

Equations & Algebra	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Total	Average
Algebraic Identities			1			4	5	1
Linear Equations	3	3	4	6	2	5	23	4
Polynomials		1			2		3	1
Quadratic Equations	1				1		2	0.33
Surds and Indices		2		1			3	0.50
<b>Grand Total</b>	<b>4</b>	<b>6</b>	<b>5</b>	<b>7</b>	<b>5</b>	<b>9</b>	<b>36</b>	<b>6.00</b>

- One year payment to an assistant is 120 and one gold coin. The assistant leaves after 8 months and receives 70 and a gold coin. Determine the value of the gold coin.  
A) 20  
B) 30  
C) 40  
D) 50  
E) 60
- Five years ago, A was 10 years older than B. If A is currently twice as old as B, what is the sum of their current ages?  
A) 20  
B) 30  
C) 40  
D) 50  
E) 60
- The sum of ages of 6 children born at intervals of 2 years each is 66 years. What is the age of the oldest child?  
A) 16  
B) 14  
C) 12  
D) 18  
E) 20
- How many positive integer solutions exist for the equation  $2x + 3y = 15$ ?  
A) 1  
B) 3  
C) 2  
D) 4  
E) 0
- If the sum of two numbers is 25 and their difference is 7, find the difference between their squares.  
A) 150  
B) 175  
C) 200  
D) 225  
E) 250
- Find the value of  $198^2$ .  
A) 38404  
B) 39904  
C) 39204  
D) 40204  
E) 41204

7. Find  $x$  if  $2^{(x+3)} - 2^x = 112$ .

- A) 3
- B) 2
- C) 5
- D) 4
- E) 7

8. If  $x + 1/x = 2$ , find the value of  $x^2 + 1/x^2$ .

- A) 1
- B) 2
- C) 4
- D) 6
- E) 8

## Solutions

1. B) 30: Total yearly = 120 + coin; for 8 months  $\rightarrow (2/3)(120 + \text{coin}) = 70 + \text{coin} \rightarrow \text{coin} = 30$ .
2. B) 30: Let  $B=x$ ,  $A=2x$ ; 5 years ago  $\rightarrow (2x-5) = (x-5)+10 \rightarrow x=10 \rightarrow \text{sum} = 30$ .
3. A) 16:  $x, x+2, \dots, x+10$ ; sum =  $6x+30 = 66 \rightarrow x=6 \rightarrow \text{oldest} = 16$
4. C) 2:  $2x+3y=15 \rightarrow$  If  $y = 1$ ,  $x = 6$  (Valid) If  $y = 3$ ,  $x = 3$  (Valid)  $\rightarrow$  total 2 solutions.
5. B) 175:  $(a^2-b^2) = (a+b)(a-b) = 25 \times 7 = 175$ .
6. C) 39204:  $(200-2)^2 = 40000 - 800 + 4 = 39204$ .
7. D) 4:  $2^{(x+3)} = 8 \cdot 2^x \rightarrow 7 \cdot 2^x = 112 \rightarrow 2^x = 16 \rightarrow x = 4$ .
8. B) 2:  $(x + 1/x)^2 = x^2 + 1/x^2 + 2 \rightarrow 4 = x^2 + 1/x^2 + 2 \rightarrow x^2 + 1/x^2 = 2$ .