MATH 2340 WARM-UP PROBLEMS

Consider the differential equation

$$ay'' + by' + cy = 0,\ y(0) = y_0,\ y'(0) = y_0'.$$

Match following parameter sets for a, b, and c with the corresponding graph that matches *a* solution to the initial value problem.

exponential decay + oscillation

1. Figure A $\{a, b, c\} = \{16, 8, 65\}$ $16y'' + 8y' + 65y = 0 \rightarrow \lambda = -\frac{1}{4} \pm 2i$ $y_1 = e^{-\frac{1}{4}x}\cos(2x)$ $y_2 = e^{-1/4x}\sin(2x)$
2. Figure E $\{a, b, c\} = \{4, 4, 1\}$ $\lambda = -\frac{1}{2}$ repeated $y_1 = e^{-\frac{1}{2}x}$, $y_2 = e^{-\frac{1}{2}x} \cdot x$
3. Figure F $\{a, b, c\} = \{16, 8, -3\}$ $\lambda = -\frac{3}{4}$, $\lambda = \frac{1}{4}$
4. Figure B $\{a, b, c\} = \{1, 1, 0\}$ $\lambda = 0$, $\lambda = -1$ $y_1 = e^{-x}$ $y_2 = 1$
5. Figure D $\{a, b, c\} = \{16, -8, 65\}$ $\lambda = \frac{1}{4} \pm 2i$ $y_1 = e^{1/4x}\cos(2x)$ $y_2 = e^{1/4x}\sin(2x)$

Figure ~~(a)~~

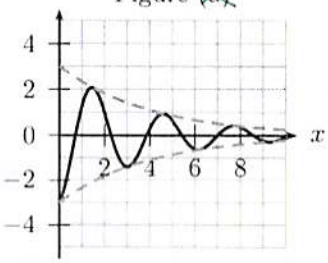


Figure ~~(b)~~

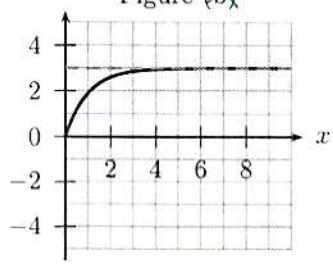


Figure (c)

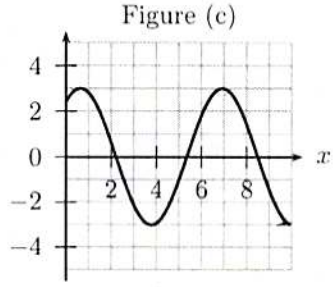


Figure ~~(d)~~

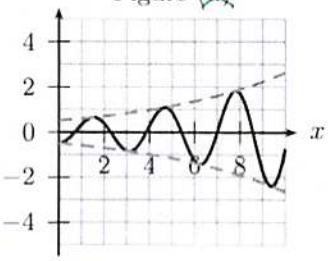


Figure ~~(e)~~

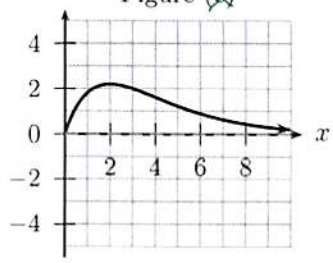
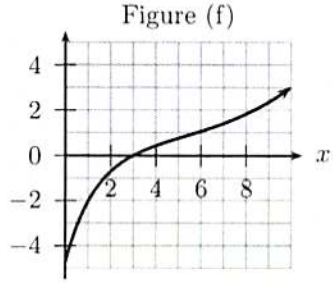


Figure (f)



That's it. No more fun left.