EMCF Quiz 8 Due March 4 at 11:59 PM

1. If $f(x) = 2e^{-3x} + \cos 2x + 3x$, then $\mathcal{L}[f(x)] =$

   (a) $\dfrac{2}{s-3} + \dfrac{2}{s^2+4} + \dfrac{3}{s^2}$

   (b) $\dfrac{2}{s-3} + \dfrac{s}{s^2+4} + \dfrac{3}{s^3}$

   (c) $\dfrac{2}{s+3} + \dfrac{2}{s^2+4} + \dfrac{3}{s}$

   (d) $\dfrac{2}{s+3} + \dfrac{s}{s^2+4} + \dfrac{3}{s^2}$

   (e) None of the above.

2. If $f(x) = 2e^{2x} \sin 3x - 2xe^{3x} + 4$, then $\mathcal{L}[f(x)] =$

   (a) $\dfrac{3}{s^2-4s+13} - \dfrac{2}{(s+3)^2} + \dfrac{4}{s}$

   (b) $\dfrac{6}{(s-2)^2+9} + \dfrac{2}{(s-3)^2} + \dfrac{4}{s^2}$

   (c) $\dfrac{6}{s^2-4s+13} - \dfrac{2}{(s-3)^2} + \dfrac{4}{s}$

   (d) $\dfrac{3}{(s-2)^2+13} + \dfrac{2}{(s+3)^2} + \dfrac{4}{s}$

   (e) None of the above.

3. If $f(x) = x^2 + 2x - 3e^x + 5\cos 3x$, then $\mathcal{L}[f(x)] =$

   (a) $\dfrac{2}{s^3} + \dfrac{2}{s^2} - \dfrac{3}{s-1} + \dfrac{5s}{s^2+9}$

   (b) $\dfrac{1}{s^3} + \dfrac{2}{s^2} - \dfrac{3}{s-1} + \dfrac{5}{s^2+9}$

   (c) $\dfrac{2}{s^3} + \dfrac{1}{s^2} + \dfrac{3}{s+1} + \dfrac{5s}{s^2+9}$

   (d) $\dfrac{1}{s^2} + \dfrac{2}{s} - \dfrac{3}{s+1} + \dfrac{15}{s^2+9}$

   (e) None of the above.

4. If $f(x) = 4\cosh x - 3x^2 + 3e^{3x}$, then $\mathcal{L}[f(x)] =$

(a) $\dfrac{2}{s-1} + \dfrac{2}{s+1} - \dfrac{3}{s^3} + \dfrac{1}{s-3}$

(b) $\dfrac{2}{s-1} + \dfrac{2}{s+1} - \dfrac{6}{s^3} + \dfrac{3}{s-3}$

(c) $\dfrac{2}{s+1} - \dfrac{2}{s-1} - \dfrac{6}{s^3} + \dfrac{3}{s+3}$

(d) $\dfrac{4}{s-1} + \dfrac{4}{s+1} - \dfrac{6}{s^3} + \dfrac{3}{s-3}$

(e) None of the above.

5. If $f(x) = 2\cosh x - 2\sinh x$, then $\mathcal{L}[f(x)] =$

(a) $\dfrac{2}{s+1}$

(b) $\dfrac{2s-2}{s^2-1}$

(c) $\dfrac{2s}{s^2-1} - \dfrac{2}{s^2-1}$

(d) $\left(\dfrac{1}{s-1} + \dfrac{1}{s+1}\right) - \left(\dfrac{1}{s-1} - \dfrac{1}{s+1}\right)$

(e) All of the above.

6. If $F(s) = \dfrac{s^2-2s+4}{(s-1)(s+2)^2}$, then $\mathcal{L}^{-1}[F(s)] =$

(a) $\frac{1}{3}e^x - 4xe^{2x} + \frac{2}{3}e^{2x}$

(b) $\frac{2}{3}e^x - 4xe^{-2x} + \frac{1}{3}e^{-2x}$

(c) $\frac{2}{3}e^x + 4xe^{-2x} + \frac{1}{3}e^{-2x}$

(d) $\frac{1}{3}e^x - 4xe^{-2x} + \frac{2}{3}e^{-2x}$

(e) None of the above.

7. If $F(s) = \dfrac{s^2-4}{s^3-3s^2-s+3}$, then $\mathcal{L}^{-1}[F(s)] =$

(a) $\frac{5}{8}e^{3x} + \frac{3}{4}e^x - \frac{3}{8}e^{-x}$

(b) $\frac{1}{8}e^{-3x} + \frac{3}{4}e^x - \frac{5}{8}e^{-x}$

(c) $\frac{3}{8}e^{3x} + \frac{1}{4}e^x - \frac{3}{8}e^{-x}$

(d) $\frac{5}{8}e^{-3x} + \frac{3}{4}e^{-x} - \frac{3}{8}e^x$

(e) None of the above.

8. If $F(s) = \dfrac{s^2+1}{s^4-13s^2+36}$, then $\mathcal{L}^{-1}[F(s)] =$

(a) $\frac{2}{3}e^{3x} - \frac{2}{3}e^{-3x} - \frac{1}{4}e^{2x} + \frac{1}{4}e^{-2x}$
(b) $\frac{1}{3}e^{3x} - \frac{1}{3}e^{-3x} - \frac{3}{4}e^{2x} + \frac{3}{4}e^{-2x}$
(c) $\frac{1}{3}e^{3x} + \frac{1}{3}e^{-3x} + \frac{1}{4}e^{2x} - \frac{1}{4}e^{-2x}$
(d) $\frac{1}{3}e^{3x} - \frac{1}{3}e^{-3x} - \frac{1}{4}e^{2x} + \frac{1}{4}e^{-2x}$
(e) None of the above.

9. If $F(s) = \dfrac{s+4}{s^3+6s^2+9s}$, then $\mathcal{L}^{-1}[F(s)] =$

(a) $\frac{5}{9}x - \frac{4}{9}e^{3x} - \frac{1}{3}xe^{3x}$
(b) $\frac{4}{9} - \frac{4}{9}e^{-3x} - \frac{1}{3}xe^{-3x}$
(c) $\frac{4}{9} + \frac{4}{9}e^{-3x} + \frac{1}{3}xe^{-3x}$
(d) $\frac{4}{9}x^2 + \frac{4}{9}e^{3x} + \frac{1}{3}xe^{3x}$
(e) None of the above.

10. If $F(s) = \dfrac{s^3+3s^2}{s^4+3s^2-4}$, then $\mathcal{L}^{-1}[F(s)] =$

(a) $\frac{1}{5}e^{x} - \frac{2}{5}e^{-x} + \frac{3}{5}\cos 2x + \frac{12}{5}\sin 2x$
(b) $\frac{2}{5}e^{x} + \frac{1}{5}e^{-x} + \frac{4}{5}\cos 2x - \frac{6}{5}\sin 2x$
(c) $\frac{2}{5}e^{x} - \frac{1}{5}e^{-x} + \frac{4}{5}\cos 2x + \frac{6}{5}\sin 2x$
(d) $\frac{2}{5}e^{x} - \frac{1}{5}e^{-x} + \frac{4}{5}\cos 2x + \frac{12}{5}\sin 2x$
(e) None of the above.

11. If $F(s) = \dfrac{s^3+2s-1}{s^4-s^3+3s^2-9s-54}$, then $\mathcal{L}^{-1}[F(s)]$ is:

(a) $\frac{1}{5}e^{-2x} + \frac{16}{45}e^{3x} + \frac{4}{9}\cos\ 3x + \frac{1}{9}\sin 3x$.
(b) $-\frac{8}{45}e^{3x} + \frac{4}{5}e^{-2x} + \frac{2}{9}\cos\ 3x + \frac{4}{9}\sin 3x$.
(c) $\frac{6}{45}e^{3x} - \frac{6}{5}e^{-2x} - \frac{1}{9}\cos\ 3x + \frac{5}{9}\sin 3x$.
(d) $-\frac{1}{5}e^{3x} + \frac{3}{5}e^{-2x} - \frac{5}{9}\cos\ 3x - \frac{2}{9}\sin 3x$.
(e) None of the above.

12. If $F(s) = \dfrac{3s^2 + 5s - 1}{s^3 + 2s^2 + 2s}$, then $\mathcal{L}^{-1}[F(s)] =$

(a) $\frac{1}{2} - \frac{5}{2}\, e^{-x} \cos\, x + \frac{7}{2}\, e^{-x} \sin\, x$
(b) $-\frac{1}{2} + \frac{5}{2}\, e^{-x} \sin\, x + \frac{7}{2}\, e^{-x} \cos\, x$
(c) $-\frac{1}{2} + \frac{5}{2}\, e^{x} \sin\, x + \frac{7}{2}\, e^{x} \cos\, x$
(d) $\frac{1}{2} + \frac{5}{2}\, e^{x} \cos\, x + \frac{7}{2}\, e^{-x} \sin\, x$
(e) None of the above.

13. If $F(s) = \dfrac{s^2 - 2s + 2}{s^3 - 7s^2 + 25s - 39}$, then $\mathcal{L}^{-1}[F(s)] =$

(a) $-\frac{1}{2}e^{-3x} + \frac{1}{2}e^{2x} \cos\, 3x - \frac{1}{2}e^{2x} \sin\, 3x$
(b) $-\frac{1}{2}e^{-3x} + \frac{1}{2}e^{-2x} \cos\, 3x - \frac{1}{4}e^{-2x} \sin\, 3x$
(c) $\frac{1}{2}e^{3x} - \frac{1}{2}e^{2x} \cos\, 3x + \frac{1}{4}e^{2x} \sin\, 3x$
(d) $\frac{1}{2}e^{3x} + \frac{1}{2}e^{2x} \cos\, 3x + \frac{5}{6}e^{2x} \sin\, 3x$
(e) None of the above.

14. If $F(s) = \dfrac{4}{s^3 - 2s^2 + 4s - 8}$, then $\mathcal{L}^{-1}[F(s)]$ is:

(a) $\frac{1}{2}e^{2x} - \frac{1}{2} \cos\, 2x - \frac{1}{2} \sin\, 2x.$
(b) $\frac{1}{2}e^{2x} - \frac{1}{2} \cos\, 2x - \sin\, 2x.$
(c) $\frac{1}{2}e^{-2x} + \frac{1}{2} \cos\, 2x + \frac{1}{2} \sin\, 2x.$
(d) $-\frac{1}{2}e^{-2x} + \frac{1}{2} \cos\, 2x - \frac{1}{2} \sin\, 2x.$
(e) None of the above.

15. If $F(s) = \dfrac{8}{s^3(s^2 - s - 2)}$, then $\mathcal{L}^{-1}[F(s)]$ is:

(a) $3 - 2x + x^2 + \frac{2}{3}e^{2x} - \frac{5}{3}e^{-x}$
(b) $-3 + 2x - 2x^2 + \frac{1}{3}e^{2x} + \frac{8}{3}e^{-x}$
(c) $-3 + 2x - 2x^2 - \frac{1}{3}e^{2x} + \frac{4}{3}e^{-x}$
(d) $3 + 2x + 2x^2 + \frac{8}{3}e^{2x} + \frac{1}{3}e^{-x}$
(e) None of the above.