Matthew Mendoza **Math-45-Krauel-F20**
Assignment Math45-Homework-WEEK-14 due 12/05/2020 at 11:59pm PST

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1. (1 point)
Find the inverse Laplace transform $f(t) = \mathcal{L}^{-1}\{F(s)\}$ of the function $F(s) = \dfrac{7s+8}{s^2+100}$.

$f(t) = \mathcal{L}^{-1}\left\{\dfrac{7s+8}{s^2+100}\right\} =$ ________________ help (formulas)

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2. (1 point)
Find the inverse Laplace transform $f(t) = \mathcal{L}^{-1}\{F(s)\}$ of the function $F(s) = \dfrac{8}{s^2} + \dfrac{2}{s+9}$.

$f(t) = \mathcal{L}^{-1}\left\{\dfrac{8}{s^2} + \dfrac{2}{s+9}\right\} =$ ________________ help (formulas)

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3. (1 point)
Use translation properties for the Laplace transform to compute $\mathcal{L}\left\{e^{5t}\sin(6t)\right\}$.

- A. $\mathcal{L}\left\{e^{5t}\sin(6t)\right\} = \dfrac{5}{s^2-61}$
- B. $\mathcal{L}\left\{e^{5t}\sin(6t)\right\} = \dfrac{6}{s^2-10s+61}$
- C. $\mathcal{L}\left\{e^{5t}\sin(6t)\right\} = \dfrac{6}{s^2-5}$
- D. $\mathcal{L}\left\{e^{5t}\sin(6t)\right\} = \dfrac{6}{s^2-10s+25}$

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4. (1 point)
Use translation properties for the Laplace transform to compute $\mathcal{L}^{-1}\left\{\dfrac{5}{s^2-12s+61}\right\}$.

- A. $\mathcal{L}^{-1}\left\{\dfrac{5}{s^2-12s+61}\right\} = e^{6t}\cos(5t)$
- B. $\mathcal{L}^{-1}\left\{\dfrac{5}{s^2-12s+61}\right\} = e^{6t}\sin(5t)$
- C. $\mathcal{L}^{-1}\left\{\dfrac{5}{s^2-12s+61}\right\} = e^{5t}\sin(6t)$
- D. $\mathcal{L}^{-1}\left\{\dfrac{5}{s^2-12s+61}\right\} = e^{5t}\cos(6t)$

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5. (1 point)
Consider the following initial value problem:

$$y'' - 5y' - 14y = \sin(2t) \qquad y(0) = -2,\ y'(0) = -1$$

Using Y for the Laplace transform of $y(t)$, i.e., $Y = \mathcal{L}\{y(t)\}$, find the equation you get by taking the Laplace transform of the differential equation and solve for

$Y(s) =$ ________________________

To find a solution to the IVP above, what steps must next be performed next?

- A. Plug in the given values to $Y(s)$.
- B. Take the derivative of $Y(s)$.
- C. Apply the inverse Laplace transform to $Y(s)$ (using partial fraction decomposition where necessary).
- D. Apply the Laplace transform to $Y(s)$.