Name: Richard

QUIZ 12 ♠

MATH 201
February 29, 2024

1. $\int \frac{x+34}{x^2-4x-12}\,dx = \int \frac{5}{x-6} - \frac{4}{x+2}\,dx = 5\ln|x-6| - 4\ln|x+2| + C$

$$= \boxed{\ln\left|\frac{(x-6)^5}{(x+2)^4}\right| + C}$$

$$\frac{x+34}{x^2-4x-12} = \frac{x+34}{(x-6)(x+2)} = \frac{A}{x-6} + \frac{B}{x+2}$$

$$\Rightarrow \quad x+34 = A(x+2) + B(x-6)$$

Put $x=6$: $\quad 6+34 = A(6+2) + B(6-6)$

$$40 = 8A$$

$$\boxed{A = 5}$$

Put $x=-2$ $\quad -2+34 = A(-2+2) + B(-2-6)$

$$32 = -8B$$

$$\boxed{B = -4}$$

$$\therefore \quad \frac{x+34}{x^2-4x-12} = \frac{5}{x-6} - \frac{4}{x+2}$$

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QUIZ 12 ♢

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1. $\int \frac{x+16}{x^2+2x-8}\,dx = \int \frac{3}{x-2} - \frac{2}{x+4}\,dx = 3\ln|x-2| - 2\ln|x+4| + C$

$$= \boxed{\ln\left|\frac{(x-2)^3}{(x+4)^2}\right| + C}$$

$$\frac{x+16}{x^2+2x-8} = \frac{x+16}{(x-2)(x+4)} = \frac{A}{x-2} + \frac{B}{x+4}$$

$$\Rightarrow \quad x+16 = A(x+4) + B(x-2)$$

Put $x=2$: $\quad 2+16 = A(2+4) = B(2-2)$

$$18 = 6A$$

$$\boxed{A = 3}$$

Put $x=-4$ $\quad -4+16 = A(-4+4) + B(-4-2)$

$$12 = -6B$$

$$\boxed{B = -2}$$

$$\therefore \quad \frac{x+16}{x^2+2x-8} = \frac{3}{x-2} - \frac{2}{x+4}$$

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QUIZ 12 ♣

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1. $\int \frac{10x-2}{x^2+2x-8}\,dx = \int \frac{3}{x-2} + \frac{7}{x+4}\,dx$

$= 3\ln|x-2| + 7\ln|x+4| + C$

$= \boxed{\ln\left|(x-2)^3(x+4)^7\right| + C}$

$$\frac{10x-2}{x^2+2x-8} = \frac{10x-2}{(x-2)(x+4)} = \frac{A}{x-2} + \frac{B}{x+4}$$

$$\Rightarrow \quad 10x-2 = A(x+4) + B(x-2)$$

Put $x=2$: $10\cdot 2 - 2 = A(2+4) + B(2-2)$

$18 = 6A$

$\boxed{A = 3}$

Put $x=-4$: $10(-4)-2 = A(-4+4) + B(-4-2)$

$-42 = -6B$

$\boxed{B = 7}$

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QUIZ 12 ♡

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1. $\int \frac{30x-40}{x^2-x-6}\,dx = \int \frac{20}{x+2} + \frac{10}{x-3}\,dx$

$= 20\ln|x+2| + 10\ln|x-3| + C$

$= \boxed{\ln\left|(x+2)^{20}(x-3)^{10}\right| + C}$

$$\frac{30x-40}{x^2-x-6} = \frac{30x-40}{(x+2)(x-3)} = \frac{A}{x+2} + \frac{B}{x-3}$$

$$\Rightarrow \quad 30x-40 = A(x-3) + B(x+2)$$

Put $x=-2$: $30(-2)-40 = A(-2-3) + B(-2+2)$

$-100 = -5A$

$\boxed{A = 20}$

Put $x=3$ $\quad 30\cdot 3 - 40 = A(3-3) + B(3+2)$

$50 = 5B$

$\boxed{B = 10}$