Pg 176
39, 40, 49
39) $c = -\frac{1}{2}$
40) $-\frac{1}{3}$
49) $y-1 = \frac{1}{4}(x-4)$
find pts
$f(1)=\sqrt{1}=(1,1)$
$f(9)=\sqrt{9}\ (9,3)$
$\frac{3-1}{9-1}=\frac{1}{4}$
$y-1=\frac{1}{4}(x-1)$
$y-2=\frac{1}{4}(x-4)$
[1, 9]
find $\frac{1}{2\sqrt{x}} = \frac{1}{4}$
$4 = 2/\sqrt{x}$
$2=\sqrt{x}$
$4=x$
$f(4)=\sqrt{4}=2$
(4, 2)

Pg 186
1) inc (0,6) (8,9)
dec (6,8) (9,10)
2) inc (4,5) (6,7)
dec (-3,1) (1,4) (5,6)
5) (-∞,-2) (2,∞)
D: (-2,2)
11) inc (1,∞)
dec (-∞,1)
12) inc (-3,3)
dec (-∞,-3) ∪ (3,∞)
18) inc (-4,∞)
dec (-∞,-4)
rel max (-4,-6)
19) inc (-∞,1)
dec (1,∞)
rel max (1,5)

6-9
$f(1)\cdot f(0) = 3x^2-2x-2$
$-1 = 3x^2-2x-2$
$c = -\frac{1}{3}, 1$
(-1, 1)

find $3x^2-2x$
$3x^2-2x-2$
$3x^2-2x-1=0$
$(3x+1)(x-1)=0$
$x=-\frac{1}{3}$ $x=1$
$c=-\frac{1}{3}$ $c=1$
$\frac{1-1}{1}=-1$
$c=-\frac{1}{3}$
$c=1$

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More increasing, decreasing, relative max and relative min problems Day 2 Trig and Fractions

V.A

Find where f(x) inc dec and any relative max or relative min points:

1) $f(x)=\frac{x^4+1}{x^2}$

$u(x)=x^4+1$ $v(x)=x^2$
$u'(x)=4x^3$ $v'(x)=2x$

$f'(x) = \frac{4x^5-2x(x^4+1)}{(x^2)^2}$

$f'(x)=\frac{4x^5-2x^5-2x}{x^4} = \frac{2x^5-2x}{x^4}$

$n=0$ $d=0$
$2x^5-2x=0$ $x^4=0$
$2x(x^4-1)=0$ $x=0$
$2x(x^2-1)(x^2+1)=0$
$x=0$ $x^2-1=0$ $x^2+1=0$
$x=\pm1$ $x^2=-1$

$2(-\frac{1}{2})^5-2(-\frac{1}{2})$
$-\frac{2}{32}+1$
$-\frac{2}{32}-1$
$2(\frac{1}{2})^5-2(\frac{1}{2})$
$\frac{2}{32}-1$
$f(0)$ $\frac{0^4+1}{0^2}=\frac{1}{0}$ und
$f(1)$ $\frac{(+1)^4+1}{(+1)^2}=2$
$f(-1)$ $\frac{(-1)^4+1}{(-1)^2}=2$
$\frac{+1}{(1)^2}=2$

inc (-1,0) ∪ (1,∞)
dec (-∞,-1) ∪ (0,1)
rel max (-1, 2)
rel min (1, 2)

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2) $f(x)=(x^2-4)^{\frac{2}{3}}$

C.R.
$f'(x)=\frac{2}{3}(x^2-4)^{-\frac{1}{3}}(2x)$
$f'(x)=\frac{4x}{3\sqrt[3]{x^2-4}}$
-2 0 2
dec (-∞,-2) ∪ (0,2)
inc (-2,0) (2,∞)
rel min (-2,0) (2,0)
rel max (0, $\sqrt[3]{16}$)

I: x^2-4
D: $2x$

$n=0$ $d=0$
$4x=0$ $\sqrt[3]{x^2-4}=0$
$x=0$ $\sqrt[3]{x^2-4}=0$
$x^2-4=0$
$x=\pm2$

$(0^2-4)^{2/3}$
$\sqrt[3]{(-4)^2}=\sqrt[3]{16}$

$4x$
$3\sqrt[3]{x^2-4}$
$3\sqrt[3]{-5}$

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3) $f(x)=\cos^2 x-\cos x$ $[0,2\pi]$

$f(x)=(\cos x)^2-\cos x$
$f'(x)=2(\cos x)^1\cdot(-\sin x)-(-\sin x)$
$f'(x)=-2\cos x\sin x+\sin x=0$
$\sin x(-2\cos x+1)=0$

$\sin x=0$
$-2\cos x+1=0$
$-2\cos x=-1$
$\cos x=\frac{1}{2}$
$\{\frac{\pi}{3}, \frac{5\pi}{3}\}$

I: cos x
D: -sin x

$-2\cos(\frac{\pi}{2})+1$
$-2\cos(\frac{3\pi}{2})+1$
$-2\cos(\frac{5\pi}{3})+1$
$f'(x)$
$\sin x$
$-2\cos x+1$
$(-\frac{1}{2})+1$

inc $(\frac{\pi}{3},\pi) \cup (\frac{5\pi}{3},2\pi)$
dec $(0,\frac{\pi}{3}) \cup (\pi,\frac{5\pi}{3})$
rel max: $(\pi, 2)$
rel min: $(\frac{\pi}{3}, -\frac{1}{4})$ $(\frac{5\pi}{3}, -\frac{1}{4})$

$f(\pi)=\frac{\cos^2\pi}{(-1)^2}-(-1)$
$(\cos\frac{\pi}{3})^2-\cos\frac{\pi}{3}$
$(\frac{1}{2})^2-\frac{1}{2}$
$\frac{1}{4}-\frac{1}{2}$

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4) f(x)=x- 2sinx $[0,2\pi]$

$f'(x)=1-2\cos x$
$1-2\cos x=0$
-1 -1
$\frac{-2\cos x}{-2}=\frac{-1}{-2}$
$\cos x=\frac{1}{2}$
ref: $\frac{\pi}{3}$

test 0: $1-2\cos 0$
$1-2(1)=-$
π: $1-2\cos\pi$
$2(-1)\to+$

dec: $(0,\frac{\pi}{3}) \cup (\frac{5\pi}{3},2\pi]$
inc $(\frac{\pi}{3},\frac{5\pi}{3})$
rel min $(\frac{\pi}{3}, \frac{\pi}{3}-\sqrt{3})$
rel max: $(\frac{5\pi}{3}, \frac{5\pi}{3}+\sqrt{3})$

$f(\frac{\pi}{3})=\frac{\pi}{3}-2\sin\frac{\pi}{3}$
$f(\frac{5\pi}{3})=\frac{5\pi}{3}-2\sin\frac{5\pi}{3}$

$\frac{5\pi}{3}+\sqrt{3}\cdot\frac{3}{3}\to\frac{5\pi+3\sqrt{3}}{3}$

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