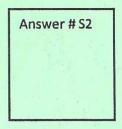## Sample Questions

**Answer # S1**

**Sample 1:** Find the smallest solution to the equation:

$$x^3 - 4x = 20 - 5x^2$$

**Answer # S2**

**Sample 2:** How many multiples of 7 are there between 2014 and 2094 that are not multiples of 3?

## Question #1

**Answer # 1**

1. Evaluate $(4)^a(-27)^b$ if $a = -\dfrac{3}{2}$ and $b = \dfrac{5}{3}$:
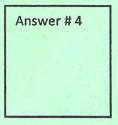
## Question #2

**Answer # 2**

2. If $f(x) = x^2 + kx + 3k - 5$, find all values of $k$ such that $f(x)$ has exactly one zero.

## Question #3

Answer # 3

3. Simplify completely: $7\log_3\left(3\log_8 512\right)$

## Question #4

Answer # 4

4. Line m passes through the point (5, -3) and is perpendicular to the line $4x - 3y = 12$. If the y-intercept of line m is (0, b), find $b^2$.

## Question #5

Answer # 5

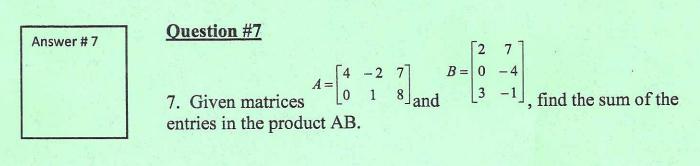5. Solve the following inequality, write the solution in interval notation: $x + \dfrac{2}{x} \le 3$ .

## Question #6

Answer # 6

6. Given that [x] is the greatest integer less than or equal to x. If $f(x) = [x-1] + \sqrt{1-x} + |x-1|$, then find $f(0.99)$.
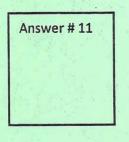
## Question #7

7. Given matrices $A = \begin{bmatrix} 4 & -2 & 7 \\ 0 & 1 & 8 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 7 \\ 0 & -4 \\ 3 & -1 \end{bmatrix}$, find the sum of the entries in the product AB.

## Question #8

8. Solve for x: $\left( \dfrac{2x+1}{x-1} \right)^2 - 4\left( \dfrac{2x+1}{x-1} \right) + 3 = 0$

## Question #9

9. Given the system of equations: $\begin{cases} 2x + 3y = 11 \\ 3x - y = 2 \end{cases}$, find the value of $x + y$.

## Question #10

10. Simplify completely: $i^{|14+48i|}$

| Answer # 11 |
|---|

### Question #11

11. For what value of t is t the arithmetic mean of 7t and 3t – 4?

| Answer # 12 |
|---|

### Question #12

12. What is the remainder when $\left(x^4 + x^2 - 6\right)$ is divided by $(x + 2)$?