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Assignment.

1) $(11-3x)/x^2+2x-3$
Solution

$$\frac{11-3x}{x^2+2x-3} = \frac{11-3x}{(x-1)(x+3)}$$

$$= \frac{A}{x-1} + \frac{B}{x+3}$$

$$11-3x = A(x+3) + B(x-1)$$

Let $x=1$
 $11-3 = A(4) + B(0)$
 $8 = 4A$
 $A = 2$

Let $x=-3$
 $11-3(-3) = A(0) + B(-4)$
 $20 = -4B$
 $B = -5$

$$\frac{2}{x-1} - \frac{5}{x+3}$$

$A = 2$
 $B = -5$

2) $(2x^2-9x-35)/(x+1)(x-2)(x+3)$
Solution

$$\frac{2x^2-9x-35}{(x+1)(x-2)(x+3)} = \frac{A}{x+1} + \frac{B}{x-2} + \frac{C}{x+3}$$

$$2x^2-9x-35 = A(x-2)(x+3) + B(x+1)(x+3) + C(x+1)(x-2)$$

Let $x=1$
 $2(1)^2-9(1)-35 = A(-1)(4) + B(4)(4) + C(2)(-1)$
 $-38 = -4A + 16B - 2C$

Let $x=2$
 $2(2)^2-9(2)-35 = A(0)(5) + B(3)(5) + C(3)(0)$
 $-27 = 15B$
 $B = -3$

Let $x=-3$
 $2(-3)^2-9(-3)-35 = A(-4)(0) + B(-2)(0) + C(-4)(-5)$
 $18+27-35 = 20C$
 $10 = 20C$
 $C = 1/2$

$$\frac{2}{x+1} - \frac{3}{x-2} + \frac{1}{2(x+3)}$$

$A = 2$
 $B = -3$
 $C = 1/2$

Let $x = -3$
 $2(-3)^2 - 9(-3) - 35 = C(-3+1)(-3-2)$

$$18+27-35 = C(-2)(-5)$$

$$10 = 10C$$

$$C = 1$$

$$\int \frac{1}{x^2+121} dx$$

$$\int \frac{1}{1+u^2} du = \frac{1}{121} \int \frac{1}{1+u^2} du = \frac{1}{121} \arctan u$$

$$= \frac{1}{121} \arctan \left(\frac{x}{11}\right)$$

$u = x/11$