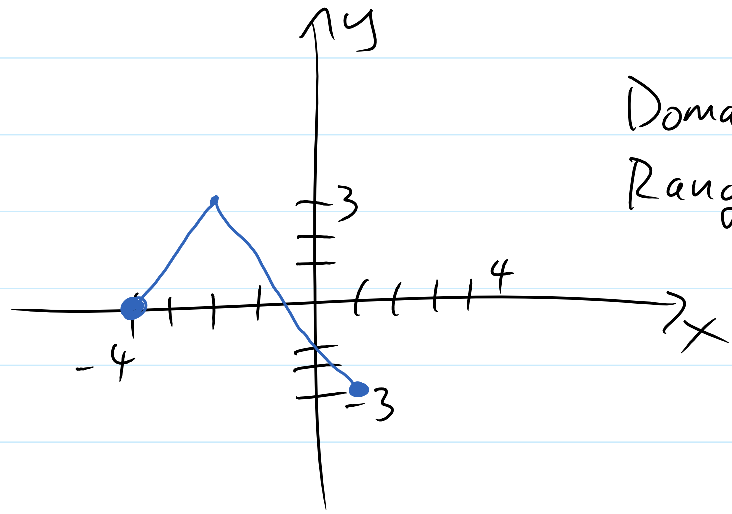
10/1

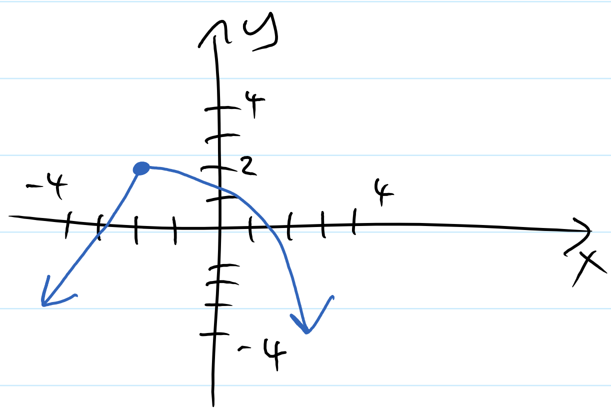
Sunday, October 1, 2017 8:29 PM

functions:



Domain: $[-4, 1]$

Range: $[-3, 3]$



Dom: $(-\infty, \infty)$

Range: $(-\infty, 2]$

P.3

Simplify:

- $3\sqrt[3]{24} + \sqrt[3]{81} = 3\cdot\sqrt[3]{2^3}\cdot\sqrt[3]{3} + \sqrt[3]{3^3}\cdot\sqrt[3]{3}$

  $= 3\cdot 2\cdot\sqrt[3]{3} + 3\cdot\sqrt[3]{3}$

  $= 6\sqrt[3]{3} + 3\sqrt[3]{3}$

  $= \boxed{9\sqrt[3]{3}}$

  $24 = 2\cdot 2\cdot 2\cdot 3 = 2^3\cdot 3$

  $81 = 9\cdot 9 = 3^4 = 3^3\cdot 3$

- $\sqrt{20} + 6\sqrt{5} = \sqrt{4}\cdot\sqrt{5} + 6\sqrt{5}$

  $20 = 4\cdot 5 = 2^2\cdot 5$

$\bullet\ \sqrt{20}+6\sqrt{5}=\sqrt{4}\cdot\sqrt{5}+6\sqrt{5}$ $\quad 20=4\cdot 5=2^2\cdot 5$

$=2\sqrt{5}+6\sqrt{5}=\boxed{8\sqrt{5}}$

$\bullet\ \left(x^{\frac{2}{3}}\right)^3+\sqrt{16x^4}=x^{\frac{2}{3}\cdot 3}+\sqrt{16}\cdot\sqrt{x^4}=x^2+4\left(x^4\right)^{\frac{1}{2}}$

$=x^2+4x^2=\boxed{5x^2}$

P.5/1.5

Solve:

$\bullet\ x^3+3x^2+25x=-75$

$\quad +75 \quad +75$

$\underbrace{x^3+3x^2}+\underbrace{25x+75}=0$

$x^2(x+3)+25(x+3)=0$

$(x+3)(x^2+25)=0$

$x+3=0$

$-3 \quad -3$

$\boxed{x=-3}$

$x^2+25=0$

$x^2=-25$

$x=\pm\sqrt{-25}=\pm i\sqrt{25}$

$=\boxed{\pm 5i}$

$\bullet\ 10x^2(x+1)-7x(x+1)-6(x+1)=0$

// factor

$(x+1)(10x^2-7x-6)=0$

$(x+1)(\underbrace{10x^2-12x}+\underbrace{5x-6})=0$

$A\cdot C=-60$, $A+C=-7$ $\Big\}$ $A=-12$, $C=5$

$(x+1)\left(2x(5x-6)+(5x-6)\right)=0$

$(x+1)(5x-6)(2x+1)=0$

$x+1=0 \qquad 5x-6=0 \qquad 2x+1=0$

$(x+1)(5x-6)(2x+1)=0$

$x+1=0$ $\quad$ $5x-6=0$ $\quad$ $2x+1=0$

$\boxed{x=-1}$ $\quad$ $5x=6$ $\quad$ $2x=-1$

$\boxed{x=6/5}$ $\quad$ $\boxed{x=-1/2}$

P.6

- $\dfrac{x^2+x}{x^2-4} \div \dfrac{x^2-1}{x^2+5x+6} = \dfrac{x(x+1)}{\underbrace{(x-2)(x+2)}} \div \dfrac{(x-1)(x+1)}{\underbrace{(x+2)(x+3)}}$

$a^2-b^2=(a-b)(a+b)$

$$= \frac{x\cancel{(x+1)}}{(x-2)\cancel{(x+2)}} \cdot \frac{\cancel{(x+2)}(x+3)}{\underbrace{(x-1)\cancel{(x+1)}}} = \boxed{\frac{x(x+3)}{(x-2)(x-1)}}$$

$x \neq \pm 2, -3, \pm 1$

- $\dfrac{x-3}{\frac{x-2}{x-2}\cdot x - \dfrac{3}{\underbrace{x-2}}} = \dfrac{x-3}{\dfrac{x(x-2)}{x-2} - \dfrac{3}{x-2}} = \dfrac{x-3}{\dfrac{x^2-2x-3}{x-2}} = \dfrac{\frac{x-3}{1}}{\dfrac{x^2-2x-3}{x-2}}$

$$= \frac{x-3}{1} \cdot \frac{x-2}{\underbrace{x^2-2x-3}} = \frac{\cancel{x-3}}{1} \cdot \frac{x-2}{\underbrace{\cancel{(x-3)}(x+1)}} = \boxed{\frac{x-2}{x+1}}$$

$x \neq 2, 3, -1$

- $\dfrac{\dfrac{x}{x-2}+1}{\dfrac{3}{x^2-4}+1} = \dfrac{\dfrac{x}{\underbrace{x-2}} + 1 \cdot \dfrac{x-2}{x-2}}{\dfrac{3}{\underbrace{(x-2)(x+2)}} + 1 \cdot \dfrac{(x-2)(x+2)}{(x-2)(x+2)}} = \dfrac{\dfrac{x}{x-2} + \dfrac{x-2}{x-2}}{\dfrac{3+(x-2)(x+2)}{(x-2)(x+2)}}$

$\dfrac{x+x-2}{x-2}$ $\quad$ $2x-2$ $\quad$ $\cancel{(x-2)}(x+2)$

$$= \frac{\frac{x+x-2}{x-2}}{\frac{3+x^2-4}{(x-2)(x+2)}} = \frac{2x-2}{\cancel{x-2}} \cdot \frac{\cancel{(x-2)}(x+2)}{x^2-1}$$

$$= \frac{2\cancel{(x-1)}}{1} \cdot \frac{x+2}{\cancel{(x-1)}(x+1)} = \boxed{\frac{2(x+2)}{x+1}} = \boxed{\frac{2x+4}{x+1}} \quad x \neq \pm 2, \pm 1$$

1.4

express in standard form: $a+bi$

- $\frac{5i}{2-i} \cdot \frac{2+i}{2+i} = \frac{5i(2+i)}{4-i^2} = \frac{10i+5i^2}{4-(-1)} = \frac{10i+5(-1)}{5}$

  $= \frac{-5}{5} + \frac{10i}{5} = \boxed{-1+2i}$

- $\frac{4}{(2+i)(3-i)} = \frac{4}{6-2i+3i-i^2} = \frac{4}{6-(-1)+i}$

  $= \frac{4}{7+i} \cdot \frac{7-i}{7-i} = \frac{28-4i}{49-(-1)} = \frac{\cancel{2}(14-2i)}{\cancel{50}_{25}} = \frac{14-2i}{25}$

  $= \boxed{\frac{14}{25} - \frac{2}{25}i}$

1.5

$ax^2+bx+c=0 \rightarrow x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ discriminant

Solve:

- $x^2-3x-7=0$

$(-3)^2 - 4\cdot 1\cdot(-7) = 9 + 28 = 37 > 0 \to 2$ real solutions

$$x = \boxed{\frac{3 \pm \sqrt{37}}{2}} = \boxed{\frac{3}{2} \pm \frac{1}{2}\sqrt{37}}$$

- $3x^2 = 2x - 1$

$3x^2 - 2x + 1 = 0$

$(-2)^2 - 4\cdot 3\cdot 1 = 4 - 12 = -8 \to 2$ complex solutions

$$\frac{+2 \pm \sqrt{-8}}{2} = \frac{2 \pm i\sqrt{4}\cdot\sqrt{2}}{2} = \frac{\cancel{2}}{\cancel{2}} \pm \frac{i\cdot\cancel{2}\cdot\sqrt{2}}{\cancel{2}} = \boxed{1 \pm \sqrt{2}\cdot i}$$

$$\frac{2 \pm 2i\sqrt{2}}{2} = \frac{\cancel{2}(1 \pm i\sqrt{2})}{\cancel{2}} = \boxed{1 \pm \sqrt{2}\,i}$$

$\boxed{1.6}$ solve:

- $\sqrt{2x-1} + 2 = x$

$\phantom{\sqrt{2x-1}} -2 \quad -2$

$(\sqrt{2x-1})^2 = (x-2)^2$

$2x - 1 = x^2 - 2x\cdot 2 + 4$

$0 = x^2 - 4x + 4 - 2x + 1$

$0 = x^2 - 6x + 5$

$0 = (x-1)(x-5)$

$x - 1 = 0 \qquad x - 5 = 0$

$\boxed{x=1}$

$\sqrt{2-1} + 2 = 1$

$\sqrt{1} + 2 = 1$

$3 = 1$ False

$\boxed{x=5}$

$\sqrt{10-1} + 2 = 5$

$\sqrt{9} + 2 = 5$

$x-1=0$ $\quad$ $x-5=0$ $\quad$ $\sqrt{9}+2=5$

$\cancel{\boxed{x=1}}$ $\quad$ $\boxed{x=5}$ $\quad$ $3+2=5$

True