MATH 115 **Name:** ______________________

In class work 13, Fall 2022 **Row and Seat:** ______________________

In class work 13 has questions 1 through 2 with a total of 9 points. Turn in your work at the end of class *on paper*. This assignment is due *Wednesday 16 November 13:15* PM.

1. Find a formula for each antiderivative.

$\boxed{1}$ (a) $\int (6x+3)(x+1)\,\mathrm{d}x =$

Solution:

$$\int (6x+3)(x+1)\,\mathrm{d}x = 2x^3 + \frac{9x^2}{2} + 3x + C. \tag{1}$$

$\boxed{1}$ (b) $\int (x-1)(x+2)\,\mathrm{d}x =$

Solution:

$$\int (x-1)(x+2)\,\mathrm{d}x = \frac{x^3}{3} + \frac{x^2}{2} - 2x + C$$

$\boxed{1}$ (c) $\int \frac{7}{x} + \frac{x}{7}\,\mathrm{d}x =$

Solution: For the interval $(-\infty, 0)$, we have

$$\int \frac{7}{x} + \frac{x}{7}\,\mathrm{d}x = 7\ln(-x) + \frac{x^2}{14} + C.$$

For the interval $(0, \infty)$, we have

$$\int \frac{7}{x} + \frac{x}{7}\,\mathrm{d}x = 7\ln(x) + \frac{x^2}{14} + C.$$

And for either the interval $(-\infty, 0)$ or $(0, \infty)$, we have

$$\int \frac{7}{x} + \frac{x}{7}\,\mathrm{d}x = 7\ln(|x|) + \frac{x^2}{14} + C.$$

$\boxed{1}$ (d) $\int \frac{x+1}{\sqrt{x}}\,\mathrm{d}x =$

Solution:

$\boxed{1}$ (e) $\int \cos(23\pi x)\,\mathrm{d}x =$

Solution:

$\boxed{1}$ (f) $\int \cos(\pi x)^2 + \sin(\pi x)^2\,\mathrm{d}x =$

Solution:

$\boxed{1}$ (g) $\int 5\mathrm{d}x =$

Solution:

$\boxed{1}$ (h) $\int \mathrm{e}^{5x}\mathrm{d}x =$

Solution:

$\boxed{1}$ 2. Find numbers a and b such that $\int x\mathrm{e}^x\,\mathrm{d}x = (a + bx)\mathrm{e}^x + C$ is correct. Do this by requiring that $\frac{\mathrm{d}}{\mathrm{d}x}((a + bx)\mathrm{e}^x) = x\mathrm{e}^x$ be an identity.