Questions from Homework

① $a = 80000$ $\quad t_n = ar^{n-1}$

$t_5 = 117128$ $\quad \frac{117128}{80000} = \frac{80000r^4}{80000}$

$n = 5$ $\quad (1.4641)^{1/4} = (r^4)^{1/4}$

$r = ?$ $\quad \boxed{1.1 = r}$

$1.1 - 1 = 0.1$

$0.1 \times 100 = 10\%$

The annual rate of increase is 10%.

⑤ a) $\sum_{n=1}^{5} n^2 + 1$

$= 2 + 5 + 10 + 17 + 26$

$= \boxed{60}$

b) $\sum_{n=1}^{\infty} (3)\left(\frac{1}{2}\right)^{n-1}$ (a, r)

$S_n = \frac{a}{1-r}$

$= \frac{3}{1-\frac{1}{2}}$

$= 3 \div \frac{1}{2}$

$= \boxed{6}$

① $t_{12} = 15$ $\quad S_{15} = 105$

$t_n = a + (n-1)d$

$t_{12} = a + 11d$

$a + 11d = 15$

$S_n = \frac{n}{2}(2a + (n-1)d)$

$S_{15} = \frac{15}{2}(2a + 14d)$

$S_{15} = 15a + 105d$

$15a + 105d = 105$

$15a + 105d = 105$

$a + 11d = 15$ ← ⑤

$15a + 105d = 105$

(−) $15a + 165d = 225$

$-60d = -120$

$d = 2$

$a + 11d = 15$

$a + 11(2) = 15$

$a + 22 = 15$

$a = -7$

$-7 + (-5) + (-3)$ → $-7 -5 -3$

Functions Toolkit 1

1. Factor Completely

a) $x^4 - 28x^2 + 36$

$\sqrt{36} = 6 \times 2 = 12$

$(x^4 - 12x^2 + 36) - 16x^2$

$(x^2 - 6)^2 - 16x^2$

$(x^2 - 6 + 4x)(x^2 - 6 - 4x)$

b) $9x^4 + 38x^2 + 49$

$\sqrt{441} = 21 \times 2 = 42$

$(9x^4 + 42x^2 + 49) - 4x^2$

$(3x^2 + 7)^2 - 4x^2$

$(3x^2 + 7 + 2x)(3x^2 + 7 - 2x)$

when $x=2 \rightarrow (x-2)$ is a factor

2. For the following: $y = x^3 - x^2 - 14x + 24$

$0 = 8 - 4 - 28 + 24$

a) Use *the Factor Theorem* to factor the function.

Find a value of "x" that makes $y=0$

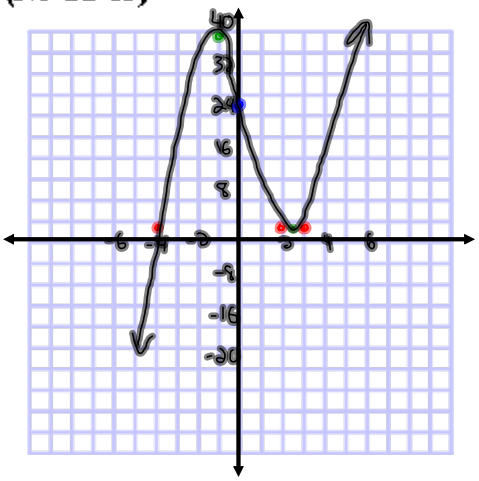
b) State the *Roots* of the function

c) Find the *y intercept*

d) State the approximate *Local Maximum (No TI-83)*

e) State the approximate *Local Minimum (No TI-83)*

f) Sketch the function



a) $x-2 \overline{)\, x^3 - x^2 - 14x + 24}$

$x^2 + x - 12$

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

$x^2 - 14x$

$-(x^2 - 2x)$

$-12x + 24$

$-(-12x + 24)$

0

$y = (x-2)(x^2 + x - 12)$

$y = 1(x-2)(x-3)(x+4)$

Stretch Factor: $a=1$

b) Roots:

$x = -4, 2, 3$

c) y int $(x=0)$

$y = x^3 - x^2 - 14x + 24$

$y = 24$

d) App. Local Max $(x=-1)$

$y = (x-2)(x-3)(x+4)$

$y = (-3)(-4)(3)$

$y = 36$

$(-1, 36)$

e) App Local Min $(x=2.5)$

$y = (x-2)(x-3)(x+4)$

$y = (0.5)(-0.5)(6.5)$

$y = -\frac{13}{8} = -1.625$

$(2.5, -1.625)$

3. Solve the following inequality and express your answer using *Interval Notation* $x^3 - 9x \leq x^2 - 9$

$x^3 - x^2 - 9x + 9 \leq 0$ Where does this function have negative y values?

$y = (x^3 - x^2)(9x + 9)$ ← Factor

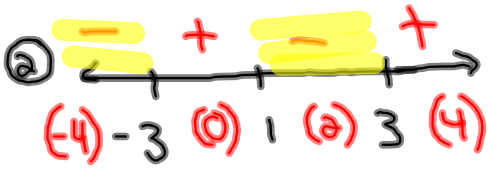
$y = x^2(x-1) - 9(x-1)$

$y = (x^2 - 9)(x-1)$

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

① Roots

$x = -3, 1, 3$

② 

③ $x \in (-\infty, -3] \cup [1, 3]$

Homework

① Fs $4x^4 - 33x^2 + 36$

$\sqrt{4 \times 36} = \sqrt{144} = 12 \times 2 = 24$

Perfect square Trinomial → $(4x^4 - 24x^2 + 36) - 9x^2$

$(2x^2 - 6)^2 - 9x^2$

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