Translating Words into Expressions

Translating words into expressions: Applications and decisions

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QUICK REVIEW

Use a variable for the unknown. Three times the sum of n and 4 is $3(n+4)$, while 4 more than three times n is $3n+4$. At $n=2$, the values are 18 and 10, so grouping matters. 5 less than n is $n-5$, not $5-n$.

Worked example

Write three times the sum of n and 4, then evaluate at $n=2$.

1. Write the whole sum $n+4$, then multiply it by 3: $3(n+4)$.
2. Substitute $n=2$. First add: $2+4=6$.
3. Then multiply: $3\times 6=18$.
Answer: $3(n+4)$; at $n=2$, 18.

Practice Problems

Show your thinking.

1. Admission costs 5 dollars plus 4 per ride. Write cost for n rides; find dollars for $n=3$.

2. Three bags each hold n apples plus 2 pears. Write total fruit and check $n=6$.

3. A fund has 24 dollars and buys n items at 2 dollars each. Write money left; use $n=7$.

4. Share n newly collected cards plus 8 old cards among 4 friends. Write cards each; use $n=16$.

5. A game gives 5 points per win and then deducts 3. Write score for n wins; check $n=4$.

6. Two racks each start with n balls. Remove 3 from each rack. A label says $2n-3$. Repair it and test $n=8$.

7. A game gives 6 points per round and charges 4 points once. Model score for n rounds; use $n=3$.

8. Design three equal packets, each with one fewer than n cards. Write total and check $n=7$.

Answer Key

1. $4n + 5$; at $n = 3$, 17 dollars.
2. $3(n + 2)$; at $n = 6$, 24 pieces of fruit.
3. $24 - 2n$; at $n = 7$, 10 dollars.
4. $\frac{n+8}{4}$; at $n = 16$, 6 cards each.
5. $5n - 3$; at $n = 4$, 17 points.
6. $2(n - 3)$; at $n = 8$, 10 balls.
7. $6n - 4$; at $n = 3$, 14 points.
8. $3(n - 1)$; at $n = 7$, 18 cards.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Write the product $4n$. Add 5 to that product: $4n + 5$.
2. Substitute $n = 3$. First multiply: $4 \times 3 = 12$.
3. Then add: $12 + 5 = 17$ dollars.

Problem 2

1. Write the whole sum $n + 2$, then multiply it by 3: $3(n + 2)$.
2. Substitute $n = 6$. First add: $6 + 2 = 8$.
3. Then multiply: $3 \times 8 = 24$ pieces of fruit.

Problem 3

1. The amount removed is $2n$. Subtract it from 24: $24 - 2n$.
2. Substitute $n = 7$. The amount removed is $2 \times 7 = 14$.
3. Remaining: $24 - 14 = 10$ dollars.

Problem 4

1. Group the sum $n + 8$ first. Divide the whole group by 4: $\frac{n+8}{4}$.
2. Substitute $n = 16$. The numerator is $16 + 8 = 24$.
3. Divide by 4: $24/4 = 6$ cards each.

Problem 5

1. Write the product $5n$. Subtract 3 from it: $5n - 3$.
2. Substitute $n = 4$. $5 \times 4 = 20$.
3. Subtract 3: $20 - 3 = 17$ points.

Problem 6

1. Write the difference $n - 3$ for one group, then multiply by 2: $2(n - 3)$.
2. Substitute $n = 8$. First subtract: $8 - 3 = 5$.
3. Multiply: $2 \times 5 = 10$ balls.

Problem 7

1. Write the product $6n$. Subtract 4 from it: $6n - 4$.
2. Substitute $n = 3$. $6 \times 3 = 18$.
3. Subtract 4: $18 - 4 = 14$ points.

Problem 8

1. Write the difference $n - 1$ for one group, then multiply by 3: $3(n - 1)$.
2. Substitute $n = 7$. First subtract: $7 - 1 = 6$.
3. Multiply: $3 \times 6 = 18$ cards.

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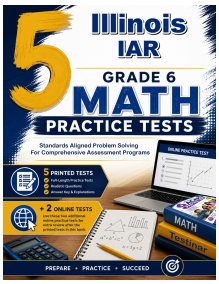

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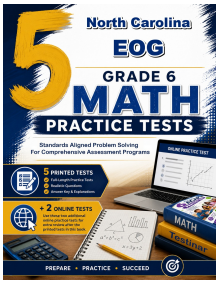

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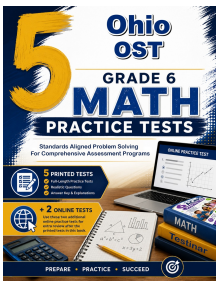

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