Panel 1

Limits

c) $\lim_{x \to -5} (-x^2 + x) = -30$

5) $\lim_{x \to -2} \frac{x+2}{x^2 - x - 6} = \frac{-5}{0}$ undef.

$\lim_{x \to -2} \frac{x+2}{(x-3)(x+2)} = -\frac{1}{5}$

a) $\lim_{x \to \infty} \frac{7x - x^3}{2x^3 + 1} = -\frac{1}{2}$

1

Panel 2

Continuity:

(1) $f(c)$ exists
(2) $\lim_{x \to c} f(x)$ exists
(3) (1) = (2)

} then f is cont. at $x = c$

$$f(x) = \begin{cases} 6 & x = 1 \\ \frac{x^2 + 4x - 5}{x - 1} & x \neq 1 \end{cases}$$

(1) $f(1) = 6$

(2) $\lim_{x \to 1} \frac{x^2 + 4x - 5}{x - 1} = \lim_{x \to 1} \frac{(x-1)(x+5)}{x-1} = 6$

(3)

YES, continuous

2

Panel 3

$f(x) = -7x^2 + 4x$

$f'(x) = -14x + 4$

$= \lim_{h \to 0} \frac{f(x+h) - f(x)}{h} = \lim_{h \to 0} \frac{[-7(x+h)^2 + 4(x+h)] - [-7x^2 + 4x]}{h}$

$= \lim_{h \to 0} \frac{-7x^2 - 14xh - 7h^2 + 4h + 4x + 7x^2 - 4x}{h}$

$= \lim_{h \to 0} \frac{h(-14x - 7h + 4)}{h} =$

$\lim_{h \to 0} -14x - 7h + 4 = -14x + 4$

3

Panel 4

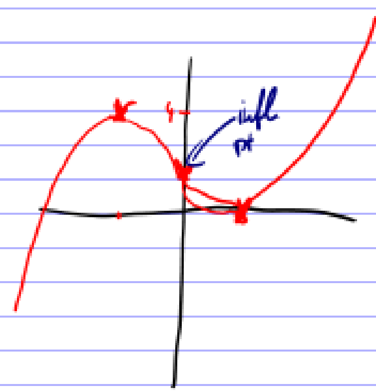
Sketch $f(x) = x^3 - 3x + 2$

① $f'(x) = 3x^2 - 3 = 3(x^2 - 1) = 0$, $x = +1, -1$ critical

② $f''(x) = 6x = 0 \Rightarrow x = 0$ possible infl. point

③

	-2	-1	-1/2	0	1/2	+1	+2
f'	+		−		−		+
f''	−		−		(+)		+
f							



④ $f(-1) = 4$

$f(1) = 0$ $f(0) = 2$

4

Panel 5

6) $\int e^x - x^2 - 5 \, dx = e^x - \frac{1}{3}x^3 - 5x + C$

$$\int_1^e x^2 - \frac{1}{x} \, dx = \frac{1}{3}x^3 - \ln(x) \Big|_1^e = \left[\frac{1}{3}e^3 - \ln(e)\right] - \left[\frac{1}{3} - \ln(1)\right] = \frac{1}{3}e^3 - 1 - \frac{1}{3}$$

$f'(x) = \sqrt{x} - 3$, $f(4) = -1$. Find $f(x)$

$$f(x) = \int \sqrt{x} - 3 \, dx = \frac{2}{3}x^{3/2} - 3x + C$$

$x^{1/2}$

$f(4) = \frac{2}{3}4^{3/2} - 3 \cdot 4 + C = -1$

$\frac{16}{3} - 12 + C = -1$

$C = -1 + 12 - \frac{16}{3}$

5

Panel 6

Solve using Gauss Jordan Elimination

$3x + y + z = 2$
$x - y + z = 0$
$-x + 4y - 2z = 3$

$3x + y + z = 2$
$3y - z = 3$
$-x + 4y - 2z = 3$

$3x + y + z = 2$
$3y - z = 3$
$13y - 5z = 11$

$3x + y + z = 2$
$-39y + 13z = -39$
$39y - 15z = 33$

$3x + y + z = 2$
$-39y + 13z = -39$
$-2z = -6$

x = fraction
y = horrible fraction
z = 3

6

Panel 7

Say profit p & quantity q. linear function

$\boxed{p = p(q)}$ Say line goes through $(1, 3)$ and $(5, 7)$ (q, p)

$$m = \frac{7-3}{5-1} = \frac{4}{4} = 1$$

$$p - 3 = 1\,(q - 1)$$

$$y - \_ = \_\,(x - \_)$$

$$p = q - 1 + 3 = q + 2$$

$$R(q) = q \cdot p = q(q+2)$$

7