 7$

$3x + 3y = 7$ —①

Case 1 $x \geq 0$, $|x| = x$

$x + x + 3y = 1$

$2x + 3y = 1$ —③

Case 2 $\boxed{y < 0}$, $|y| = -y$.

$3x + 2(-y) + y = 7$

$3x - 2y + y = 7$

$3x - y = 7$ —②

Case 2 $\boxed{x < 0}$, $|x| = -x$

$x + (-x) + 3y = 1$

$x - x + 3y = 1$

$3y = 1$

$\boxed{y = \frac{1}{3}}$ —④

$3x + 3y = 7$.

$-(2x + 3y = 1)$

$\boxed{x = 6}$

$3x + 3y = 7$.

$3x + 1 = 7$

$3x = 7 - 1 = 6$

$3x = 6$

$\boxed{x = 2}$ ✗

$2x + 3y = 1$

$2 \times 6 + 3y = 1$

$12 + 3y = 1$

$3y = -11$

$\boxed{y = -\frac{11}{3}}$ ✗

$2x + 3y = 1$ ✓

$3 \times (3x - y = 7)$

$9x - 3y = 21$ ✓

$2x + 3y = 1$

$9x - 3y = 21$

$11x = 22$ $\boxed{x = 2}$ ✓

$2x + 3y = 1$

$2 \times 2 + 3y = 1$

$4 + 3y = 1$

$3y = 1 - 4 = -3$

$3y = -3$

$\boxed{y = -1}$ ✓

$x + 2y = 2 + 2 \times (-1) = 2 - 2 = 0$. Ans.

total.

Among 100 students x_1 have birthdays in January, x_2 have birthday in February, and so on. If $x_0 = \max(x_1, x_2, \ldots\ldots, x_{12})$, then the smallest possible value of x_0 is

	Jan	Feb	Mar	Ap	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec.	Total
No of students	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}	x_{12}	100,
	5	10	5	15	10	5	5	15	5	5	10	10	100
	10	10	10	10	5	5	10	10	10	10	5	5	

$\boxed{x_0 = 15}$

$\boxed{x_0 = 10}$

min of $x_0 = 10$

$\frac{100}{12} = 8 + 4$ rem

$4 \times 9 + 8 \times 8$

36   64

$x_0 = \max(x_1, x_2, \ldots\ldots x_{12})$

$\min(x_0) = \boxed{\min[\max}(x_1, x_2 \ldots\ldots x_{12})]$

$\Downarrow$

$x_1, x_2 \ldots\ldots x_{12}$ has to be as close as possible.

9 9 9 9 8 8 8 8 8 8 8 8   100

$x_0 = 9$

$\min(x_0) = 9$

The number of real-valued solutions of the equation $2^x + 2^{-x} = 2 - (x - 2)^2$ is

How many 3-digit numbers are there, for which the $\boxed{\text{product of their digits is more than 2 but less than 7}}$?

$2 < abc < 7$

$3 \le abc \le 6$

$abc \to 3, 4, 5, 6$

$\underline{a}\ \underline{b}\ \underline{c}$

1-9   0-9   0-9

$a=1$ $bc = 3, 4, 5, 6$

1	b	c
	1	3
	3	1
	1	4
	4	1
	2	2
	1	5
	5	1
	1	6
	6	1
	2	3
	3	2

11

$a=2$ $bc = 2, 3$

2	b	c
	1	2
	2	1
	1	3
	3	1

4

$a=3$ $bc = 1, 2$

3	b	c
	1	1
	1	2
	2	1

3

$a=4$ $bc=1$ 4 1 1   1

$a=5$ $bc=1$ 5 1 1   1

$a=6$ $bc=1$ 6 1 1   1

21 number

The number of distinct real roots of the equation $\left(x+\frac{1}{x}\right)^2-3\left(x+\frac{1}{x}\right)+2=0$ e

If a, b and c are positive integers such that ab = 432, bc = 96 and c < 9, then the smallest possible value of a + b + c is

How many distinct positive integer-valued solutions exist to the equation
$(x^2 - 7x + 11)^{(x^2 - 13x + 42)} = 1$?