Evaluating Expressions

Evaluating expressions: Models and calculations

Name _____ **Date** _____ **Score** _____ / 8

QUICK REVIEW

Substitute the value for every occurrence of each variable, then follow the order of operations. At $x = 3, y = 2$, $4x + y^2 = 4(3) + 2^2 = 12 + 4 = 16$. Use parentheses for a negative input: if $x = -4$, then $x^2 = (-4)^2 = 16$.

Worked example

Substitute carefully. Evaluate $x^2 + 3x + 5$ at $x = 2$.

1. Substitute $x = 2$ to get $(2)^2 + 3(2) + 5$.
2. $(2)^2 = 4$ and $3(2) = 6$.
3. $4 + (6) + 5 = 15$.
Answer: 15.

Practice Problems

Show your thinking.

1. Evaluate $4x + 7$ at $x = 3$.

2. Evaluate $2(x + 6)$ at $x = 5$.

3. Evaluate $x^2 + 3x + 1$ at $x = 4$.

4. Evaluate $\frac{x+2}{5}$ at $x = 13$.

5. A remaining-money expression is given in dollars. Evaluate $20 - 3x$ at $x = 4$.

6. Explain why the square term is positive. Evaluate $x^2 + 2x + 3$ at $x = -2$.

7. Calculate another input-output value. Evaluate $6x + 2$ at $x = 4$.

8. Model the grouped numerator before dividing. Evaluate $\frac{x+9}{3}$ at $x = 6$.

Answer Key

1. 19.
2. 22.
3. 29.
4. 3.
5. 8 dollars.
6. 3.
7. 26.
8. 5.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Substitute $x = 3$ to get $4(3) + 7$.
2. $4(3) = 12$.
3. $12 + 7 = 19$.

Problem 2

1. Substitute $x = 5$ to get $2((5) + 6)$.
2. Inside the parentheses: $5 + 6 = 11$.
3. $2 \times 11 = 22$.

Problem 3

1. Substitute $x = 4$ to get $(4)^2 + 3(4) + 1$.
2. $(4)^2 = 16$ and $3(4) = 12$.
3. $16 + (12) + 1 = 29$.

Problem 4

1. Substitute $x = 13$ to get $\frac{(13)+2}{5}$.
2. Numerator: $13 + 2 = 15$.
3. $15/5 = 3$.

Problem 5

1. Substitute $x = 4$ to get $20 - 3(4)$.
2. $3(4) = 12$.
3. $20 - 12 = 8$ dollars remain.

Problem 6

1. Substitute $x = -2$ to get $(-2)^2 + 2(-2) + 3$.
2. Two negative factors give a positive square: $(-2)^2 = (-2)(-2) = 4$. The separate product is $2(-2) = -4$.
3. $4 + (-4) + 3 = 3$.

Problem 7

1. Substitute $x = 4$ to get $6(4) + 2$.
2. $6(4) = 24$.
3. $24 + 2 = 26$.

Problem 8

1. Substitute $x = 6$ to get $\frac{(6)+9}{3}$.
2. Numerator: $6 + 9 = 15$.
3. $15/3 = 5$.

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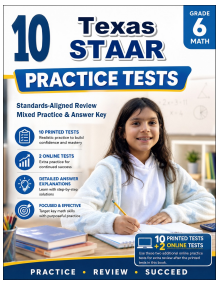

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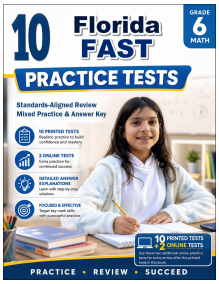

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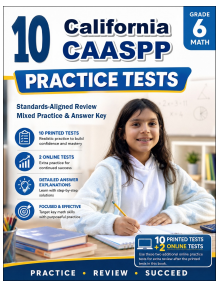

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