Penyelesai soal-soal Aljabar

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Kelas: Pendidikan Matematika C

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

Jawab :

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

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

$$\left(\frac{125p^{12}q^{-14}r^{22}}{25p^8q^6r^{-15}}\right)^{-4}$$

jawab:

```
>$&((125*p^12*q^-14*r^22)/(25*p^8*q^6*r^-15))^-4
```

$$\frac{q^{80}}{625\,p^{16}\,r^{148}}$$

$$2^6 \cdot 2^{-3} : 2^{10} : 2^{-8}$$

Jawab:

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

2

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

Jawab:

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

5

$$\frac{[4(8-6)^2 + 4](3 - 2 \cdot 8)}{2^2(2^3 + 5)}$$

jawab:

```
>(((4*(8-6)^2 + 4)*(3 - 2*8))/(2^2*(2^3+5)))
```

−5

$$(x + 6)(x + 3)$$

Jawab:

```
>$&showev('expand((x+6)*(x+3)))
```

$$expand\,((x + 3)\,(x + 6)) = x^2 + 9\,x + 18$$

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

Jawab:

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

$$expand\left((a+5)\left(2\,a+3\right)\right) = 2\,a^2 + 13\,a + 15$$

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

jawab:

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

$$expand\left((y+2\,x)\left(3\,y+2\,x\right)\right) = 3\,y^2 + 8\,x\,y + 4\,x^2$$

$$(x + 3)^2$$

```
>$&showev('expand((x+3)^2))
```

$$expand\left((x+3)^2\right) = x^2 + 6\,x + 9$$

$$(y-5)^2$$

Jawab:

```
>$&showev('expand((y-5)^2))
```

$$expand\left((y-5)^2\right) = y^2 - 10\,y + 25$$

R.4 —

$$t^2 + 8t + 15$$

Jawab:

```
>$&showev('factor((t^2+8*t+15)))
```

$$factor\left(t^2 + 8\,t + 15\right) = \left(t + 3\right)\left(t + 5\right)$$

$$z^2 - 81$$

Jawab:

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

$$factor\left(z^2 - 81\right) = \left(z - 9\right)\left(z + 9\right)$$

$$3a^5 - 24a^2$$

Jawab:

```
>$&showev('factor(3*a^5-24*a^2))
```

$$factor\left(3\,a^5 - 24\,a^2\right) = 3\left(a - 2\right)a^2\left(a^2 + 2\,a + 4\right)$$

$$18^2b - 15ab^2$$

Jawab:

```
>$&showev('factor(18*a^2*b-15*a*b^2))
```

$$factor\left(18\,a^2\,b - 15\,a\,b^2\right) = -3\,a\,b\left(5\,b - 6\,a\right)$$

R.5

$$7(3x + 6) = 11 - (x + 2)$$

Jawab:

```
>$solve(7*(3*x+6)=11-(x+2),x)
```

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

$$9(2x + 8) = 20 - (x + 5)$$

Jawab:

```
>$solve(9*(2*x+8)=20-(x+5),x)
```

$$[x = -3]$$

$$12z^2 + z = 6$$

Jawab:

```
>$solve(12*(z^2)+z=6,z)
```

$$\left[z = -\frac{3}{4}, z = \frac{2}{3}\right]$$

$$x^2 - 36 = 0$$

Jawab:

```
>$solve(x^2-36=0,x)
```

$$[x = -6, x = 6]$$

$$3y^2 - 15 = 0$$

Jawab:

```
>$solve(3*y^2-15=0,y)
```

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

R.6

$$\left(\frac{x^2 - 4}{x^2 - 4x + 4}\right)$$

Jawab:

```
>$&showev('factor((x^2-4)/(x^2-4*x+4)))
```

$$factor\left(\frac{x^2 - 4}{x^2 - 4\,x + 4}\right) = \frac{x + 2}{x - 2}$$

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

Jawab:

```
>$&showev('factor((7/(5*x))+ (3/(5*x))))
```

$$factor\left(\frac{2}{x}\right) = \frac{2}{x}$$

$$\frac{4}{3a+4} + \frac{3a}{3a+4}$$

Jawab:

```
>$&showev('factor(4/(3*a+4)+(3*a)/(3*a+4)))
```

$$factor\left(\frac{3\,a}{3\,a+4} + \frac{4}{3\,a+4}\right) = 1$$

$$\frac{x}{2x-3y} - \frac{y}{3y-2x}$$

Jawab:

$$factor\left(\frac{x}{2\,x-3\,y}-\frac{y}{3\,y-2\,x}\right)=\frac{-y-x}{3\,y-2\,x}$$

$$\frac{1-x}{x}+\frac{x}{1+x}$$

Jawab:

$$factor\left(\frac{x}{x+1}+\frac{1-x}{x}\right)=\frac{1}{x\,(x+1)}$$

Review Exercises

$$(t^a + t^{-a})^2$$

Jawab:

```
>$&showev('expand((t^a+t^(-a))^2))
```

$$expand\left(\left(t^a + \frac{1}{t^a}\right)^2\right) = t^{2\,a} + \frac{1}{t^{2\,a}} + 2$$

$$(y^b - z^c)(y^b + z^c)$$

Jawab:

```
>$&showev('expand((y^b-z^c)*(y^b+z^c)))
```

$$expand\left(\left(y^b - z^c\right)\left(z^c + y^b\right)\right) = y^{2\,b} - z^{2\,c}$$

$$\left(a^n - b^n\right)^3$$

Jawab:

```
>$&showev('expand((a^n-b^n)^3))
```

$$expand\left(\left(a^n - b^n\right)^3\right) = -b^{3\,n} + 3\,a^n\,b^{2\,n} - 3\,a^{2\,n}\,b^n + a^{3\,n}$$

$$y^{2n} + 16y^n + 64$$

Jawab:

```
>$&showev('factor((y^(2*n)+16*y^n+64)))
```

$$factor\left(y^{2\,n} + 16\,y^n + 64\right) = \left(y^n + 8\right)^2$$

$$m^{6n} - m^{3n}$$

Jawab:

```
>$&showev('factor((m^(6*n)-m^(3*n))))
```

$$factor\left(m^{6\,n} - m^{3\,n}\right) = m^{3\,n}\left(m^n - 1\right)\left(m^{2\,n} + m^n + 1\right)$$

f(x)=3x+1 , g(x)=x^2-2x-6 , h(x)=x^3 find each of the following

```
>function f(x):= 3*x+1;
>function g(x):= x^2-2*x-6;
>function h(x):= x^3;
```

$$(fog)(-1)$$

```
>f(g(-1))
```

-8

$$(gof)(-2)$$

```
>g(f(-2))
```

29

$$(goh)\left(\frac{1}{2}\right)$$

Jawab:

```
>g(h(1/2))
```

  −6.234375

$$(gof)(5)$$

jawab:

```
>g(f(5))
```

  218

$$(-5 + 3i) + (7 + 8i)$$

Jawab:

```
>$(-5+3*i)+(7+8*i)
```

$$11\,i + 2$$

(-6-5i)+(9+2i)

jawab:

```
>$(-6-5*i)+(9+2*i)
```

$$3 - 3\,i$$

(4-9i)+(1-3i)

Jawab:

```
>$(4-9*i)+(1-3*i)
```

$$5 - 12\,i$$

$$(7 - 2i) + (4 - 5i)$$

Jawab:

```
>$ (7-2*i)+(4-5*i)
```

$$11 - 7\,i$$

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

Jawab:

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

$$8\,i + 4$$

3.4

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

Jawab:

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

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

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

Jawab:

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

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

$$\frac{6}{y+3} + \frac{2}{y} = \frac{5y-3}{y^2-9}$$

Jawab:

```
>$solve(6/(y+3)+2/y=(5*y-3)/(y^2-9),y)
```

$$[y = 6, y = -1]$$

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

Jawab:

```
>$solve(sqrt(3*x-4)=1,x)
```

$$\left[x = \frac{5}{3} \right]$$

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

Jawab:

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

$$[x = 3]$$

3.5

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

Jawab:

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

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

$$|3x + 1| - 4 = -1$$

```
>$&fourier_elim([abs(3*x+1)-4=-1],[x])
```

$$fourier\_\_elim\left(\left[|3\,x+1|-4=-1\right],[x]\right)$$

$$|4x-3|+1=7$$

Jawab:

```
>$&fourier_elim([abs(4*x-3)+1=7],[x])
```

$$fourier\_\_elim\left(\left[|4\,x-3|+1=7\right],[x]\right)$$

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

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

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

$$7 - |2x - 1| = 6$$

```
>$&fourier_elim([7-abs(2*x-1)=6],[x])
```

$$fourier\_elim\left(\left[7 - |2\,x - 1| = 6\right], [x]\right)$$

Chapter 3 Test

solve. Find exact solutions.

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

Jawab:

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

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

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

Jawab:

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

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

$$\sqrt{x + 4} - 2 = 1$$

Jawab:

```
>$&solve(sqrt(x+4)-2=1,x)
```

$$[x = 5]$$

$$|x + 4| = 7$$

Jawab:

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

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

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

Jawab:

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

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

$$|x+5| > 2$$

Jawab:

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

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

4.1

Use substitution to determine whether 4, 5,and -2 are zeros of

$$f(x) = x^3 - 9x^2 + 14x + 24$$

Jawab

```
>function f(x):= x^3-9*x^2+14*x+24
>f(4)
```

    0

```
>f(5)
```

    -6

```
>f(-2)
```

-48

Use substitution to determine whether 2, 3, and -1 are zeros of

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

Jawab:

```
>function f(x):=2*x^3-3*x^2+x+6
>f(2)
```

12

```
>f(3)
```

36

```
>f(-1)
```

```
    0
```

Use substitusion to determine whether 2,3,and -1 are zeros of

$$g(x) : x^4 - 6x^3 + 8x^2 + 6x - 9$$

Jawab:

```
>function g(x):=x^4-6*x^3+8*x^2+6*x-9
>g(2)
```

```
    3
```

```
>g(3)
```

0

0

---

tentukan pembuatan not dari polinomial berikut

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

Jawab:

```
>function f(x):=x^4-4*x^2+3
>$&solve(x^4-4*x^2+3=0,x)
```

$$\left[x = -1, x = 1, x = -\sqrt{3}, x = \sqrt{3}\right]$$

Tentukan pembuatan nol dari polinomial berikut

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

Jawab:

```
>function f(x):=x^4-4*x^2+3
>$&solve(x^4-4*x^2+3=0,x)
```

$$\left[x = -1, x = 1, x = -\sqrt{3}, x = \sqrt{3}\right]$$

Tentukan Pembuat nol dari polinomial

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

Jawab:

```
>function f(x):=x^4-10*x^2+9
>$&solve(x^4-10*x^2+9=0,x)
```

$$[x = -1, x = 1, x = -3, x = 3]$$

4.3

For the function

$$f(x) = x^4 - 6x^3 + x^2 + 24x - 20$$

determine whether each of the following is a factor of f(x)
a)x+1 b)x-2 c)x+5

Jawab:

```
>$&showev('factor(x^4-6*x^3+x^2+24*x-20))
```

$$factor\left(x^4 - 6\,x^3 + x^2 + 24\,x - 20\right) = (x - 5)\,(x - 2)\,(x - 1)\,(x + 2)$$

Jadi, yang merupakan faktor dari f(x) adalah b) x-2

for the function

$$h(x) := x^3 - x^2 - 17x - 15$$

determine whether each of the following is a factor of h(x)
a)x+5 b)x+1 c)x+3

Jawab:

```
>$&showev('factor(x^3-x^2-17*x-15))
```

$$factor\left(x^3 - x^2 - 17\,x - 15\right) = (x - 5)\,(x + 1)\,(x + 3)$$

jadi, yang merupakan faktor dari h(x) adalah (x+1) dan (x+3)

___

$$f(x) = x^3 - 6x^2 + 11x - 6$$

find f(1),f(-2), dan f(3)

```
>function f(x):=x^3-6*x^2+11*x-6
>f(1)
```

    0

```
>f(-2)
```

    -60

```
>f(3)
```

    0

$$f(x) = x^3 + 7x^2 - 12x - 3$$

find f(-3), f(-2), dan f(1)

Jawab:

```
>function f(x):=x^3+7*x^2-12*x-3
>f(-3)
```

  69

```
>f(-2)
```

  41

```
>f(1)
```

  -7

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

find f(-1), f(4), dan f(-5)

Jawab:

```
>function f(x):=x^4+3*x^3+2*x+8
>f(-1)
```

   4

```
>f(4)
```

   464

```
>f(-5)
```

   248

$$g(x) = x^3 - 9x^2 + 4x - 10$$

find g(-5)

Jawab:

```
>function g(x):=x^3-9*x^2+4*x-10
>g(-5)
```

   -380

$$f(x) = 20x^2 - 40x$$

$$findf\left(\frac{1}{2}\right)$$

```
>function f(x):=20*x^2-40*x
>f(1/2)
```

    -15

$$f(x) = 5x^4 + x^3 - x$$

$$find, f(-\sqrt{2})$$

Jawab:

```
>function f(x):= 5*x^4+x^3-x
>f(-sqrt(2))
```

    18.5857864376

---

faktorkan fungsi h(x) berikut lalu tentukan soplusi dari h(x)=0

$$h(x) = x^3 - 4x^2 + 9x - 36$$

Jawab:

```
>function h(x):=x^3-4*x^2+9*x-36
>$&factor(x^3-4*x^2+9*x-36)
```

$$(x - 4)\left(x^2 + 9\right)$$

```
>$&solve(x^3-4*x^2+9*x-36=0,x)
```

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

---

faktorkan fungsi g(x) berikut lalu tentukan solusi dari g(x)=0

$$g(x) = x^4 - 2x^3 - 13x^2 + 14x + 24$$

Jawab:

```
>function g(x):=x^4-2*x^3-13*x^2+14*x+24
>$&factor(x^4-2*x^3-13*x^2+14*x+24)
```

$$(x - 4)\,(x - 2)\,(x + 1)\,(x + 3)$$

```
>$&solve(x^4-2*x^3-13*x^2+14*x+24=0,x)
```

$$[x = -3, x = -1, x = 2, x = 4]$$