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$u = x^2 + x$
 $du = 2x + 1$

Choose T (true) or F (false) for each statement.

1. The integral of $\int \frac{(8x+4)(x^2+x)^3 dx}{4(2x+1)}$ is $\frac{1}{4}(x^2+x)^4 + C$ $4(x^2+x)^3 = \frac{4(x^2+x)^4}{4} = (x^2+x)^4$ (F) T

2. The integral of $\int 4x\sqrt{2x-3} dx$ is $(2x-3)^{\frac{5}{2}} + (2x-3)^{\frac{3}{2}} + C$ (F) T

$4x(2x-3)^{1/2} = 4 \int x(2x-3)^{1/2} dx$ $u = 2x-3$ $x = \frac{u+3}{2}$ $4 \int \left[\frac{u+3}{2} \right] u^{1/2} = \frac{4}{2} \int (u^{3/2} + 3u^{1/2}) = 2 \int (u^{3/2} + 3u^{1/2}) = 2 \left[\frac{u^{5/2}}{5/2} + \frac{3u^{3/2}}{3/2} \right] = \frac{4u^{5/2}}{5} + 4u^{3/2}$

3. The partial fraction decomposition of the integral $\int \frac{x^2+4}{3x^3+4x^2-4x} dx$ is $\frac{A}{x} + \frac{B}{(3x-2)} + \frac{C}{(x+2)}$ F (T)

$x(3x^2+4x-4) = x(3x-2)(x+2)$

4. The integral of $\int \frac{x^2+26x+12}{5x^3+3x^2} dx$ is $-\frac{9}{5} \ln|5x+3| + 2 \ln|x| - \frac{4}{x} + C$ F (T)

5. Solve the following integral, SHOW THE STEPS OF YOUR PROCEDURE.

$\int \frac{2x^3 - 4x^2 - 15x + 15}{x^2 - 2x - 8} dx = \int \frac{2x^2 + x + 15}{x^2 - 2x - 8} dx$ $\int \frac{3x^3 - 23x^2 - 2x + 112}{x^2 - 5x - 14} dx \parallel \int \frac{2x^3 - 4x^2 - 15x + 15}{x^2 - 2x - 8} dx =$

$\frac{x+15}{x^2-2x-8} = \frac{A}{x-4} + \frac{B}{x+2}$ $x+15 = A(x+2) + B(x-4)$ $x+15 = Ax+2A+Bx-4B$ $x = x(A+B)$ $5 = 2A-4B$

$\frac{3}{2} + \frac{-1/2}{(x+2)}$ $\frac{3}{2} \ln|x-4| - \frac{1}{2} \ln|x+2| + C$ $1 = A+B$ $5 = 2[1-B] - 4B$

$1-B=A$ $5 = 2-2B-4B$ $5 = 2-6B$ $A = 1 - [-\frac{1}{2}] = \frac{3}{2}$ $3 = -6B$ $B = -\frac{1}{2}$

$\int \frac{x^2+12x+12}{5x^3+3x^2} = \frac{A}{x} + \frac{B}{x^2} + \frac{C}{(5x+3)}$ $= Ax(5x+3) + B(5x+3) + Cx^2 = 5Ax^2+3Ax+5Bx+3B+Cx^2$

$x^2 = 5Ax^2 + Cx^2$ $26x = 5Bx + 3Ax$ $12 = 3B$
 $x^2 = 5A + Cx^2$ $26 = 5B + 3A$ $4 = B$
 $1 = 5A + C$ $26 = 5(4) + 3A$
 $1 - 5A = C$ $26 = 20 + 3A$
 $1 - 10 = C = -9$ $6 = 3A = 2$

$\frac{2}{x} + \frac{4}{x^2} + \frac{-9}{5x+3} = 2 \ln|x| - 4x^{-1} - \frac{9 \ln|5x+3|}{5} + C$

QUIZ 1: THIRD PARTIAL CORRECTIONS.

5. SOLVE THE FOLLOWING INTEGRAL, SHOW STEPS OF YOUR PROCEDURE.

$$\int \frac{2x^3 - 4x^2 - 15x + 15}{x^2 - 2x - 8} dx =$$

$$\int \frac{2x + \frac{15}{x+2}}{x^2 - 2x - 8} \quad \frac{x+5}{x^2 - 2x - 8} = \frac{A}{x-1} + \frac{B}{x+2}$$

$$\begin{array}{r|l} 2x^3 - 4x^2 - 15x + 15 & x^2 - 2x - 8 \\ -2x^3 + 4x^2 + 16x & 2x \\ \hline & x + 5 \end{array}$$

$$A(x+2) + B(x-1) = x+5 = Ax + 2A + Bx - 4B$$

$$x = Ax + Bx \quad 5 = 2A - 4B$$

$$x = x(A+B) \quad 5 = 2[1-B] - 4B$$

$$1 = A+B \quad 5 = 2 - 2B - 4B$$

$$1 - B = A \quad 5 = 2 - 6B$$

$$1 - \left[\frac{1}{2}\right] = A \quad 3 = -6B \quad B = -\frac{1}{2} \quad A = \frac{3}{2}$$

$$\int 2x + \frac{3/2}{x-1} + \frac{-1/2}{x+2}$$

$$\boxed{x^2 + 3 \ln|x-1| - \ln|x+2| + C}$$