

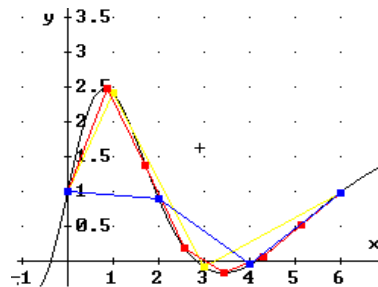
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#1: Curso 2019-20
#2: PRACTICA 5: INTERPOLACIÓN II
#3: LOAD(F:\0 Ampliación 1920\PRACTICAS 19-20\Interpol18.mth)
#4: =====
#5: 1. Acotar el error gráficamente
#6: =====
#7: ==> 1.1

      x      3
      e  - x  + 2·x
#8: f(x) := -----
      COSH(x)

#9: TABLE(f(s), s, [0, 1, 3, 6])
#10: TABLE(f(s), s, 0, 6, 2)
#11: TABLE(f(s), s, 0, 6,  $\frac{6}{7}$ )
#12: Se borran la tablas despues de dibujar.
#13: T1(x): amarillo; T2(x): azul; T3(x): rojo

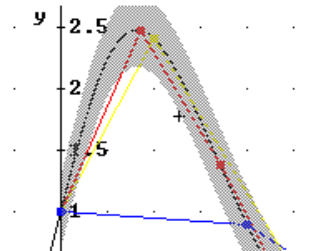
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#14: f(x) - 0.3 < y < f(x) + 0.3 ^ 0 < x < 6

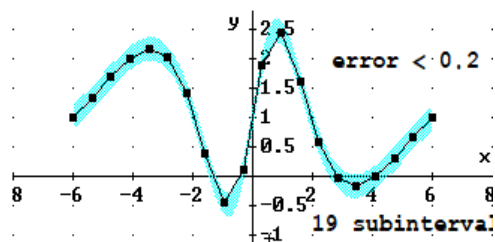
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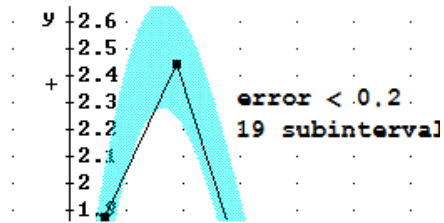


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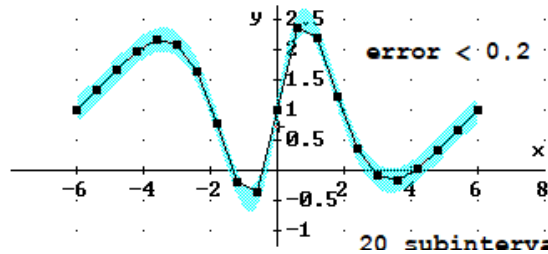
#15: ==> 1.2
#16: n+1 nodos ==> n subintervalos ==> tamaño de paso h=(b-a)/n
#17: Mayor tamaño de paso <=> mínimo número de nodos
#18: f(x) - 0.2 < y < f(x) + 0.2 ^ -6 < x < 6
#19: TABLE(f(s), s, -6, 6,  $\frac{12}{19}$ )

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#20: TABLE(f(s), s, -6, 6, 12/20)
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#21: n=20
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#22: =====
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#23: 2. Error (real) de interpolación
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#24: =====
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#25: f(x) := COS(x)
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#26: ==> 2.1
```

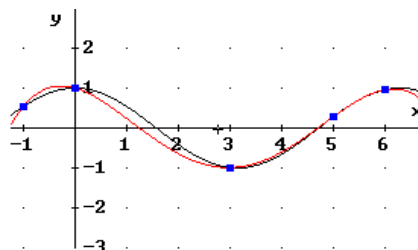
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#27: f(x) := COS(x)
```

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#28: P(x) := LF([-1, 0, 3, 5, 6], x)
```

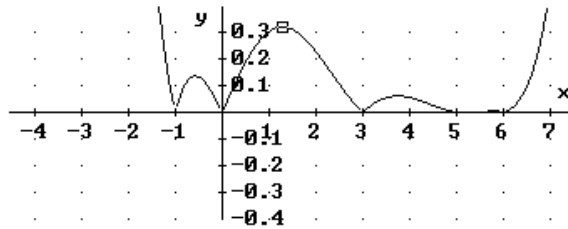
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#29: P(x) := (x*(x+1)*(x-3)*(x-5)*COS(6))/126 + (x*(x+1)*(3-x)*(x-6)*COS(5))/60 +
          (x*(x+1)*(x-5)*(x-6)*COS(3))/72 + (x*(x-3)*(x-5)*(x-6)*COS(1))/168 +
          ((x+1)*(3-x)*(x-5)*(x-6))/90
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#30: TABLE(f(s), s, [-1, 0, 3, 5, 6]) = [ -1  COS(1) ]
                                           [  0   1      ]
                                           [  3  COS(3) ]
                                           [  5  COS(5) ]
                                           [  6  COS(6) ]
```

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#31: No se pide dibujar esta gráfica:
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#32: |f(x) - P(x)|
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#33:  $\frac{d}{dx} |f(x) - P(x)|$

#34:  $\text{NSOLVE}\left(\frac{d}{dx} |f(x) - P(x)|, x, 1, 2\right)$

#35:  $x = 1.280154234$

#36:  $|f(1.280154234) - P(1.280154234)|$

#37:  $0.3202539965$

#38:  $\implies 2.2$  (Cota para el error en  $[-1, 6]$ )

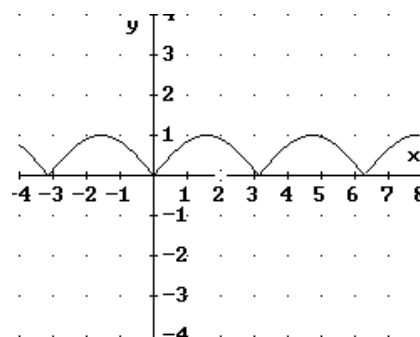
#39: (1) Cota de la derivada en el intervalo  $(1, 6)$ :

#40:  $\left(\frac{d}{dx}\right)^5 f(x)$

#41:  $-\sin(x)$

#42:  $\left|\left(\frac{d}{dx}\right)^5 f(x)\right|$

#43:  $|\sin(x)|$

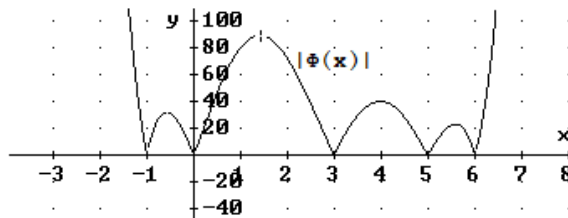


#44: .... en  $(-1, 6)$ :  $|\sin x| \leq 1$

#45: (2) Máximo de  $|\Phi(x)|$  en  $[-1, 6]$ :

#46:  $\Phi(x) := (x + 1) \cdot x \cdot (x - 3) \cdot (x - 5) \cdot (x - 6)$

#47:  $|\Phi(x)|$



#48:  $\frac{d}{dx} |\Phi(x)|$

#49:  $\text{NSOLVE}\left(\frac{d}{dx} |\Phi(x)|, x, 1, 2\right)$

#50:  $x = 1.40900524$

#51:  $|\Phi(1.40900524)|$

#52: 89.03088094

#53: .... la cota para el error  $|f(x) - P(x)|$  es:

#54:  $\frac{1}{5!} \cdot 1.89.03088094$

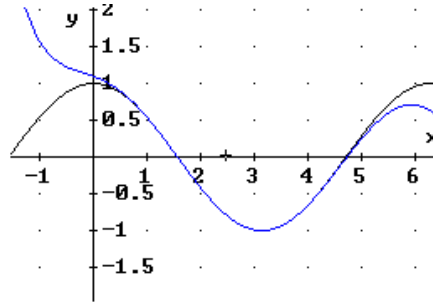
#55: 0.7419240078

#56: =====

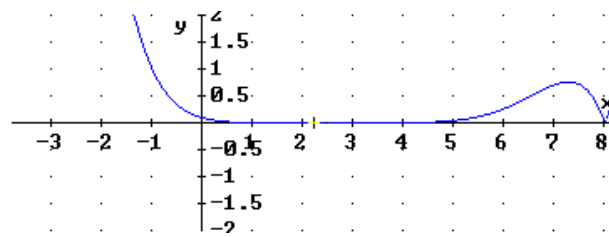
#57: ==> 2.3

#58: ==> 2.3.a)

#59:  $T_6(x) := \text{TAYLOR}(\cos(x), x, 2.5, 6)$



#60:  $|f(x) - T_6(x)|$

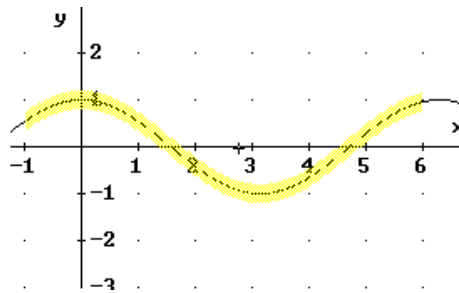


#61:  $|f(-1) - T_6(-1)|$

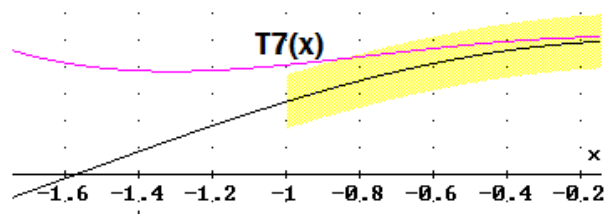
#62: 1.039238897

#63: ==> 2.3.b)

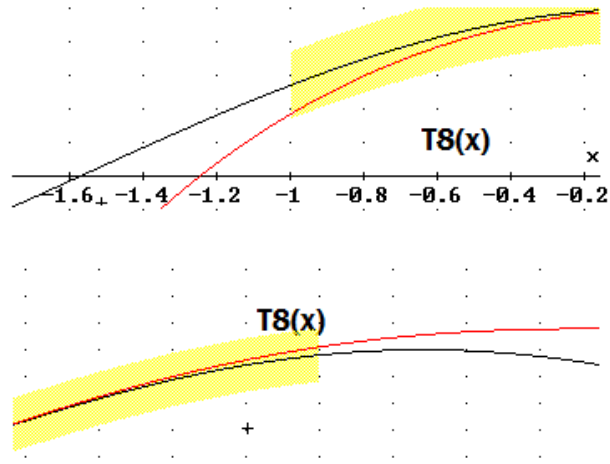
#64:  $f(x) - 0.2 < y < f(x) + 0.2 \wedge -1 < x < 6$



#65:  $\text{TAYLOR}(\cos(x), x, 2.5, 7)$



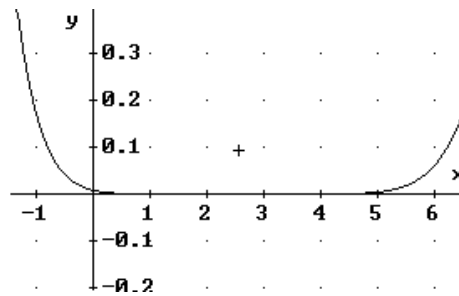
#66:  $\text{TAYLOR}(\cos(x), x, 2.5, 8)$



#67: ==> 2.3.c)

#68:  $T_8(x) := \text{TAYLOR}(f(x), x, 2.5, 8)$

#69:  $|f(x) - T_8(x)|$



#70:  $|f(-1) - T_8(-1)|$

#71: 0.1721940755

#72: ===== FIN =====