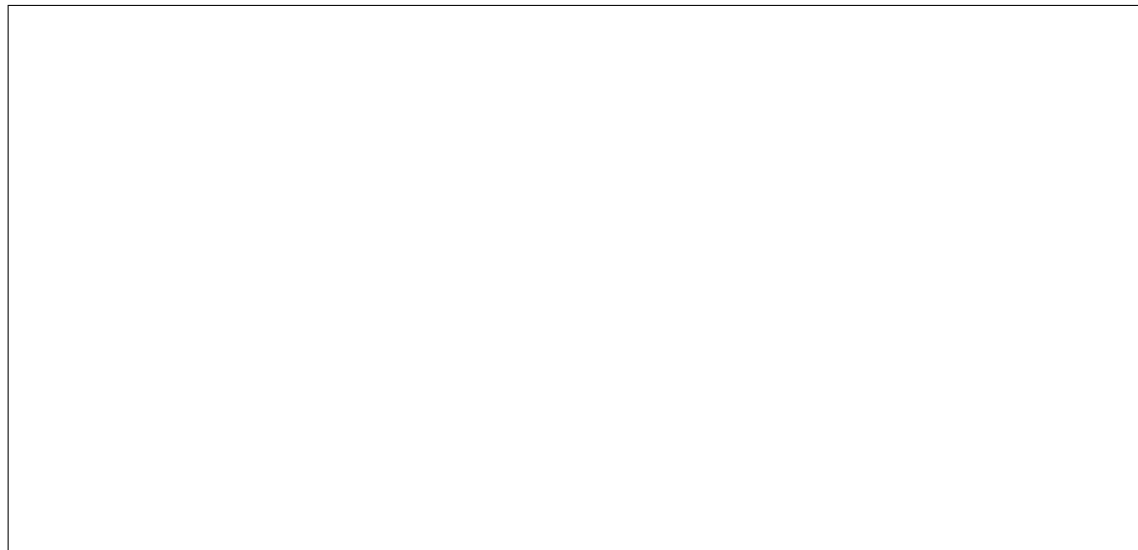
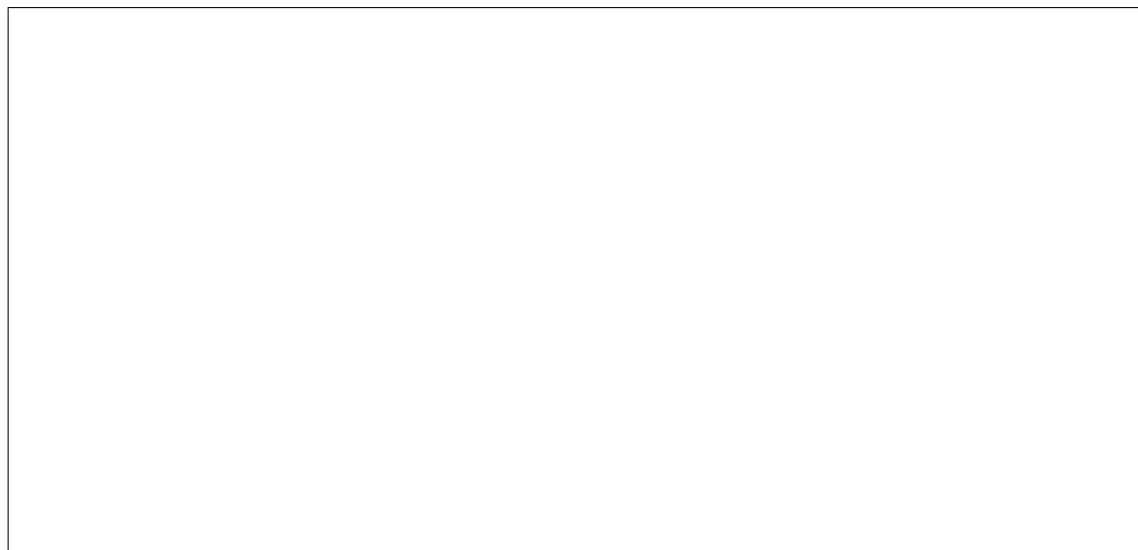


QUESTION 2.

- a) Find the Taylor polynomial of degree n of $f(x) = e^x$ near $x = 1$.



- b) Approximate $\sqrt{e^3}$ using the Taylor polynomial obtained in (a) of degree $n = 3$.



QUESTION 3. Complete the following steps needed to sketch the graph of the function

$$f(x) = e^{-\frac{x^2-3x+1}{2}}.$$

a) Determine the domain of $f(x)$:

Answer:

b) Determine the vertical asymptotes of $f(x)$:

c) Determine the horizontal asymptote(s):

$$\lim_{x \rightarrow +\infty} f(x) =$$

$$\lim_{x \rightarrow -\infty} f(x) =$$

Answer: $y =$.

d) Determine the zeros of f (if any) and the value of f at $x = 0$:

Zeros of f : . $f(0) =$.

e) Compute the derivative $f'(x)$, find the critical points of $f(x)$, and determine the sign of $f'(x)$ and behavior of $f(x)$.

$$f'(x) =$$

Critical point(s): $x =$.

x	$-\infty$	$\frac{3}{2}$	$+\infty$
sign of $f'(x)$		0	
behaviour of $f(x)$			

- f) Compute the second derivative $f''(x)$, determine its sign, find the inflection points and determine the concavity of $f(x)$.

$f''(x) =$.

x	$-\infty$	0.5	2.5	$+\infty$
sign of $f''(x)$		0	0	
concavity of $f(x)$				

Inflection points: $x_1 =$ and $x_2 =$.

- g) Sketch the graph of $f(x)$.

QUESTION 4. Determine the following limits: (a) $\lim_{x \rightarrow 0} \frac{1 - \cos(x)}{x \tan(x)}$

(b) $\lim_{t \rightarrow 0} \frac{7^t - 6^t}{t}$

(c) $\lim_{x \rightarrow 1} \frac{1 - x + \ln x}{1 + \cos(2\pi x)}$