$P(1+i)^n = R\left(\frac{(1+i)^n - 1}{i}\right)$

Solve for P to find what J.G. Wentworth thinks your annuity is worth, today

$\sum_{k=1}^{n} ar^{k-1} = a\left(\frac{1-r^n}{1-r}\right)$

$\frac{15}{14} + \frac{45}{98} + \dots + \frac{405}{4802}$

Find the geometric sum

$a = \frac{15}{14} = a_1$

$\frac{a_2}{a_1} = \frac{\frac{45}{98}}{\frac{15}{14}} = \frac{\cancel{45}^{3}}{\cancel{98}_{\cancel{49}_{7}}} \cdot \frac{\cancel{14}^{\cancel{7}^{1}}}{\cancel{15}_{1}} = \frac{3}{7} = r$

$\frac{15}{14} + \frac{15}{14}\cdot\frac{3}{7} + \dots + \frac{15}{14}\left(\frac{3}{7}\right)^{?}$

? = n-1. Need to find n.

$\frac{405}{4802} = \frac{15}{14}\cdot\left(\frac{3}{7}\right)^{n-1}$

$\frac{\cancel{14}^{\cancel{7}^{1}}}{\cancel{15}_{\cancel{3}_{1}}} \cdot \frac{\cancel{405}^{\cancel{81}^{27}}}{\cancel{4802}_{\cancel{2401}_{343}}} = \left(\frac{3}{7}\right)^{n-1} = \frac{27}{343} = \frac{3^{n-1}}{7^{n-1}}$

$\boxed{7 \,|\, 343 \quad 7 \,|\, 49 \quad 7}$

$\frac{3^3}{7^3} = \left(\frac{3}{7}\right)^3 = \left(\frac{3}{7}\right)^{n-1}$

So $3 = n-1$

$\boxed{4 = n}$

So we're looking at $\sum_{k=1}^{4} \frac{15}{14}\left(\frac{3}{7}\right)^{k-1}$

$= \frac{15}{14}\left(\frac{1-\left(\frac{3}{7}\right)^4}{1-\frac{3}{7}}\right) = \frac{15}{14}\left(\frac{1-\frac{81}{2401}}{1-\frac{3}{7}}\right)$

$= \frac{15}{14}\left(\frac{\frac{2401}{2401} - \frac{81}{2401}}{\frac{4}{7}}\right) = \frac{15}{14}\left(\frac{\left(\frac{2320}{2401}\right)}{\left(\frac{4}{7}\right)}\right)$

$3 \,|\, 15 \quad 5$

$= \frac{15}{\cancel{14}_{7}}\cdot\frac{\cancel{7}^{1}}{\cancel{4}_{1}}\left(\frac{\cancel{2320}^{\cancel{580}^{290}}}{2401}\right) = \frac{4350}{2401}$

$2 \,|\, 290 \quad 5 \,|\, 145 \quad 29$

$2401 = 7^4$

$= \frac{3\cdot5\cdot2\cdot5\cdot29}{7^4}$

So numerator and denominator are relatively prime.

No common factors

$\frac{2}{3}$ is nicer.

Show that $+0x$

$f(x) = 2x^4 + 7x^3 - x^2 - 5$ has a root

in $(0,2)$.

f is a polynomial. They're continuous!

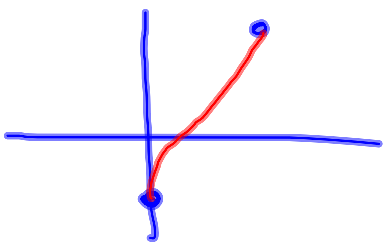
$f(0) = -5 < 0$ IVT. All ya need.

$f(2)$:

$$\begin{array}{r|rrrrr} 2 & 2 & 7 & -1 & 0 & -5 \\ & & 4 & 22 & 42 & 84 \\ \hline & 2 & 11 & 21 & 42 & \boxed{79 = f(2)} > 0 \end{array}$$

Therefore there is a $c \in (0,2)$ such that $f(c) = 0$ (since $-5 = f(0) < 0 < f(2) = 79$)

by I.V.T.



Use Synthetic Division to determine if $x+5$ is a factor of

$$f(x) = x^4 - 2x^3 + 4x^2 - 10x + 25$$

$$\begin{array}{r|rrrrr}
-5 & 1 & -2 & 4 & -10 & 25 \\
 & & -5 & 35 & -195 & 1025 \\
\hline
 & 1 & -7 & 39 & -205 & \boxed{1050 \neq 0 \text{ No}}
\end{array}$$

Binomial Theorem

$$(2x-3)^6 =$$

$$\begin{array}{ccccccccccccc}
 & & & & & & 1 & & & & & & \\
 & & & & & 1 & & 1 & & & & & \\
 & & & & 1 & & 2 & & 1 & & & & \\
 & & & 1 & & 3 & & 3 & & 1 & & & \\
 & & 1 & & 4 & & 6 & & 4 & & 1 & & \\
 & 1 & & 5 & & 10 & & 10 & & 5 & & 1 & \\
1 & & 6 & & 15 & & 20 & & 15 & & 6 & & 1
\end{array}$$

halfway home

$$1(2x)^6(-3)^0 + 6(2x)^5(-3)^1 + 15(2x)^4(-3)^2 + 20(2x)^3(-3)^3$$

$$+ 15(2x)^2(-3)^4 + 6(2x)^1(-3)^5 + 1(2x)^0(-3)^6$$

$$= 64x^6 + 6(2)^5(-3)x^5 + 15(-3)^2(2)^4x^4$$

$$+ 20(8)(-27)x^3 + 15(4)(81)x^2 + 12(-243)x + (-3)^6$$

$$= 64x^6 - 576x^5 + 2160x^4 - 4320x^3 + 4860x^2 - 2916x + 729$$

Apr 29-9:23 AM

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} = \begin{bmatrix} 1+4+9 \\ 4+10+18 \end{bmatrix} = \begin{bmatrix} 14 \\ 32 \end{bmatrix}$$

$2\times3 \quad 3\times1$

What's $(f\circ g)(x)$ if $f(x)=\sqrt{x-1}$ and $g(x)=x^2-3x+3$?

$$(f\circ g)(x) = f(g(x)) = \sqrt{g(x)-1}$$

$$=\sqrt{x^2-3x+3-1} = \sqrt{x^2-3x+2}$$

What's the domain of f?

Need $x-1\geq 0$ $\quad \mathcal{D}=\{x \mid x\geq 1\} = \mathcal{D}(f)$

$x \geq 1$

What's the domain of g? $\mathbb{R}$

What's .. .. of $f\circ g$?

$$\mathcal{D}(f\circ g) = \{x \mid g(x)\geq 1\} = \{x \mid x\leq 1 \text{ OR } x\geq 2\}$$

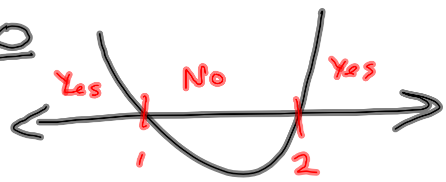
$$= (-\infty,1]\cup[2,\infty)$$

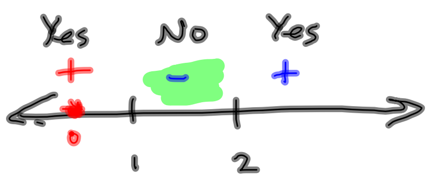
Solve $g(x)\geq 1$

$x^2-3x+3\geq 1$

$x^2-3x+2\geq 0$

$(x-2)(x-1)\geq 0$





test $x=0$:

$0^2-3(0)+2=2$

2 is "+"

FINAL.

MONDAY,

9:10 am.