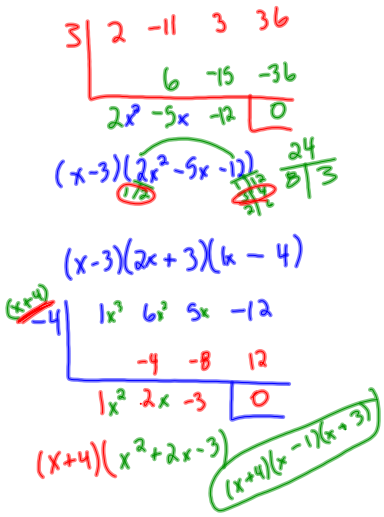
Bellwork:

factor completely given x-3 is a factor:

$f(x)=2x^3-11x^2+3x+36$



1) $(4x^4+5x-4)\div(x^2-3x-2)$
long division

2) Factor completely
$f(x)=x^3-9x^2+8x+60$;

Chapter 5.6: Find Rational Zeros

Rational Root Theorem: If given a polynomial that has integer coefficients, then every rational zero is in the form....

$\pm\frac{p}{q}$

p is the factors of the constant term

q is the factors of the leading coefficient

List the possible rational zeros:

$$f(x)=1x^3+2x^2-11x+12$$

$\frac{P}{Q}=\frac{12}{1}=\frac{1,2,3,4,6,12}{1}$

$\pm1,\pm2,\pm3,\pm4,\pm6,\pm12$

$$f(x)=4x^4-x^3-3x^2+9x-10$$

$\frac{P}{Q}=\frac{10}{4}=\frac{1,2,5,10}{1,2,4}$

$\pm1,\pm2,\pm5,\pm10,\pm\frac{1}{2},\pm\frac{5}{2},\pm\frac{1}{4},\pm\frac{5}{4}$

Find all the real zeros of:

$$f(x)=x^3-8x^2+11x+20$$

$\frac{P}{Q}=\frac{20}{1}=\frac{1,2,4,5,10,20}{1}$

$\pm1,\pm2,\pm4,\pm5,\pm10,\pm20$

$$\begin{array}{r|rrr} -1 & 1 & -8 & 11 & 20 \\ & & -1 & 9 & -20 \\ \hline & 1x^2 & -9x & 20 & 0 \end{array}$$

$(x+1)(x^2-9x+20)$

$(x+1)(x-4)(x-5)$ $x=-1,4,5$

Find all real roots of:

$$f(x)=10x^4-11x^3-42x^2+7x+12$$

$\frac{P}{Q}=\frac{12}{10}=\frac{1,2,3,4,6,12}{1,2,5,10}$

$\pm1,\pm2,\pm3,\pm4,\pm6,\pm12,\pm\frac{1}{2},\pm\frac{3}{2},\pm\frac{1}{5},\pm\frac{2}{5},\pm\frac{3}{5},\pm\frac{4}{5},\pm\frac{6}{5},\pm\frac{12}{5},\pm\frac{1}{10},\pm\frac{3}{10}$

$\frac{3}{5}$ | 10 -11 -42 7 12

6 -3 -27 -12

$10x^3-5x^2-45x-20$ | 0

$(5x-3)(10x^3-5x^2-45x-20)$

$-\frac{1}{2}$ | 10 -5 -45 -20

-5 5 20

$10x^2-10x-40$ | 0

$(5x-3)(2x+1)(10x^2-10x-40)$

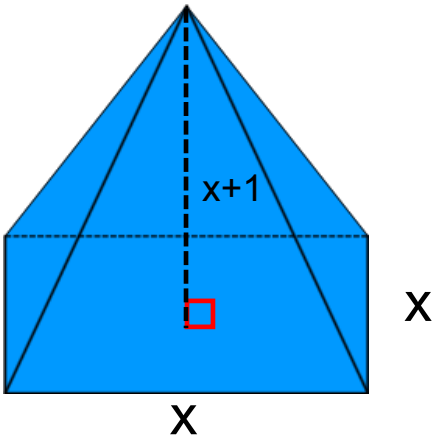
$x=\frac{10\pm\sqrt{(-10)^2-4(10)(-4)}}{2(10)}$

$x=\frac{10\pm\sqrt{100+1600}}{20}$

$x=\frac{10\pm\sqrt{1700}}{20}$ $1700 = 17 \cdot 100 = 10 \cdot 10$

$x=\frac{10\pm10\sqrt{17}}{20}$

$x=\frac{1\pm\sqrt{17}}{2}$ $x=-\frac{1}{2},\frac{3}{5}$



Volume is 4 what is x?

$$V=\frac{1}{3}Bh$$

factor: $f(x)=x^3-5x^2+7x-35$

grouping $x^2(x-5)+7(x-5)$

$(x-5)(x^2+7)$

$\frac{p}{q}=\frac{35}{1}=\frac{1,5,7,35}{1}$

$\pm1,\pm5,\pm7,\pm35$

5 | 1 −5 7 −35

5 | 1 5 0 35

$1x^2+0x+7$ | 0

$(x-5)(x^2+7)$

zeros: $x=5$

$x^2+7=0$

$x^2=-7$

$x=\pm\sqrt{7}i$

Factor: $9x^4+3x^3-30x^2+6x+12$

$3(3x^4+x^3-10x^2+2x+4)$

$\frac{p}{q}=\frac{4}{3}=\frac{1,2,4}{1,3}$

$\pm1,\pm2,\pm4,\pm\frac{1}{3},\pm\frac{2}{3},\pm\frac{4}{3}$

1 | 3 1 −10 2 4

3 4 −6 −4

−2 | 3 4 −6 −4 | 0

−6 4 4

$3x^2-2x-2$ | 0

$(x-1)(x+2)(3x^2-2x-2)$

zeros: $x=1,-2$

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

$x=\frac{2\pm\sqrt{4+24}}{6}$

$x=\frac{2\pm\sqrt{28}}{6}$ (28 = 2 · 14 = 2 · 2 · 7)

$x=\frac{2\pm2\sqrt{7}}{6}$

$x=\frac{1\pm\sqrt{7}}{3}$

Homework: Chapter 5.6 pg.374 #'s 3-6,13-16,20,22,24-34e