

10. [10 points]

- a. [2 points] Which of the following functions dominates all the others as $x \rightarrow \infty$? **Circle exactly one of the options below.**

$$5 \left(\frac{2}{3}\right)^x \quad \boxed{e^{0.5x}} \quad (1.6)^{x-3} \quad 8(1.6)^{-x} \quad 10x^{100} \quad 2^{x/2}$$

- b. [2 points] Which of the following functions dominates all the others as $x \rightarrow -\infty$? **Circle exactly one of the options below.**

$$5 \left(\frac{2}{3}\right)^x \quad e^{0.5x} \quad (1.6)^{x-3} \quad \boxed{8(1.6)^{-x}} \quad 10x^{100} \quad 2^{x/2}$$

- c. [2 points] Circle **all** intervals over which $(x - 1)^{2016}(x - 2)^{2017}(x - 3)^{2018}$ is positive.

$$(-\infty, 1) \quad (1, 2) \quad \boxed{(2, 3)} \quad \boxed{(3, \infty)} \quad \text{NONE OF THESE}$$

- d. [2 points] Which of the following functions are periodic? Circle **all** correct options.

$$\boxed{e^{\sin(x)}} \quad e^{0.1x} \sin(3x) \quad \cos(x^2)$$

$$\boxed{\sin^2(2x) + 3 \cos^5(4x)} \quad \text{NONE OF THESE}$$

- e. [2 points] Which of the following expressions could be a formula for $f(x)$, given that $\lim_{x \rightarrow \infty} f(x) = \infty$. Circle **all** correct options.

$$\boxed{e^{0.01x^2-x}} \quad \boxed{x^6 + e^{-2x}} \quad x^6 e^{-2x}$$

$$\ln(x + 2017) - \ln(x + 2016) \quad \text{NONE OF THESE}$$