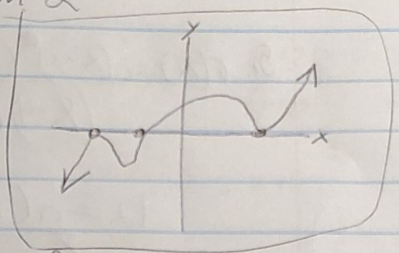
Math 418

Oct. 20

Exam 2

1. $p(x) = 3(x^2-16)(x^2+6x+8)(x-4)$

$3(x-4)^2(x+4)^2(x+2)$



2. $f(x) = \frac{4x^4-5x+1}{-3x^2+2}$

$-3x^2+2 \;\overline{)\; 4x^4+0x^3+0x^2-5x+1}$

$-4/3x^2 - 8/9$

$4x^4+0x^3-8/3x^2$

$8/3x^2-5x+1$

$8/3x^2+0x-16/9$

$-5x+25/9$

$(-3x)? = (8/3)/3$

-8

$-x = \frac{8}{3} \div \frac{3}{1}$

$-x = 8/3 \cdot 1/3 = 8/9$

$\frac{2}{1} \cdot \frac{-8}{9} = \frac{-16}{9}$

$-4/3x^2 - 8/9 + \frac{-5x+25/9}{3x^2+2}$

3. $f(x) = \sqrt{2-3x}$ $g(x) = x^2+4$

$(g \circ f)(x) = \sqrt{2-3x}^2 + 4 = 2-3x+4 = -3x+6$

$(f \circ g)(x) = \sqrt{2-3(x^2+4)} = \sqrt{2-3x^2-12} = \sqrt{-3x^2-10}$

4. $p(x) = 2kx^5 + k^2x^3 - 3x$ $0 = 2k(-1)^5 + k^2(-1)^3 - 3(-1)$

$-k^2-2k+4$ $-(k^2+2k-4)$

-1 $-(k-$

$k^2(-1)^5 + 2k(-1)^3 - 3(-1)$

$-k^2-2k+4$

$-x^2-2x+4$

$(x-2)(x-2)$

x^2+2x-4

$x-2$

no solution

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5. $r(x) = a\dfrac{(x-3)^2(x+1)(x+4)(x+2)(x-2)}{(x+4)(x+2)(x-2)}$

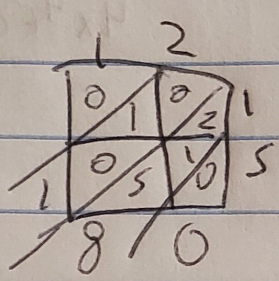
$-2 \cdot 3 \cdot -1$

$12 = \dfrac{a(1-3)^2(1+1)(1-2)}{(1+4)(1+2)(1-2)}$

$5 \cdot 3 \cdot -1$

$12\left(\dfrac{4}{-15}a\right)^{-15}$

$12 \cdot -15 = \dfrac{-180}{4}$



$4 \overline{)180}$ — 45; 16, 20

$$r(x) = \frac{45(x+2)(x-2)(x-3)}{(x+4)(x+2)(x-2)}$$

6. $p(x) = a(x-2)(x+1)(x)^2$

$10 = a(1-2)(1+1)(1)^2$

$10 = a \cdot -1 \cdot 2 \cdot 1$

$\dfrac{10}{-2} = \dfrac{-2a}{-2}$ $\quad a = -5$

$$p(x) = -5(x+1)(x)^2(x-2)$$

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7.

A) solve $\left(\frac{1+x}{5-x}\right)=\left(\frac{1}{x+2}\right)^{x+2}$

$\frac{x+2}{1}$

$\frac{x^2+3x+2}{-x^2+3x+10}$ $-x+5$ $\frac{(1+x)(x+2)}{(5-x)}=x+2$

x^2+2x-3

$\left(\frac{x+1}{-x+5}\right)=\frac{1}{x+2}$ $\frac{(x-1)(x+3)}{}$

$x=-3,1$

$-x$

$\frac{(-x+5)a}{-x+5}=\frac{(x+2)}{-x+5}$ $-\frac{2}{5}$

$\frac{x+2}{x+2}\left(\frac{1+x}{5-x}\right)\left(\frac{1}{x+2}\right)^{\frac{5-x}{5-x}}$ $(x+2)(x+1)=x^2+3x+2$ $(5-x)(x+2)\ -x^2+3x+10$

$\frac{x^2+3x+2}{-x+5}=x+2$ $-2x+5$

$\frac{(x+1)(x+2)}{x+5}=1$

$\left(\frac{-x+5}{1}\right)\left(\frac{(x+1)(x+2)}{-x+5}\right)=1(-x+5)$

$(x+1)(x+2)=-x+5$

$x^2+3x+2=-x+5$

$+x\ -5\ +x\ -5$

$x^2+4x-3=0$

$(x-1)(x+3)=0$

B) Solve $5t^3+2=13$ $-2\ -2$

$\frac{5t^3}{5}=\frac{11}{5}$ $\sqrt[3]{t^3}=\sqrt[3]{11/5}$ $t=\sqrt[3]{11/5}$

C) solve $\left(\frac{1}{1-x}\right)^2+2\left(\frac{1}{1-x}\right)+1=0 \rightarrow x^2+2x+1=0$

$(x+1)(x+1)=0$

$\frac{1}{1-x}=0$

$\frac{1}{1-x}\cdot\frac{1}{1-x}=\frac{1}{1-2x+x^2}$

$\frac{1}{1-2x+x^2}+\left(\frac{2}{1-x}\right)^{\frac{1+x}{1-x}}+1=0$

$\frac{1}{1-2x+x^2}+\frac{2-2x}{1-2x+x^2}+\frac{1-2x+x^2}{1-2x+x^2}$ $2-2x+1-2x+x^2=x^2-4x+3$ $\frac{x^2-4x+3}{x^2-2x+1}=0$

$\frac{(x-1)(x-3)}{(x-1)(x-1)}=0$

$\frac{x-3}{x-1}=0$

$x=3$