Math 2C03 PracPb#11 Section 7.3-4 (18683515)

Due: Sat, May 1, 2021 11:00 PM EDT

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

1. Question Details ZillDiffEQ9 7.3.007. [3744641] -

Find $F(s)$.

$$\mathscr{L}\{e^t \sin 3t\}$$

$F(s) =$

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2. Question Details ZillDiffEQ9 7.3.011. [4568104] -

Find $f(t)$.

$$\mathscr{L}^{-1}\left\{\frac{1}{(s+8)^3}\right\}$$

$f(t) =$

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3. Question Details ZillDiffEQ9 7.3.013. [3744781] -

Find $f(t)$.

$$\mathscr{L}^{-1}\left\{\frac{1}{s^2-4s+5}\right\}$$

$f(t) =$

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4. Question Details ZillDiffEQ9 7.3.015. [4568347] -

Find $f(t)$.

$$\mathscr{L}^{-1}\left\{\frac{s}{s^2+8s+17}\right\}$$

$f(t) =$

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5. Question Details ZillDiffEQ9 7.3.017. [3744758]

Find $f(t)$.

$$\mathscr{L}^{-1}\left\{\frac{s}{(s+1)^2}\right\}$$

$f(t) =$

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6. Question Details ZillDiffEQ9 7.3.029. [3744872]

Use the Laplace transform to solve the given initial-value problem.

$$y'' - y' = e^t \cos t, \quad y(0) = 0, \; y'(0) = 0$$

$y(t) =$

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7. Question Details ZillDiffEQ9 7.3.041. [4568353]

Find $F(s)$.

$$\mathscr{L}\{\cos(6t)\, \mathscr{U}(t - \pi)\}$$

$F(s) =$

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8. Question Details ZillDiffEQ9 7.3.045. [3745062]

Find $f(t)$.

$$\mathscr{L}^{-1}\left\{\frac{e^{-\pi s}}{s^2+1}\right\}$$

$f(t) = \square + (\square)\,\mathscr{U}(t - \square)$

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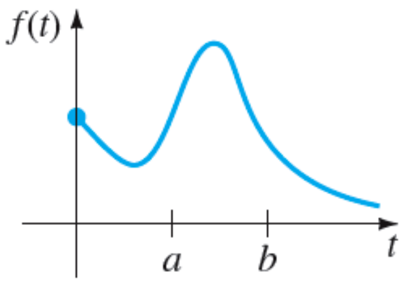
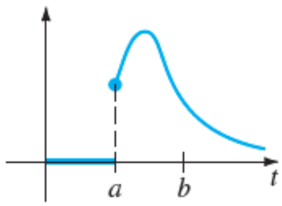
9. Question Details ZillDiffEQ9 7.3.049. [3744735]

The graph of $f(t)$ is given below.



Match the graph below with one of the given functions.



- $f(t) - f(t)\,\mathscr{U}(t - a)$
- $f(t - b)\,\mathscr{U}(t - b)$
- $f(t)\,\mathscr{U}(t - a)$
- $f(t) - f(t)\,\mathscr{U}(t - b)$
- $f(t)\,\mathscr{U}(t - a) - f(t)\,\mathscr{U}(t - b)$
- $f(t - a)\,\mathscr{U}(t - a) - f(t - a)\,\mathscr{U}(t - b)$

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10. Question Details ZillDiffEQ9 7.3.055. [4568094]

Write the function in terms of unit step functions. Find the Laplace transform of the given function.

$$f(t) = \begin{cases} 4, & 0 \le t < 7 \\ -4, & t \ge 7 \end{cases}$$

$F(s) =$

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11. Question Details ZillDiffEQ9 7.3.057. [3745031]

Write the function in terms of unit step functions. Find the Laplace transform of the given function.

$$f(t) = \begin{cases} 0, & 0 \le t < 1 \\ t^2, & t \ge 1 \end{cases}$$

$F(s) =$ [ ]

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12. Question Details ZillDiffEQ9 7.3.059. [3744718]

Write the function in terms of unit step functions. Find the Laplace transform of the given function.

$$f(t) = \begin{cases} t, & 0 \le t < 3 \\ 0, & t \ge 3 \end{cases}$$

$F(s) =$ [ ]

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13. Question Details ZillDiffEQ9 7.3.063. [3744679]

Use the Laplace transform to solve the given initial-value problem.

$$y' + y = f(t), \quad y(0) = 0, \text{ where } f(t) = \begin{cases} 0, & 0 \le t < 1 \\ 3, & t \ge 1 \end{cases}$$

$y(t) =$ [ ] $+ \Big($ [ ] $\Big)\mathcal{U}\Big(t -$ [ ] $\Big)$

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14. Question Details ZillDiffEQ9 7.3.065.EP. [4603963]

Consider the following initial-value problem.

$$y' + 5y = f(t), \quad y(0) = 0, \text{ where } f(t) = \begin{cases} t, & 0 \le t < 1 \\ 0, & t \ge 1 \end{cases}$$

Write the function $f(t)$ in terms of unit step functions. Find the Laplace transform of the given function.

$F(s) =$ [ ]

Use the Laplace transform to solve the given initial-value problem.

$y(t) =$ [ ] $+ \Big($ [ ] $\Big)\mathcal{U}\Big(t -$ [ ] $\Big)$

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15. Question Details ZillDiffEQ9 7.3.067. [3745052]

Use the Laplace transform to solve the given initial-value problem.

$$y'' + 4y = \sin t\,\mathscr{U}(t - 2\pi), \quad y(0) = 1,\ y'(0) = 0$$

$y(t) =$ [ ] $+ \big($ [ ] $\big)\mathscr{U}\big(t -$ [ ] $\big)$

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16. Question Details ZillDiffEQ9 7.3.069. [3744738]

Use the Laplace transform to solve the given initial-value problem.

$$y'' + y = f(t), \quad y(0) = 0,\ y'(0) = 1, \text{ where } f(t) = \begin{cases} 0, & 0 \le t < \pi \\ 1, & \pi \le t < 2\pi \\ 0, & t \ge 2\pi \end{cases}$$

$y(t) =$ [ ] $+ \big($ [ ] $\big)\mathscr{U}(t - \pi) + \big($ [ ] $\big)\mathscr{U}\big(t -$ [ ] $\big)$

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17. Question Details ZillDiffEQ9 7.4.003. [4568105]

Use Theorem 7.4.1.

THEOREM 7.4.1 Derivatives of Transforms

If $F(s) = \mathscr{L}\{f(t)\}$ and $n = 1, 2, 3, \ldots$, then

$$\mathscr{L}\{t^n f(t)\} = (-1)^n \frac{d^n}{ds^n} F(s).$$

Evaluate the given Laplace transform. (Write your answer as a function of s.)

$$\mathscr{L}\{t \cos(6t)\}$$

[ ]

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18. Question Details ZillDiffEQ9 7.4.007. [4568048]

Use Theorem 7.4.1.

THEOREM 7.4.1 Derivatives of Transforms

If $F(s) = \mathscr{L}\{f(t)\}$ and $n = 1, 2, 3, \ldots$, then

$$\mathscr{L}\{t^n f(t)\} = (-1)^n \frac{d^n}{ds^n} F(s).$$

Evaluate the given Laplace transform. (Write your answer as a function of s.)

$$\mathscr{L}\{te^{2t} \sin(7t)\}$$

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19. Question Details ZillDiffEQ9 7.4.009.EP. [4903638]

Consider the following initial-value problem.

$$y' + y = t \sin(t), \quad y(0) = 0$$

Take the Laplace transform of the differential equation and solve for $\mathscr{L}\{y\}$. (Write your answer as a function of s.)

$\mathscr{L}\{y\} =$

Use the Laplace transform to solve the given initial-value problem. Use the table of Laplace transforms as needed.

$y(t) =$

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20. Question Details ZillDiffEQ9 7.4.013.MI.SA. [4605520]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Use the Laplace transform to solve the given initial-value problem. Use the table of Laplace transforms in Appendix III as needed.

$$y'' + 36y = f(t), \quad y(0) = 0, \quad y'(0) = 1, \text{ where}$$

$$f(t) = \begin{cases} \cos(6t), & 0 \le t < \pi \\ 0, & t \ge \pi \end{cases}$$

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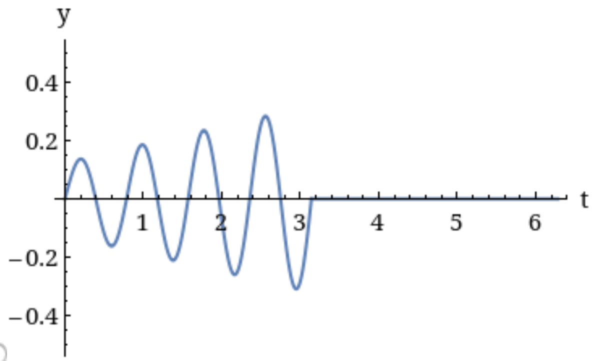
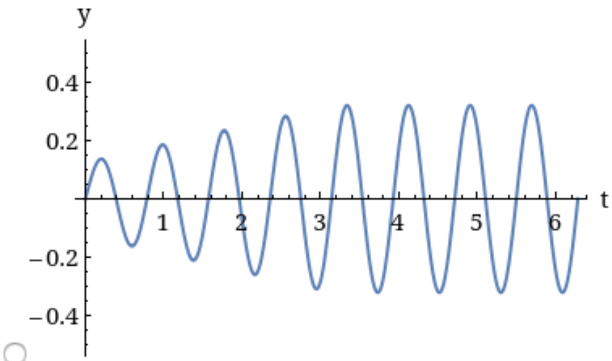
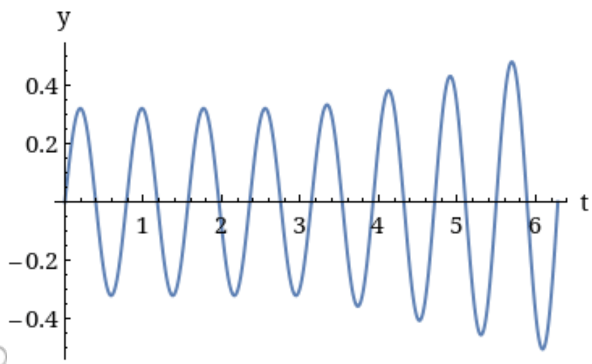
21. Question Details ZillDiffEQ9 7.4.015. [3756043]

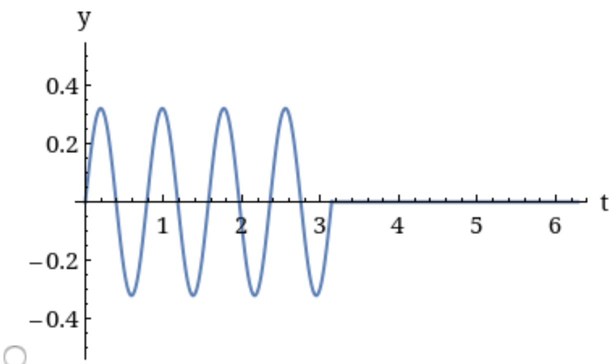
Use the Laplace transform to solve the given initial-value problem. Use the table of Laplace transforms in Appendix III as needed. Use a graphing utility to graph the solution $y(t)$ for $0 \le t < 2\pi$.

$$y'' + 64y = f(t), \quad y(0) = 0, \quad y'(0) = 1, \quad \text{where } f(t) = \begin{cases} \cos 8t, & 0 \le t < \pi \\ 0, & t \ge \pi \end{cases}$$









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22. Question Details ZillDiffEQ9 7.4.017.EP. [4603914] -

In some instances the Laplace transform can be used to solve linear differential equations with variable monomial coefficients. Use Theorem 7.4.1.

THEOREM 7.4.1 Derivatives of Transforms

Reduce the given differential equation to a linear first-order DE in the transformed function $Y(s) = \mathscr{L}\{y(t)\}$.

$$ty'' - y' = 7t^2, \quad y(0) = 0$$

Solve the first-order DE for $Y(s)$. (Write your answer as a function of s.)

$Y(s) =$

Find the general solution $y(t) = \mathscr{L}^{-1}\{Y(s)\}$.

$y(t) =$

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Assignment Details

Name (AID): **Math 2C03 PracPb#11 Section 7.3-4 (18683515)**
Submissions Allowed: **20**
Category: **Homework**
Code:
Locked: **Yes**
Author: **Lia Bronsard (** bronsard@mcmaster.ca **)**
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