

Find each of the following, then sketch the graph. Show work/logic used.

NO GRAPHING CALCULATORS

1.  $f(x) = x^4 - 12x^3 + 48x^2 - 64x$   $x(x-4)^3$

A: Intercepts:

B: Symmetry:

x-intercept(s)  $(0,0)(4,0)$

y-axis:  $\text{Y/N}$                      

y-intercept(s)  $(0,0)$

origin:  $\text{Y/N}$                      

C: Domain  $(-\infty, \infty)$

D: Vertical Asymptote(s): N/A

Range  $(-27, \infty)$

Horizontal Asymptote: N/A

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

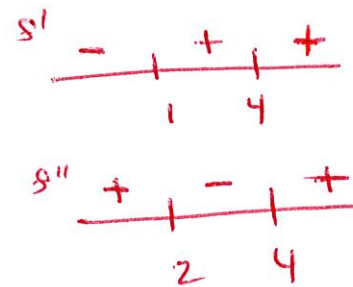
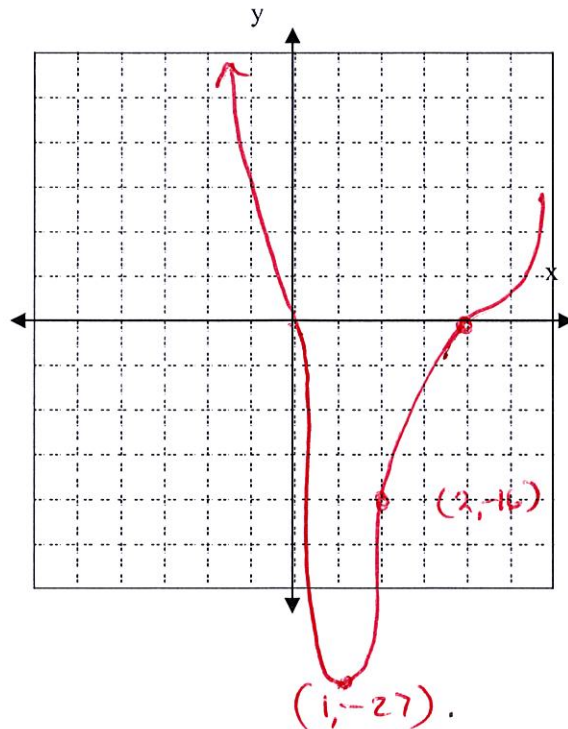
E:  $f'(x) = 4x^3 - 36x^2 + 96x - 64$   
 $4(x-1)(x-4)^2$

Critical Point(s):  $x=1$   $x=4$

F:  $f''(x) = 12(x-4)(x-2)$

Inflection Point(s):  $(4,0)$   $(2,-16)$

Label Axis



Find each of the following, then sketch the graph. Show work/logic used.

NO GRAPHING CALCULATORS

1.  $f(x) = \frac{x}{\sqrt{x^2 + 2}}$

A: Intercepts:

x-intercept(s) (0, 0)

y-intercept(s) (0, 0)

B: Symmetry:

y-axis: Y/N

origin: Y/N yes

C: Domain  $(-\infty, \infty)$

Range  $(-1, 1)$

D: Vertical Asymptote(s): \_\_\_\_\_

Horizontal Asymptote:  $y=1$   $y=-1$

End Behavior: \_\_\_\_\_

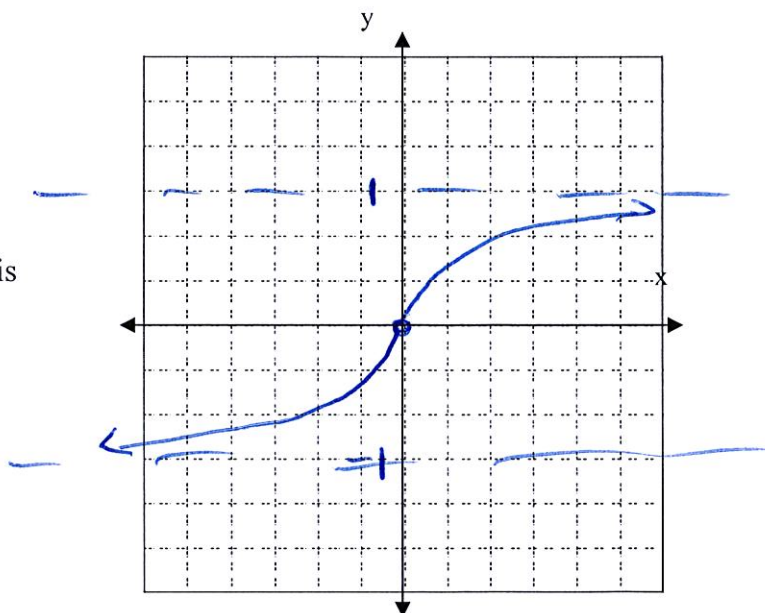
E:  $f'(x) = \frac{2}{(x^2+2)^{3/2}}$

Critical Point(s): none

F:  $f''(x) = \frac{6x}{(x^2+2)^{5/2}}$

Inflection Point(s): (0, 0)

Label Axis





Find each of the following, then sketch the graph. Show work/logic used.

NO GRAPHING CALCULATORS

1.  $f(x) = x \tan(x) \left( -\frac{3\pi}{2}, \frac{3\pi}{2} \right)$

A: Intercepts:

x-intercept(s)  $(-\pi, 0) (0, 0) (\pi, 0)$

y-intercept(s)  $(0, 0)$

B: Symmetry:

y-axis: Y

origin: Y/N

C: Domain  $x \neq -\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$

Range  $(-\infty, \infty)$

D: Vertical Asymptote(s):  $x = -\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$

Horizontal Asymptote: none

End Behavior:  $\infty$

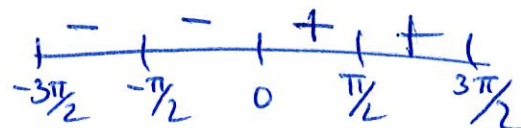
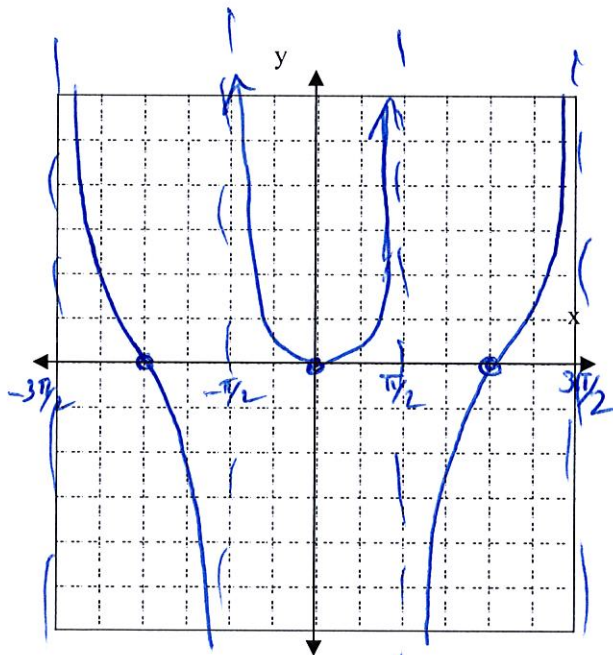
E:  $f'(x) = \frac{x + \sin x \cos x}{\cos^2 x}$

Critical Point(s):  $x = 0$

F:  $f''(x) = \frac{2(\cos x + x \sin x)}{\cos^3(x)}$

Inflection Point(s):  $\pm 2.80, 0$

Label Axis





Find each of the following, then sketch the graph. Show work/logic used.

NO GRAPHING CALCULATORS

1.  $f(x) = \frac{x^2}{\sqrt{x+1}}$

A: Intercepts:

x-intercept(s) (0, 0)

y-intercept(s) (0, 0)

B: Symmetry:

y-axis: Y/N N

origin: Y/N N

C: Domain  $(-1, \infty)$

Range  $[0, \infty)$

D: Vertical Asymptote(s):  $x = -1$

Horizontal Asymptote: NONE

End Behavior: \_\_\_\_\_

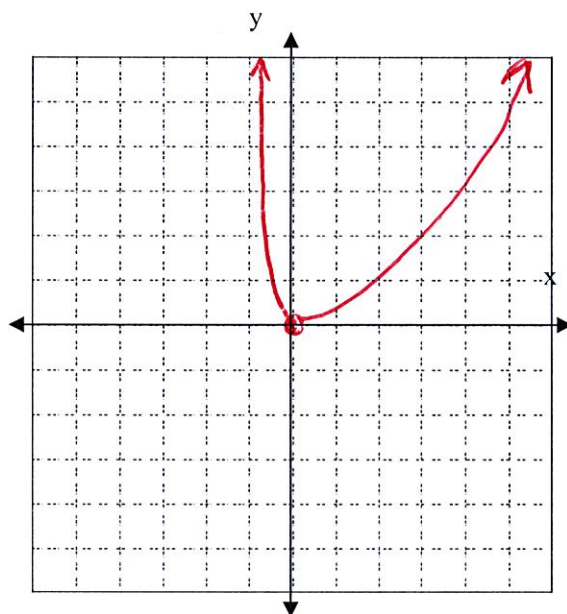
E:  $f'(x) = \frac{x(3x+4)}{2(x+1)^{3/2}}$

Critical Point(s):  $x=0$   $x=-1$   
 *$x \neq -4/3$  not in domain*

F:  $f''(x) = \frac{3x^2+8x+8}{4(x+1)^{5/2}}$

Inflection Point(s): none

Label Axis



Find each of the following, then sketch the graph. Show work/logic used.

NO GRAPHING CALCULATORS

1.  $f(x) = 2\cos(x) + \sin(2x)$   $[-2\pi, 2\pi]$

A: Intercepts:

x-intercept(s)  $(\frac{\pi}{2}, 0)$   $(\frac{3\pi}{2}, 0)$

y-intercept(s)  $(0, 2)$

B: Symmetry:

y-axis: Y/N Y

origin: Y/N Y

C: Domain  $-\infty, \infty$

D: Vertical Asymptote(s): N/A

Range \_\_\_\_\_

Horizontal Asymptote: N/A

End Behavior: \_\_\_\_\_

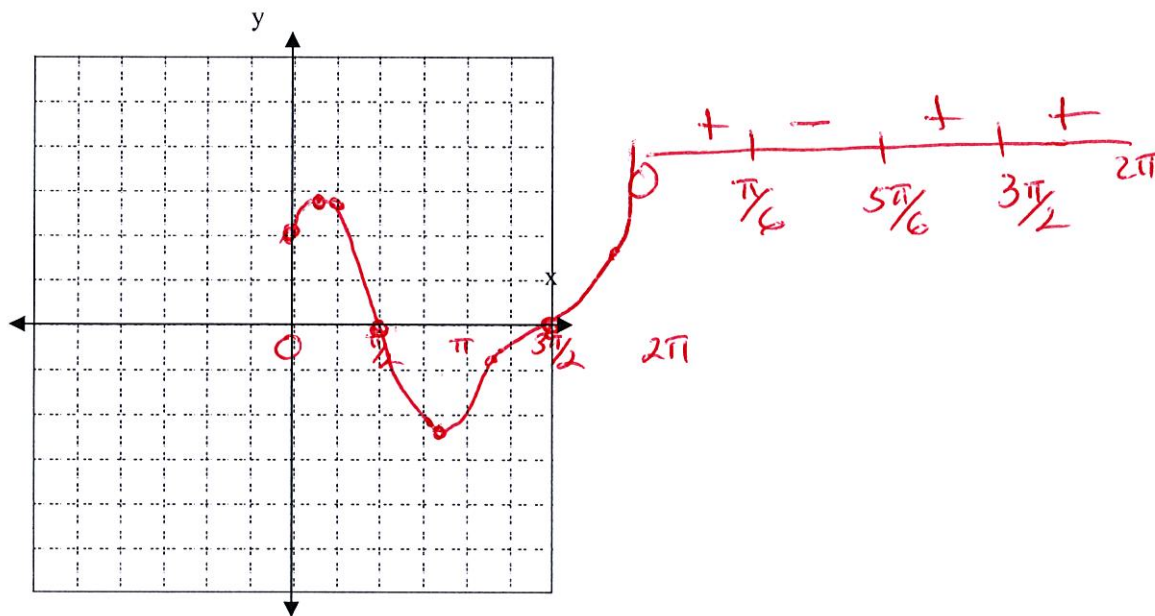
E:  $f'(x) = -2(2\sin x - 1)(\sin x + 1)$

Critical Point(s):  $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2}$

F:  $f''(x) = -2\cos x(1 + 4\sin x)$

Inflection Point(s):  $\frac{\pi}{2}, \frac{3\pi}{2}$   $\sin x = -\frac{1}{4}$

Label Axis



Find each of the following, then sketch the graph. Show work/logic used.

NO GRAPHING CALCULATORS

1.  $f(x) = 3\sin(x) - \sin^3(x)$   $[-2\pi, 2\pi]$

A: Intercepts:

x-intercept(s)  $(n\pi, 0)$

y-intercept(s)  $(0, 0)$

B: Symmetry:

y-axis: Y/N

origin: Y/N

C: Domain  $(-\infty, \infty)$

Range \_\_\_\_\_

D: Vertical Asymptote(s): N/A

Horizontal Asymptote: N/A

End Behavior: \_\_\_\_\_

E:  $f'(x) =$  \_\_\_\_\_

Critical Point(s):  $x = -3\pi/2, -\pi/2, \pi/2, 3\pi/2$

F:  $f''(x) =$  \_\_\_\_\_

Inflection Point(s):  $(0, 0)$

Label Axis

