Latihan Soal Aljabar dengan EMT

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Kelas: Pendidikan Matematika A

R.2

1.

$$3^7$$

```
>$&(3^7)
```

$$2187$$

2.

$$\left(\frac{24a^{10}b^{-8}c^{7}}{12a^{6}b^{-3}c^{5}}\right)^{-5}$$

```
>$& ((24*a^10*b^-8*c^7)/(12*a^6*b^-3*c^5))^-5
```

$$\frac{b^{25}}{32\,a^{20}\,c^{10}}$$

3.

$$\left(\frac{2x^{-3}y^{7}}{z^{-1}}\right)^{3}$$

```
>$& ((2*x^3*y^7)/(z^-1))^3
```

$$8\,x^{9}\,y^{21}\,z^{3}$$

4.

$$2^6 \times 2^{-3} \div 2^{10} \div 2^8$$

```
>$& 2^6*2^-3/2^10/2^-8
```

$$2$$

5.

$$\frac{4(8-6)^2 - 4 \times 3 + 2 \times 8}{3^1 + 19^0}$$

```
>$&(4*(8-6)^2-4*3+2*8)/(3^1+19^0)
```

$$5$$

R.3

1.

$$(-5m^4n^2)(6m^2n^3)$$

```
>$&showev ('expand((-5*m^4*n^2)*(6*m^2*n^3)))
```

$$expand\left(-30\,m^6\,n^5\right) = -30\,m^6\,n^5$$

2.

$$(6xy^3)(9x^4y^2)$$

```
>$&showev ('expand ((6*x*y^3)*(9*x^4*y^2)))
```

$$expand\left(54\,x^5\,y^5\right) = 54\,x^5\,y^5$$

3.

$$(n+6)(n-6)$$

```
>$&showev ('expand ((n+6)*(n-6)))
```

$$expand\left((n-6)\ (n+6)\right) = n^2 - 36$$

4.

$$(x-4)^2$$

```
>$&showev ('expand ((x-4)^2))
```

$$expand\left(\left(x-4\right)^2\right) = x^2 - 8\,x + 16$$

5.

$$(t^{m+n})^{m+n}.(t^{m-n})^{m-n}$$

```
>$&showev ('expand ((t^(m+n))^(m+n)*(t^(m-n))^(m-n)))
```

$$expand\left(\left(t^{n-m}\right)^{n-m}\ \left(t^{n+m}\right)^{n+m}\right) = \left(t^{n-m}\right)^{n-m}\ \left(t^{n+m}\right)^{n+m}$$

R.4

1.

$$z^2 - 81$$

```
>$& factor (z^2-81)
```

$$(z - 9)\ (z + 9)$$

2.

$$1 - 8x + 16x^2$$

```
>$& factor (1-8*x+16*x^2)
```

$$(4\,x - 1)^2$$

3.

$$t^6 + 1$$

```
>$& factor (t^6+1)
```

$$\left(t^2 + 1\right)\,\left(t^4 - t^2 + 1\right)$$

4.

$$5m^4 - 20$$

```
>$& factor (5*m^4-20)
```

$$5\left(m^2-2\right)\left(m^2+2\right)$$

5.

$$x^6-2x^5+x^4-x^2+2x-1$$

```
>$& factor (x^6-2*x^5+x^4-x^2+2*x-1)
```

$$(x-1)^3(x+1)\left(x^2+1\right)$$

R.5

1.

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

```
>sol &= solve(x^2+5*x=0,x); $&sol
```

$$[x=-5, x=0]$$

2.

$$t^2 = 25$$

```
>sol &= solve(t^2=25,t); $&sol
```

$$[t = -5, t = 5]$$

3.

$$14 = x(x - 5)$$

```
>sol &= solve(14=x*(x-5),x); $&sol
```

$$[x = 7, x = -2]$$

4.

$$z^2 = 144$$

```
>sol &= solve(z^2=144,z); $&sol
```

$$[z = -12, z = 12]$$

5.

$$n^2 + 4n + 4 = 0$$

```
>sol &= solve(n^2+4*n+4=0,n); $&sol
```

$$[n = -2]$$

R.6

1.

$$\frac{x^2 - 4}{x^2 - 4x + 4}$$

```
>$&solve((x^2-4)/(x*2-4*x+4))
```

$$[x = -2]$$

2.

$$\frac{6y^2+12y-48}{3y^2-9y+6}$$

```
>$&solve((6*y^2+12*y-48)/(3*y^2-9*y+16))
```

$$[y=-4, y=2]$$

3.

$$\frac{7}{5x}+\frac{3}{5x}$$

```
>$&solve((7/5*x)+(3/5*x))
```

$$[x=0]$$

4.

$$\frac{5}{a-3}-\frac{2}{a^2-9}$$

```
>$&solve((5/a-3)-(2/a^2-9))
```

$$\left[a=\frac{-\sqrt{73}-5}{12},a=\frac{\sqrt{73}-5}{12}\right]$$

5.

$$\frac{7}{12y}-\frac{1}{12y}$$

```
>$&solve((7/12*y)-(1/12*y))
```

$$[y=0]$$

1.

$$\sqrt{(-21)^2}$$

```
>$&(sqrt(-21)^2)
```

$$-21$$

2.

$$\sqrt{180}$$

```
>$&(sqrt(180))
```

$$6\sqrt{5}$$

3.

$$\frac{\sqrt{12}}{5}$$

```
>$&(sqrt(12)/5)
```

$$\frac{2\sqrt{3}}{5}$$

4.

$$\sqrt{(a-2)^2}$$

```
>$&(sqrt((a-2)^2))
```

$$|a-2|$$

5.

$$\sqrt{\frac{2}{3}}$$

```
>$&(sqrt(2/3))
```

$$\frac{\sqrt{2}}{\sqrt{3}}$$

2.3

1.

$$h(x) = \frac{1}{(x-2)^4}$$

```
>$&solve(h(x)=1/(x-2)^4)
```

$$\left[x = 2 - \frac{i}{h\left(x\right)^{\frac{1}{4}}}, x = \frac{i}{h\left(x\right)^{\frac{1}{4}}} + 2, x = 2 - \frac{1}{h\left(x\right)^{\frac{1}{4}}}, x = \frac{1}{h\left(x\right)^{\frac{1}{4}}} + 2\right]$$

2.

$$h(x) = (4+3x)^5$$

```
>$&solve(h(x)=(4+3*x)^5)
```

$$\left[x = e^{\frac{2\,i\,\pi}{5}}\,h\left(x\right)^{\frac{1}{5}}, x = e^{\frac{4\,i\,\pi}{5}}\,h\left(x\right)^{\frac{1}{5}}, x = e^{-\frac{4\,i\,\pi}{5}}\,h\left(x\right)^{\frac{1}{5}}, x = e^{-\frac{2\,i\,\pi}{5}}\,h\left(x\right)^{\frac{1}{5}}, x = h\left(x\right)^{\frac{1}{5}}\right]$$

3.

$$h(x)=\left(\frac{2+x^3}{2-x^3}\right)^6$$

```
>$&solve(h(x)=(2+x^3/2-x^3)^6)
```

$$\left[x^3=8\sqrt{h\left(x\right)},x^3=-8\sqrt{h\left(x\right)}\right]$$

4.

$$h(x)=\sqrt{\frac{x-5}{x+2}}$$

```
>$&solve(h(x)=(sqrt(x-5)/(x+2)))
```

$$\left[x=\frac{\sqrt{x-5}-2\,h\left(x\right)}{h\left(x\right)}\right]$$

5.

$$h(x) = (\sqrt{x} - 3)^4$$

```
>$&solve(h(x)=(sqrt(x)-3)^4)
```

$$\left[x = -\sqrt{h\left(x\right) + \sqrt{x}\ \left(12\,x + 108\right) + 648} - 27, x = \sqrt{h\left(x\right) + \sqrt{x}\ \left(12\,x + 108\right) + 648} - 27\right]$$

3.1

1.

$$7i(2 - 5i)$$

```
>$&(7*i*(2-5*i))
```

$$7\ \left(2 - 5\,i\right)\ i$$

2.

$$(12+3i)+(-8+5i)$$

```
>$&((12+3*i)+(-8+5*i))
```

$$8\,i+4$$

3.

$$(3+\sqrt{-16})+(2+\sqrt{-25})$$

```
>$&(3+sqrt(-16))+(2+sqrt(-25))
```

$$9\,i+5$$

4.

$$\sqrt{-49}.\sqrt{-9}$$

```
>$&(sqrt(-49)*sqrt(-9))
```

$$-21$$

5.

$$(-1-i)+(-3-i)$$

```
>$&((-1-i)+(-3-i))
```

$$-2\,i-4$$

3.4

1.

$$\frac{1}{3}-\frac{5}{6}=\frac{1}{x}$$

```
>$&solve(1/3-5/6=1/x)
```

$$[x=-2]$$

2.

$$\sqrt{3x-4}=1$$

```
>$&solve(sqrt(3*x-4))
```

$$\left[x=\frac{4}{3}\right]$$

3.

$$x+\frac{6}{x}=5$$

```
>$&solve(x+(6/x)=5)
```

$$[x=3,x=2]$$

4.

$$\frac{1}{x-15}-\frac{1}{x}=\frac{15}{x^2-15x}$$

```
>$&solve((1/x-15)-(1/x)=15/(x^2-15*x))
```

$$\left[x=\frac{15-\sqrt{221}}{2}, x=\frac{\sqrt{221}+15}{2}\right]$$

5.

$$\sqrt{2-7x}=2$$

```
>$&solve(sqrt(2-7*x)=2)
```

$$\left[x=-\frac{2}{7}\right]$$

3.5

1.

$$|x+3|-2=8$$

```
>$& fourier_elim([abs(x+3)-2=8],[x])
```

$$\mathit{fourier\_\_elim}\left(\left[|x+3|-2=8\right],[x]\right)$$

2.

$$12 - |x + 6| = 5$$

```
>$& fourier_elim(12-[abs(x+6)=5],[x])
```

$$fourier\_elim\left(\left[12 - |x + 6| = 7\right], [x]\right)$$

3.

$$|5x + 4| + 2 = 5$$

```
>$& fourier_elim([abs(5*x+4)+2=5],[x])
```

$$fourier\_elim\left(\left[|5\,x + 4| + 2 = 5\right], [x]\right)$$

4.

$$5 - |4x + 3| = 2$$

```
>$& fourier_elim(5-[abs(4*x+3)=2],[x])
```

$$fourier\_\_elim\left(\left[5-\left|4\,x+3\right|=3\right],\left[x\right]\right)$$

5.

$$|x-4|+3=9$$

```
>$& fourier_elim([abs(x-4)+3=9],[x])
```

$$fourier\_\_elim\left(\left[\left|x-4\right|+3=9\right],\left[x\right]\right)$$

4.1

1.

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

```
>$&solve(f(x)=(x^4-4*2^2+3))
```

$$\left[x=i\,\left(f\left(x\right)+61\right)^{\frac{1}{4}},x=-\left(f\left(x\right)+61\right)^{\frac{1}{4}},x=-i\,\left(f\left(x\right)+61\right)^{\frac{1}{4}},x=\left(f\left(x\right)+61\right)^{\frac{1}{4}}\right]$$

2.

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

```
>$&solve(f(x)=(x^3-x^2-2*x+2))
```

$$\left[x = \left(-\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right)\left(\frac{\sqrt{27\,f^2(x) - 68\,f(x) - 8}}{2\,3^{\frac{3}{2}}} + \frac{27\,f(x) - 34}{54}\right)^{\frac{1}{3}} + \frac{7\left(\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right)}{9\left(\frac{\sqrt{27\,f^2(x) - 68\,f(x) - 8}}{2\,3^{\frac{3}{2}}} + \frac{27\,f(x) - 34}{54}\right)^{\frac{1}{3}}} + \frac{1}{3}, x = \left($$

3.

$$f(x) = 2x^3 - x^2 - 8x + 4$$

```
>$&solve(f(x)=(2*x^3-x^2-8*x+4))
```

$$\left[x = \left(-\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right)\left(\frac{\sqrt{27\,f^2(x) - 143\,f(x) - 900}}{4\,3^{\frac{3}{2}}} + \frac{54\,f(x) - 143}{216}\right)^{\frac{1}{3}} + \frac{49\left(\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right)}{36\left(\frac{\sqrt{27\,f^2(x) - 143\,f(x) - 900}}{4\,3^{\frac{3}{2}}} + \frac{54\,f(x) - 143}{216}\right)^{\frac{1}{3}}} +$$

4.

$$f(x) = (x^2 - 5x + 6)^2$$

```
>$&solve(f(x)=(x^2-5*x+6)^2)
```

$$\left[x = \frac{5}{2} - \frac{\sqrt{1 - 4\sqrt{f(x)}}}{2}, x = \frac{\sqrt{1 - 4\sqrt{f(x)}}}{2} + \frac{5}{2}, x = \frac{5}{2} - \frac{\sqrt{4\sqrt{f(x)} + 1}}{2}, x = \frac{\sqrt{4\sqrt{f(x)} + 1}}{2} + \frac{5}{2}\right]$$

5.

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

```
>$&solve(f(x)=(x^4-10*x^2-+9))
```

$$\left[x^2 = \sqrt{f(x) + 34} + 5, x^2 = 5 - \sqrt{f(x) + 34}\right]$$

4.3

1.

$$(x^4 - 1) \div (x - 1)$$

```
>$& solve((x^4-1)/(x-1))
```

$$[x = -i, x = i, x = -1]$$

2.

$$f(x) = x^3 - 12x + 16$$

```
>$& solve(f(x)=x^3-12*x+16)
```

$$\left[x = \left(-\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right)\left(\frac{\sqrt{(f(x) - 32)\ f(x)}}{2} + \frac{f(x) - 16}{2}\right)^{\frac{1}{3}} + \frac{4\left(\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right)}{\left(\frac{\sqrt{(f(x)-32)\,f(x)}}{2} + \frac{f(x)-16}{2}\right)^{\frac{1}{3}}}, x = \left(\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right)\left(\sqrt{(f(x)\right.\right.$$

3.

$$(2x^4+7x^3+x-12)\div(x+3)$$

```
>$& solve(2*x^4+7*x^3+x-12)/(x+3)
```

$$\left[\frac{x}{x+3}=\frac{-\frac{\sqrt{\frac{125\,3^{\frac{3}{2}}\left(\frac{5\sqrt{68213}}{2\,6^{\frac{3}{2}}}-\frac{293}{8}\right)^{\frac{1}{6}}}{8\sqrt{48\left(\frac{5\sqrt{68213}}{2\,6^{\frac{3}{2}}}-\frac{293}{8}\right)^{\frac{2}{3}}+147\left(\frac{5\sqrt{68213}}{2\,6^{\frac{3}{2}}}-\frac{293}{8}\right)^{\frac{1}{3}}-412}}-\left(\frac{5\sqrt{68213}}{2\,6^{\frac{3}{2}}}-\frac{293}{8}\right)^{\frac{1}{3}}+\frac{103}{12\left(\frac{5\sqrt{68213}}{2\,6^{\frac{3}{2}}}-\frac{293}{8}\right)^{\frac{1}{3}}}+\frac{49}{8}}}{2}-\frac{\sqrt{48\left(\frac{5\sqrt{68213}}{2\,6^{\frac{3}{2}}}-\frac{293}{8}\right)^{\frac{2}{3}}+14}}{8\sqrt{3}\left(\frac{5\sqrt{682}}{2\,6^{\frac{3}{2}}}\right.}}{x+3}\right.$$

4.

$$(x^5+32)\div(x+2)$$

```
>$& solve((x^5+32)/(x+2))
```

$$\left[x=-\frac{\sqrt{5}}{2}-\frac{\sqrt{-2\sqrt{5}-10}}{2}+\frac{1}{2},x=-\frac{\sqrt{5}}{2}+\frac{\sqrt{-2\sqrt{5}-10}}{2}+\frac{1}{2},x=-\frac{\sqrt{2\sqrt{5}-10}}{2}+\frac{\sqrt{5}}{2}+\frac{1}{2},x=\frac{\sqrt{2\sqrt{5}-10}}{2}+\frac{\sqrt{5}}{2}\right.$$

5.

$$(x^3 - 2x^2 - 8) \div (x + 2)$$

```
>$& solve((x^3-2*x^2-8)/(x+2))
```

$$\left[x = \frac{4\left(\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right)}{9\left(\frac{4\sqrt{31}}{3^{\frac{3}{2}}} + \frac{116}{27}\right)^{\frac{1}{3}}} + \left(\frac{4\sqrt{31}}{3^{\frac{3}{2}}} + \frac{116}{27}\right)^{\frac{1}{3}}\left(-\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right) + \frac{2}{3}, x = \left(\frac{4\sqrt{31}}{3^{\frac{3}{2}}} + \frac{116}{27}\right)^{\frac{1}{3}}\left(\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right) + \frac{4\left(-\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right)}{9\left(\frac{4\sqrt{31}}{3^{\frac{3}{2}}} + \frac{116}{27}\right)}\right.$$

Chapter 3 Test

1.

$$\sqrt{x+4} - \sqrt{x-4} = 2$$

```
>$& solve((sqrt(x+4))-(sqrt(x-4))=2)
```

$$\left[\sqrt{x+4} = \sqrt{x-4} + 2\right]$$

2.

$$x + 5\sqrt{x} - 36 = 0$$

```
>$& solve(x+5*(sqrt(x))-36=0)
```

$$\left[x = 36 - 5\sqrt{x}\right]$$

3.

$$|4y - 3| = 5$$

```
>$&fourier_elim([abs(4*y-3)=5],[y])
```

$$fourier\_\_elim\left(\left[|4\,y - 3| = 5\right], [y]\right)$$

4.

$$\frac{3}{3x + 4} + \frac{2}{x - 1} = 2$$

```
>$& solve(3/3*x+4)+(2/x-1)=2
```

$$\left[x+\frac{2}{x}-1=\frac{2}{x}-5\right]=2$$

5.

$$|x+4|=7$$

```
>$&fourier_elim([abs(x+4)=7],[y])
```

$$fourier\_\_elim\left(\left[|x+4|=7\right],[y]\right)$$