Name _____ Score _____ Teacher _____ Date _____

Partial Fraction Integration

Decompose each proper rational function, integrate each term, and preserve absolute values on linear logarithms. Definite intervals never cross a pole.

1. **Evaluate the indefinite integral of (1x+0)/(x-2)^2 dx. A valid decomposition is 1/(x-2) + 2/(x-2)^2.**

2. **Evaluate the definite integral from 0 to 1 of ((6)x-39)/((x-4)(x-7)) dx.**

Show the limit, decomposition, identity, or substitution that justifies each result.

Name _____ Score _____ Teacher _____ Date _____

Partial Fraction Integration

Decompose each proper rational function, integrate each term, and preserve absolute values on linear logarithms. Definite intervals never cross a pole.

3. **Evaluate the indefinite integral of (7x^2-4x+40)/((x-2)(x^2+16)) dx. A valid decomposition is 3/(x-2) + (4x+4)/(x^2+16).**

4. **Evaluate the definite integral from 0 to 1 of (4x^2-8x+9)/((x-4)(x^2+25)) dx.**

Show the limit, decomposition, identity, or substitution that justifies each result.

Name _____ Score _____ Teacher _____ Date _____

Partial Fraction Integration

Decompose each proper rational function, integrate each term, and preserve absolute values on linear logarithms. Definite intervals never cross a pole.

5. **Evaluate the indefinite integral of (5x-16)/(x-4)^2 dx. A valid decomposition is 5/(x-4) + 4/(x-4)^2.**

6. **Evaluate the definite integral from 0 to 1 of ((6)x-23)/((x-3)(x-8)) dx.**

Show the limit, decomposition, identity, or substitution that justifies each result.

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Partial Fraction Integration

Worked Answer Key

Decompose each proper rational function, integrate each term, and preserve absolute values on linear logarithms. Definite intervals never cross a pole.

1. **Evaluate the indefinite integral of (1x+0)/(x-2)^2 dx. A valid decomposition is 1/(x-2) + 2/(x-2)^2.**

Answer: 1 ln|x-2| - 2/(x-2) + C

1. Use 1/(x-2) + 2/(x-2)^2; recombination verifies the numerator.
2. Integrate termwise: 1 ln|x-2| - 2/(x-2).
3. Keep absolute values on linear logarithms and include the integration constant.

2. **Evaluate the definite integral from 0 to 1 of ((6)x-39)/((x-4)(x-7)) dx.**

Answer: 5 ln(3/4) + 1 ln(6/7)

1. Set the decomposition to 5/(x-4) + 1/(x-7). Equating coefficients gives A = 5, B = 1.
2. Integrate termwise: 5 ln|x-4| + 1 ln|x-7|.
3. Neither denominator factor vanishes on [0,1]. Subtract F(0) from F(1): 5 ln(3/4) + 1 ln(6/7).

Show the limit, decomposition, identity, or substitution that justifies each result.

Name _____ Score _____ Teacher _____ Date _____

Partial Fraction Integration

Worked Answer Key

Decompose each proper rational function, integrate each term, and preserve absolute values on linear logarithms. Definite intervals never cross a pole.

3. **Evaluate the indefinite integral of (7x^2-4x+40)/((x-2)(x^2+16)) dx. A valid decomposition is 3/(x-2) + (4x+4)/(x^2+16).**

Answer: 3 ln|x-2| + 2 ln(x^2+16) + 1 atan(x/4) + C

1. Use 3/(x-2) + (4x+4)/(x^2+16); recombination verifies the numerator.
2. Integrate termwise: 3 ln|x-2| + 2 ln(x^2+16) + 1 atan(x/4).
3. Keep absolute values on linear logarithms and include the integration constant.

4. **Evaluate the definite integral from 0 to 1 of (4x^2-8x+9)/((x-4)(x^2+25)) dx.**

Answer: 1 ln(3/4) + 3/2 ln(26/25) + 4/5 atan(1/5)

1. Set the decomposition to 1/(x-4) + (3x+4)/(x^2+25). A(x^2+25)+(3x+4)(x-4) reproduces the numerator, so A = 1, B = 3, C = 4.
2. Integrate termwise: 1 ln|x-4| + 3/2 ln(x^2+25) + 4/5 atan(x/5).
3. Neither denominator factor vanishes on [0,1]. Subtract F(0) from F(1): 1 ln(3/4) + 3/2 ln(26/25) + 4/5 atan(1/5).

Name _____ Score _____ Teacher _____ Date _____

Partial Fraction Integration

Worked Answer Key

Decompose each proper rational function, integrate each term, and preserve absolute values on linear logarithms. Definite intervals never cross a pole.

5. **Evaluate the indefinite integral of (5x-16)/(x-4)^2 dx. A valid decomposition is 5/(x-4) + 4/(x-4)^2.**

Answer: 5 ln|x-4| - 4/(x-4) + C

1. Use 5/(x-4) + 4/(x-4)^2; recombination verifies the numerator.
2. Integrate termwise: 5 ln|x-4| - 4/(x-4).
3. Keep absolute values on linear logarithms and include the integration constant.

6. **Evaluate the definite integral from 0 to 1 of ((6)x-23)/((x-3)(x-8)) dx.**

Answer: 1 ln(2/3) + 5 ln(7/8)

1. Set the decomposition to 1/(x-3) + 5/(x-8). Equating coefficients gives A = 1, B = 5.
2. Integrate termwise: 1 ln|x-3| + 5 ln|x-8|.
3. Neither denominator factor vanishes on [0,1]. Subtract F(0) from F(1): 1 ln(2/3) + 5 ln(7/8).

Show the limit, decomposition, identity, or substitution that justifies each result.