

What's the long version of your name: key

AP Calculus BC: 10.3 Long Division Integrals

Evaluate each integral (long division won't be the easiest method on all of them)

$$1) \int \frac{3x^2+2x-1}{x+2} dx$$

$$x+2 \overline{) 3x^2+2x-1}$$

$$\underline{-(3x^2+6x)} $$

$$-4x-1$$

$$\underline{-(4x+8)}$$

$$7$$

$$\int 3x - 4 + \frac{7}{x+2} dx$$

$$\boxed{\frac{3x^2}{2} - 4x + 7 \ln|x+2| + C}$$

$$2) \int \frac{x^3-x^2-1}{x} dx$$

$$\int x^2 - x - \frac{1}{x} dx$$

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

$$3) \int \frac{6x^2-2x-25}{x-2} dx$$

$$x-2 \overline{) 6x^2-2x-25}$$

$$\underline{-(6x^2-12x)} $$

$$10x-25$$

$$\underline{-(10x-20)}$$

$$-5$$

$$\int 6x + 10 - \frac{5}{x-2} dx$$

$$\frac{6x^2}{2} + 10x - 5 \ln|x-2| + C$$

$$\boxed{3x^2 + 10x - 5 \ln|x-2| + C}$$

$$4) \int \frac{x^2}{x-1} dx$$

$$x-1 \overline{) x^2+0}$$

$$\underline{-(x^2-x)} $$

$$x+0$$

$$\underline{-(x-1)}$$

$$+1$$

$$\int x + 1 + \frac{1}{x-1} dx$$

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

factoring
is
easiest

$$5) \int \frac{6x^2-2x-20}{x-2} dx$$

$$x-2 \overline{) 6x^2-2x-20}$$

$$\underline{-(6x^2-12x)} $$

$$+10x-20$$

$$\underline{-(10x-20)}$$

$$0$$

$$\int 6x + 10 dx$$

$$\frac{6x^2}{2} + 10x + C$$

$$\boxed{3x^2 + 10x + C}$$

$$6) \int \frac{3x^2-2x-20}{x-3} dx$$

$$x-3 \overline{) 3x^2-2x-20}$$

$$\underline{-(3x^2-9x)} $$

$$7x-20$$

$$\underline{-(7x-21)}$$

$$1$$

$$\int 3x + 7 + \frac{1}{x-3} dx$$

$$\boxed{\frac{3x^2}{2} + 7x + \ln|x-3| + C}$$