Latihan Soal Aljabar dengan EMT

Nama: Alfa Yumnia
NIM: 23030130009
Kelas: Pendidikan Matematika A

R.2

1.

$$(2x^2y)^4$$

```
>$& (2*x^2*y)^4
```

$$16\,x^8\,y^4$$

2.

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

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

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

3.

$$\frac{x^{-9}y^{-17}}{z^{-11}}$$

```
>$& (x^-9*y^-17)/(z^-11)
```

$$\frac{z^{11}}{x^9\,y^{17}}$$

4.

$$\frac{4(8-6)^2-4\times3+2\times8}{3^1+19^0}$$

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

$$5$$

5.

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

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

$$2$$

R.3

1.

$$(8y^5)(9y)$$

```
>$&showev ('expand(8*y^5)*(9*y))
```

$$9\,y\;expand\left(8\,y^5\right) = 72\,y^6$$

2.

$$(2a+3)(a+5)$$

```
>$&showev ('expand(2*a+3)(a+5))
```

$$expand\,(2\,a+3)\,(a+5) = (2\,a+3)\,(a+5)$$

3.

$$(t^a - 4)(t^a - 7)$$

```
>$&showev ('expand(t^a+4)(t^a-7))
```

$$expand\,(t^a + 4)\,(t^a - 7) = (t^a + 4)\,(t^a - 7)$$

4.

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

```
>$&showev ('expand(3*x-2*y)(3*x+2*y))
```

$$expand\,(3\,x - 2\,y)\,(2\,y + 3\,x) = (3\,x - 2\,y)\,(2\,y + 3\,x)$$

5.

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

```
>$&showev ('expand(x+1)*(x-1)*(x^2+1))
```

$$(x - 1)\,\left(x^2 + 1\right)\;expand\,(x + 1) = (x - 1)\,(x + 1)\,\left(x^2 + 1\right)$$

R.4

1.

$$y^2 + 12y + 27$$

```
>$& factor(y^2+12*y+27)
```

$$(y + 3)\,(y + 9)$$

2.

$$m^2 - m - 90$$

```
>$& factor(m^2-m-90)
```

$$(m - 10)\ (m + 9)$$

3.

$$p^3 - 2p^2 - 9p + 18$$

```
>$& factor(p^3-2*p^2-9*p+18)
```

$$(p - 3)\ (p - 2)\ (p + 3)$$

4.

$$250z^4 - 2z$$

```
>$& factor(250*z^4-2*z)
```

$$2\,z\ (5\,z - 1)\ \left(25\,z^2 + 5\,z + 1\right)$$

5.

$$(x + h)^3 - x^3$$

```
>$& factor((x+h)^3-x^3)
```

$$h\ \left(3\,x^2 + 3\,h\,x + h^2\right)$$

R.5

1.

$$t^2 + 6t = 0$$

```
>sol &= solve(t^2+6*t=0,t); $&sol
```

$$[t = -6, t = 0]$$

2.

$$x^2 + 3x - 28 = 0$$

```
>sol &= solve(x^2+3*x-28=0,x); $&sol
```

$$[x = 4, x = -7]$$

3.

$$3y^2 + 8y + 4 = 0$$

```
>sol &= solve(3*y^2+8*y+4=0,y); $&sol
```

$$\left[y = -\frac{2}{3}, y = -2\right]$$

4.

$$3x^3 + 6x^2 - 27x - 54 = 0$$

```
>sol &= solve(3*x^3+6*x^2-27*x-54=0,x); $&sol
```

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

5.

$$3(2n-5)-7=4(n-9)$$

```
>sol &= solve(3*(2*n-5)=4*(n-9),n); $&sol
```

$$\left[n=-\frac{21}{2}\right]$$

R.6

1.

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

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

$$[x=-2]$$

2.

$$\frac{x^2+2x-3}{x^2-9}$$

```
>$& solve((x^2+2*x-3)/(x^2-9))
```

$$[x=1]$$

3.

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

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

$$[x=0]$$

4.

$$\frac{y^5 - 5y^4 + 4y^3}{y^3 - 6y^2 + 8y}$$

```
>$& solve((y^5-5*y^4+4*y^3)/(y^3-6*y^2+8*y))
```

$$[y = 0, y = 1]$$

5.

$$\frac{3}{x+2} + \frac{2}{x^2 - 4}$$

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

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

R.7

1.

$$\sqrt{-7^2}$$

```
>$& (sqrt(-7)^2)
```

$$-7$$

2.

$$\sqrt{(2b+5)^2}$$

```
>$& (sqrt(2*b+5)^2)
```

$$2\,b + 5$$

3.

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

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

$$[x=2]$$

4.

$$\sqrt{72}$$

```
>$& (sqrt(72))
```

$$3\,2^{\frac{3}{2}}$$

5.

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

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

$$a-2$$

2.3

1.

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

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

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

2.

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

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

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

3.

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

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

$$\left[x = -\sqrt{h^4(x) + \sqrt{x}\,(12x + 108) + 648} - 27, x = \sqrt{h^4(x) + \sqrt{x}\,(12x + 108) + 648} - 27\right]$$

4.

$$h(x) = \frac{x^3 - 1}{x^3 + 1}$$

```
>$& solve(h(x)=(x^3-1)/(x^3+1))
```

$$\left[x^3 = \frac{-h(x) - 1}{h(x) - 1}\right]$$

5.

$$h(x) = \sqrt{1 + \sqrt{1 + x}}$$

```
>$& solve(h(x)=(sqrt(1+(sqrt(1+x)))))
```

$$\left[h(x) = \sqrt{\sqrt{x+1} + 1}\right]$$

3.1

1.

$$(-5-i)+(6+2i)$$

```
>$& (-5-i)+(6+2*i)
```

$$i+1$$

2.

$$(-3-4i)-(8-i)$$

```
>$& (-3-4*i)-(8-i)
```

$$-3\,i-11$$

3.

$$\sqrt{-4}\times\sqrt{-36}$$

```
>$& (sqrt(-4))*(sqrt(-36))
```

$$-12$$

4.

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

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

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

5.

$$-2i(-8+3i)$$

```
>$& (-2*i*(-8+3*i))
```

$$-2\,i\,(3\,i-8)$$

3.4

1.

$$\frac{1}{4}+\frac{1}{5}=\frac{1}{t}$$

```
>$& solve(1/4+1/5=1/t)
```

$$\left[t=\frac{20}{9}\right]$$

2.

$$x-\frac{12}{x}=1$$

```
>$& solve(x-(12/x)=1)
```

$$[x=-3,x=4]$$

3.

$$\frac{1}{3x+6}-\frac{1}{x^2-4}=\frac{3}{x-2}$$

```
>$& solve((1/(3*x+6))-(1/(x^2-4))=3/(x-2))
```

$$\left[x=-\frac{23}{8}\right]$$

4.

$$\sqrt{2x-5}=2$$

```
>$& solve((sqrt(2*x-5))=2)
```

$$\left[x=\frac{9}{2}\right]$$

5.

$$\sqrt{7x+4} = x+2$$

```
>$& solve((sqrt(7*x+4))=x+2)
```

$$\left[x = \sqrt{7\,x+4} - 2\right]$$

3.5

1.

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

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

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

2.

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

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

$$fourier\_\_elim\left(\left[12 - |x+6| = 5\right], [x]\right)$$

3.

$$|2x-4| < -5$$

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

$$fourier\_\_elim\left(\left[|2\,x-4| < -5\right], [x]\right)$$

4.

$$|5 - 2x| > 10$$

```
>$&fourier_elim([abs(5-2*x)>10],[x])
```

$$fourier\_\_elim\left(\left[|2\,x - 5| > 10\right], [x]\right)$$

5.

$$|3x - 1| > 5x - 2$$

```
>$&fourier_elim([abs(3*x-1)>5*x-2],[x])
```

$$fourier\_\_elim\left(\left[|3\,x - 1| > 5\,x - 2\right], [x]\right)$$

Chapter 3 Test

1.

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

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

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

2.

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

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

$$\left[x = \frac{13}{6}, x = -1\right]$$

3.

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

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

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

4.

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

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

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

5.

$$|x+5|>2$$

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

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

4.1

1.

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

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

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

2.

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

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

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

3.

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

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

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

4.

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

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

$$\left[x = \left(-\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right)\left(\frac{\sqrt{27\,f^2(x) - 256}}{2\,3^{\frac{3}{2}}} + \frac{f(x)}{2}\right)^{\frac{1}{3}} + \frac{4\left(\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right)}{3\left(\frac{\sqrt{27\,f^2(x) - 256}}{2\,3^{\frac{3}{2}}} + \frac{f(x)}{2}\right)^{\frac{1}{3}}} - 1, x = \left(\frac{\sqrt{3}\,i}{2} - \frac{1}{2}\right)\left(\frac{\sqrt{27\,f^2(x) - 25}\right.\right.$$

5.

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

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

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

1.

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

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

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

2.

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

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

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

3.

$$f(x)=x^3-3x^2-10x+24$$

```
>$& solve(f(x)=x^3-3*x-10*x+24)
```

$$\left[x=\left(-\frac{\sqrt{3}\,i}{2}-\frac{1}{2}\right)\left(\frac{\sqrt{27\,f^2(x)-1296\,f(x)+6764}}{2\,3^{\frac{3}{2}}}+\frac{f(x)-24}{2}\right)^{\frac{1}{3}}+\frac{13\left(\frac{\sqrt{3}\,i}{2}-\frac{1}{2}\right)}{3\left(\frac{\sqrt{27\,f^2(x)-1296\,f(x)+6764}}{2\,3^{\frac{3}{2}}}+\frac{f(x)-24}{2}\right)^{\frac{1}{3}}},x=\left(\right.\right.$$

4.

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

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

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

5.

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

```
>$& (x^4-y^4)/(x-y)
```

$$\frac{x^4 - y^4}{x - y}$$