10. [9 points] The parts of this problem are unrelated. No justification is required for your answers.

a. [3 points] Which of the following could be the value of a if

$$1 - \frac{4a^2}{2!} + \frac{16a^4}{4!} - \frac{(2a)^6}{6!} + \frac{(2a)^8}{8!} - \cdots = \frac{1}{2}?$$

Circle **all** options which apply.

i. $a = 0$

ii. $\boxed{a = \frac{\pi}{6}}$

iii. $a = \frac{\pi}{3}$

iv. $a = \frac{\pi}{2}$

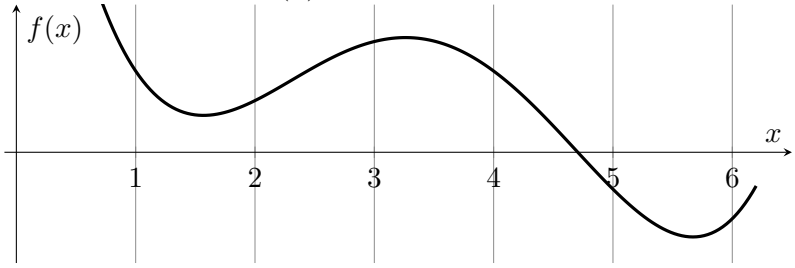
v. $a = \frac{2\pi}{3}$

vi. $\boxed{a = \frac{5\pi}{6}}$

vii. $a = \pi$

viii. NONE OF THESE

b. [3 points] A graph of a function $y = f(x)$ is sketched below.



Suppose that for some constant b, the Taylor polynomial of degree 3 for $f(x)$ around $x = b$ is given by $P_3(x) = 4 - (x-b) + 2(x-b)^2 - 3(x-b)^3$. Which of the following could be the value of b? Circle **all** options which apply.

i. $\boxed{b = 1}$

ii. $b = 2$

iii. $b = 3$

iv. $b = 4$

v. $b = 5$

vi. $b = 6$

c. [3 points] Which of the following is the Taylor series approximation around $x = 0$ to

$$\int_0^x e^{t^2}\, dt?$$

Circle the **one** best option.

i. 0

ii. $\displaystyle\sum_{n=0}^{\infty} \frac{x^{2n}}{n!}$

iii. $\displaystyle\sum_{n=0}^{\infty} \frac{t^{2n}}{n!}$

iv. $\displaystyle\sum_{n=0}^{\infty} \frac{x^n}{2(n!)}$

v. $\displaystyle\sum_{n=0}^{\infty} \frac{x^{2n+1}}{n!}$

vi. $\boxed{\displaystyle\sum_{n=0}^{\infty} \frac{x^{2n+1}}{n!(2n+1)}}$