2.1

$$\mu = 2^{-53} \text{ (16 decimal digits)}$$
$$t = 52$$

2.2

$$0.5 \cdot 10^{-16}$$
Correct decimal digits: 16

2.3

16

2.4

$$3 = (0)(100\ 0000\ 0000)\ (1000\ ....$$
sign exp fractal

3.1

$$x \approx 1.6 \cdot 10^{-8}$$
Error grows towards 1 for very small x-values

3.2

Error decreases as x goes to 0

3.3

There is no replement of operators in the rewritten form (e.g. to remove cancellation)

4.1

(1) $|2\cos(x)| > 1$ for $x \approx 0.65$, will not converge

(2) $|-\frac{1}{\sqrt{1-x} \cdot 2\sqrt{x}}| > 1$ for $x \approx 0.65$, will not converge

4.2

φ_1 alternatives between the left side and right side of the root and converges VERY slowly.
φ_2 becomes complex but the real part converges similarly to φ_1.

4.3

$$df = @(x)2 * x - 4 * cos(x)$$

4.4

Because thats how much the answer changes every iteration. If that's below our tolerance, we no longer care.

4.5

6 iterations, $\bar{x} = 1.933753762827021$

4.6

There seems to be quadratic convergens. The error estimate is good.

4.7

$$f = @(x)sqrt(1 + x). * exp(x/2) - 2 * sin(2 * x). * (x + x.^2);$$

$$fzero(f, 1.5)$$

$$1.319781106851625$$

4.8

19

4.9

$$1.2841 \cdot 10^{-4}$$
$$6.0248 \cdot 10^{-7}$$
$$1.3518 \cdot 10^{-12}$$
$$8.8818 \cdot 10^{-16}$$
$$0$$

Seems quadratic convergens

4.10

$p \approx 2$, $k = 16$

4.11

$$z_{k+1} = 2z_k - yz_k^2$$

4.12

$$\frac{1}{4}$$

$$\Phi(z) = 2z - yz^2$$

4.13

$$|\Phi''(\eta)| = |-2y| \leq 4$$

???

4.14

The result is very good.

loop has 2 multiplications (

$$z = z * (2 - y * z)$$

) end of function has 1 (

$$z = z * x$$

)