

BAB 4

1.a). $\underbrace{x+x+x}_{\substack{\text{1} \quad \text{2} \quad \text{3}}} = 3 \times x = 3x$

b). $\underbrace{y+y+y+y}_{\substack{\text{1} \quad \text{2} \quad \text{3} \quad \text{4}}} = 4 \times y = 4y$

c). $\underbrace{p \times p \times p \times p \times p}_{\substack{\text{1} \quad \text{2} \quad \text{3} \quad \text{4} \quad \text{5}}} = 5 \times p = 5p$

d). $\underbrace{a \times a \times a \times a \times a}_{\substack{\text{1} \quad \text{2} \quad \text{3} \quad \text{4} \quad \text{5}}} = 5 \times a = 5a$

2.a). $3x = \underbrace{x+x+x}_{\substack{\text{1} \quad \text{2} \quad \text{3}}}$

b). $4y = y + y + y + y$

c). $-4x = (-x) + (-x) + (-x) + (-x)$

d). $-7z = (-z) + (-z) + (-z) + (-z) + (-z) + (-z) + (-z)$

3.a). $\underbrace{\text{kurangkan}}_{\text{operasi}} \underbrace{5 \text{ kali } 2}_{\text{operand } 2} \text{ dari } \underbrace{7 \text{ kali } y}_{\text{operand } 1}$

$= 7 \times y - 5 \times 2 = 7y - 10$

b). $\underbrace{\text{kalikan } x \text{ dengan } 2}_{\text{operasi}} \text{ dan } \underbrace{\text{bagilah hasilnya}}_{\text{operand } 5}$

$= \frac{[x \times 2]}{5} = \frac{2x}{5}$

c). $\underbrace{r}_{\text{r}} \text{ (bernilai) } \underbrace{\text{lima lebih banyak dari } 5}_{\substack{\text{5} \quad \text{+} \quad \text{5}}}$

$\Rightarrow r = 5 + 5$

d). $\underbrace{\text{Jumlah dari } x, y, \text{ dan } z}_{\text{Operasi tambah pada } x, y, z}$

$= x + y + z$

4. Misalkan sembarang bilangan = x .

a). $\underbrace{\text{Kalikan sembarang bilangan dengan dirinya}}_{\substack{\text{operator} \quad \text{operand 1}}} \text{ sendiri}$

$= x \times x = x^2$

b). $\underbrace{\text{Tambahkan 4 pada sembarang bilangan}}_{\substack{\text{operator} \quad \text{2}}}$

$\underbrace{\text{hasil}}_{\text{hasil}} \text{ dan } \underbrace{\text{kalikan hasilnya dengan } 3}_{\substack{\text{0} \quad \text{1} \quad \text{2}}}$

$= \text{hasil} \times 3 = (x+4) \times 3 = 3x+12$

4.c). $\underbrace{\text{Tambahkan suatu bilangan dengan } 7}_{\substack{\text{0} \quad \text{1} \quad \text{2}}}$

$\text{hasil} \text{ dan } \underbrace{\text{kalikan hasilnya dengan } 2}_{\substack{\text{0} \quad \text{1} \quad \text{2}}}$

$= \text{hasil} \times 2 = (x+7) \times 2 = 2x+14$

d). $\underbrace{\text{Bagilah suatu bilangan dengan } 7}_{\substack{\text{0} \quad \text{1} \quad \text{2}}}$

$\text{hasil} \text{ dan } \underbrace{\text{tambahkan hasilnya dengan } 3}_{\substack{\text{0} \quad \text{1} \quad \text{2}}}$

$= \text{hasil} + 3 = (x \div 7) + 3 = \frac{x}{7} + 3$

5.a). $m = m + 0$, karena (-1) adalah bilangan sebelum 0 (nol) maka bilangan sebelum m adalah $m + (-1) = m - 1$

b). $n = n + 0$, karena $(+2)$ adalah bilangan genap setelah 0 (nol) maka bilangan genap berikutnya adalah $n + (2) = n + 2$

c). $\underbrace{\text{ganjil}}_{\text{n}} \quad \underbrace{\text{genap}}_{\text{n+1}} \quad \underbrace{\text{ganjil}}_{\text{n+2}}$

\Rightarrow Bilangan ganjil berikutnya adalah $n+2$

d). $n = 3k = 3(k+0)$, karena $(+1)$ adalah bilangan setelah 0 (nol) maka bilangan yang habis dibagi oleh 3 selanjutnya adalah $3(k+1) = 3k+3 = n+3$.

6.a). Berat Amir = Berat Tono + 2 kg

Berat Tono = x kg

\Rightarrow Berat Amir = $x \text{ kg} + 2 \text{ kg} = (x+2) \text{ kg}$

b). Tinggi Tuti = 2 x Tinggi Sri

Tinggi Sri = y meter

\Rightarrow Tinggi Tuti = $2 \times y \text{ meter} = (2y) \text{ meter}$

c). Uang Ali + Uang Soni = 3 juta rupiah

Uang Ali = 2 rupiah

\Rightarrow Uang Soni = 3 juta rupiah - 2 rupiah
 $= (3 \text{ juta} - 2) \text{ rupiah}$

6.d). $1 \text{ kg} = 1.000 \text{ gram} \Leftrightarrow 1 \text{ gram} = \frac{1}{1.000} \text{ kg}$

$\Rightarrow U \text{ gram} = U \times 1 \text{ gram} = U \times \frac{1}{1.000} \text{ kg} = \frac{U}{1.000} \text{ kg}$

7. A = Umur Andri, B = Umur Budi

a). $\underbrace{\text{Umur Andri}}_1 \underbrace{10 \text{ tahun}}_2 \underbrace{\text{lagi}}_{0. \text{ tambah}}$

$= A + 10 \text{ tahun}$

b). $\underbrace{\text{Umur Budi}}_1 \underbrace{10 \text{ tahun}}_2 \underbrace{\text{lagi}}_{0. \text{ tambah}}$

$= B + 10 \text{ tahun}$

c). $\underbrace{\text{Umur Andri}}_1 \underbrace{5 \text{ tahun}}_2 \underbrace{\text{yang lalu}}_{0. \text{ kurang}}$

$= A - 5 \text{ tahun}$

d). $\underbrace{\text{Umur Andri (adalah)}}_A \underbrace{5 \text{ tahun}}_2 \underbrace{\text{lebih tua}}_{\text{Operasi}}$

$\underbrace{\text{dari}}_{\text{tambah}} \underbrace{\text{Umur Budi}}_1$

$\Leftrightarrow A = \text{Umur Budi} + 5 \text{ tahun} = B + 5 \text{ tahun}$

8.a). Jumlah pendapatan 2 hari ini

$= \text{Upah hari ini} + \text{Upah kemarin}$
 $= x \text{ ribu rupiah} + p \text{ ribu rupiah}$
 $= (x+p) \text{ ribu rupiah}$

b). $p \text{ barang} = m \text{ rupiah}, 1 = \frac{p}{p}$

$\Rightarrow 1 \text{ barang} = 1 \times 1 \text{ barang} = \frac{p}{p} \times 1 \text{ barang}$

$= \frac{p \text{ barang}}{p} = \frac{m \text{ rupiah}}{p}$

$= \frac{m}{p} \text{ rupiah}$

c). $3 \text{ pot bunga} = m \text{ rupiah}, 1 = \frac{3}{3}$

$\Rightarrow 1 \text{ pot bunga} = \frac{3}{3} \times 1 \text{ pot bunga} = \frac{3 \text{ pot bunga}}{3}$

$= \frac{m \text{ rupiah}}{3} = \frac{m}{3} \text{ rupiah}$

8.d). Harga beli 1 lusin = P rupiah

$1 \text{ lusin} = 12 \text{ butir}$

$\Rightarrow \text{Harga beli 1 telur} = \frac{P}{12} \text{ rupiah}$

Keuntungan 10%

$\Rightarrow \text{Harga jual 1 telur}$

$= \text{Harga beli 1 telur} - \text{keuntungan 1 telur}$

$= 100\% \text{ Harga beli 1 telur}$

$- 10\% \text{ Harga beli 1 telur}$

$= 90\% \text{ Harga beli 1 telur}$

$= 90\% \times \left(\frac{P}{12} \right) \text{ rupiah}$

$= \frac{90}{100} \times \frac{P}{12} \text{ rupiah}$

$= \frac{3P}{10} \text{ rupiah}$

9. Modal = m rupiah, suku bunga = $r\% / \text{tahun}$

a). Besar bunga 1 tahun

$= \text{modal} \times \text{suku bunga} \times \text{waktu}$

$= m \text{ rupiah} \times r\% / \text{tahun} \times 1 \text{ tahun}$

$= \frac{mr}{100} \text{ rupiah}$

b). Besar bunga t bulan. $\leftarrow (1 \text{ tahun} = 12 \text{ bulan})$

$= m \text{ rupiah} \times r\% / \text{tahun} \times t \text{ bulan}$

$= m \text{ rupiah} \times \frac{r\%}{12 \text{ bulan}} \times t \text{ bulan}$

$= \frac{mrt}{1.200} \text{ rupiah}$

10. $3x^2 - 5x + 4y + 7y^3 - 8 + 8x$

$= (-5)x + 8x + 3x^2 + 4y + 7y^3 + (-8)$

a). koefisien $x = -5$ dan 8

b). koefisien $x^2 = 3$

c). koefisien $y = 4$

d). koefisien $y^3 = 7$

e). Jumlah suku ada 6 buah

f). suku-suku sejenis $= (-5)x$ dan $8x$

g). konstanta = -8

1. a) $x=10 \Rightarrow 3x+2 = 3(10)+2 = 30+2 = 32$

b) $x=-7 \Rightarrow 3x+2 = 3(-7)+2 = -21+2 = -19$

2. a) $x=5 \Rightarrow -5x+2 = -5(5)+2 = -25+2 = -23$

b) $x=-4 \Rightarrow -5x+2 = -5(-4)+2 = 20+2 = 22$

3. a) $a=7, b=-4, \text{ dan } c=5$

$$\Rightarrow 2a+3b-4c = 2(7)+3(-4)-4(5) \\ = 14-12-20 = -18$$

b) $a=7, b=-3, \text{ dan } c=-2$

$$\Rightarrow 2a+3b-4c = 2(7)+3(-3)-4(-2) \\ = 14-9+8 = 13$$

4. $x=3, y=-5, \text{ dan } z=7$

a) $5x-4y+1z = 5(3)-4(-5)+2(7) \\ = 15+20+14 = 49$

b) $x^2-3x+5 = (3)^2-3(3)+5 = 5$

c) $x(y+z)-yz = 3((-5)+7)-(-5)(7) \\ = 3(2)+35 = 6+35 = 41$

d) $x^2+y^2 = (3)^2+(-5)^2 = 9+25 = 34$

e) $(x+y)^2 = (3+(-5))^2 = (-2)^2 = 4$

f) $(x+y)(y+z) = (3+(-5))((-5)+7) \\ = (-2)(2) = 4$

5. $x=-4, y=9, \text{ dan } z=-1$

a) $3x-5y-7z = 3(-4)-5(9)-7(-1) \\ = -12-45+7 = -50$

b) $-3x+2y-7z = -3(-4)+2(9)-7(-1) \\ = 12+18+7 = 37$

c) $x(y+z)-yz = (-4)(9+(-1))-(9)(-1) \\ = (-4)(8)+9 = -32+9 = -23$

d) $x^2-y^2+z^2 = (-4)^2-(9)^2+(-1)^2 \\ = 16-81+1 = -64$

e) $(x+y)(y+z) = (-4+9)(9+(-1)) \\ = (5)(8) = 40$

5. f) $-(3x-2y+3z)(x+2y) \\ = (3(-4)-2(9)+3(-1))(-4+2(9)) \\ = (-12-18-3)(-4+18) \\ = (-33)(14) = -(33 \times 14) \\ = -(33 \times 10 + 33 \times 4) \\ = -(330 + 132) = -462$

1. a). $2a^2$ untuk $a=3 \Rightarrow 2a^2 = 2(3)^2 = 2(9) = 18$

b). $5a^3 - 3a + 1$ untuk $a=2$

$$\Rightarrow 5a^3 - 3a + 1 = 5(2)^3 - 3(2) + 1 = 5(8) - 3(2) + 1 = 40 - 6 + 1 = 35$$

c). $x^2 - x$ untuk $x=1 \Rightarrow x^2 - x = (1)^2 - 1 = 1 - 1 = 0$

d). $(y^2 + 1)(y - 1)$ untuk $y = -2$

$$\Rightarrow (y^2 + 1)(y - 1) = ((-2)^2 + 1)((-2) - 1) = (4 + 1)(-1) = 5(-1) = -5$$

2. a). $3a + 7a = (3 + 7)a = 10a$

b). $4a - 8a = (4 - 8)a = (-4)a = -4a$

c). $-19a + 20a = (-19 + 20)a = a$

d). $-10a - 13a = (-10 + (-13))a = (-23)a = -23a$

3. a). $3a + 2b - 7a + 5b = (3 - 7)a + (2 + 5)b = -4a + 7b$

b). $7a - 5b + 10a + 17b = (7 + 10)a + (-5 + 17)b = 17a + 12b$

c). $-3a + 2b - 7a - 10b = (-3 - 7)a + (2 - 10)b = -10a - 8b$

d). $10a - 5b + 6a + 7b = (10 + 6)a + (-5 + 7)b = 16a + 2b$

4. a). $3 \times (4a) = 3 \times 4 \times a = 12 \times a = 12a$

b). $5 \times (-7a) = 5 \times (-7) \times a = (-35) \times a = -35a$

c). $(-7) \times 6a = (-7) \times 6 \times a = (-42) \times a = -42a$

d). $(-5) \times (-9a) = (-5) \times (-9) \times a = 45 \times a = 45a$

5. a). $(2a) \times (3a^2) = 2 \times a \times 3 \times a^2 = 6 \times a^3 = 6a^3$

b). $(-5x) \cdot (2x^2) = (-5) \cdot x \cdot 2 \cdot x^2 = (-10) \cdot x^3 = -10x^3$

c). $(3p^2) \cdot (-2p) = 3 \cdot p^2 \cdot (-2) \cdot p = (-6) \cdot p^3 = -6p^3$

d). $(-5r^2) \cdot (-2r) = (-5) \cdot r^2 \cdot (-2) \cdot r = 10 \cdot r^3 = 10r^3$

6. a). $(3a^2) \cdot (2a^2) = 3 \cdot a^2 \cdot 2 \cdot a^2 = 6a^4$

b). $(-5b^2) \cdot (2b^2) = (-5) \cdot b^2 \cdot 2 \cdot b^2 = (-10) \cdot b^4 = -10b^4$

c). $(3x^3) \cdot (-2x^2) = 3 \cdot x^3 \cdot (-2) \cdot x^2 = (-6) \cdot x^5 = -6x^5$

d). $(-5p^2) \cdot (-3p^2) = (-5) \cdot p^2 \cdot (-3) \cdot p^2 = 15 \cdot p^4 = 15p^4$

7. a). $3(2a - 7b) + 2(-4 + 3b)$

$$= 6a - 21b + (-8) + 6b = 6a - 15b - 8$$

b). $3(7a - 5b) - 5(-5a + 7b)$

$$= 21a - 15b + 25a - 35b = 46a - 50b$$

c). $-5(6a - 5b) + 8(3a - 7b)$

$$= -30a + 25b + 24a - 56b = -6a - 31b$$

7. d). $-4(3a - 7b) - 7(2a - 5b)$

$$= -12a + 28b - 14a + 35b = -26a + 63b$$

8. a). $\frac{2}{3} \times \left(\frac{9}{16}a\right) = \frac{2}{3} \times \frac{3 \times 3}{2 \times 8} \times a = \frac{3}{8}a$

b). $0,25 \times (0,17a) = 0,25 \times 0,17 \times a = 0,0425a$

c). $\frac{9}{2} \times \left(-\frac{16}{3}b\right) = -\frac{3 \times 3}{2} \times \frac{2 \times 8}{3} \times b = -24b$

d). $\left(-\frac{5}{2}\right) \times \left(-\frac{10}{3}b\right) = \frac{5}{2} \times \frac{2 \times 5}{3} \times b = \frac{25}{3}b$

9. a). $\frac{2}{3}(7a + 3b) + \frac{1}{3}(5a - 4b)$

$$= \frac{14}{3}a + \frac{6}{3}b + \frac{5}{3}a - \frac{4}{3}b = \frac{19}{3}a + \frac{2}{3}b$$

b). $\frac{5}{3}(4a + 3b) - \frac{2}{3}(7a - 3b)$

$$= \frac{20}{3}a + \frac{15}{3}b - \frac{14}{3}a + \frac{6}{3}b = \frac{6}{3}a + \frac{21}{3}b = 2a + 7b$$

c). $-\frac{3}{5}(7a - 5b) + \frac{4}{5}(9a - 7b)$

$$= -\frac{21}{5}a + \frac{15}{5}b + \frac{36}{5}a - \frac{28}{5}b = \frac{15}{5}a - \frac{13}{5}b = 3a - \frac{13}{5}b$$

d). $-\frac{7}{2}(2a + 5b) - \frac{3}{2}(5a - 4b)$

$$= -\frac{14}{2}a - \frac{35}{2}b - \frac{15}{2}a + \frac{12}{2}b = -\frac{29}{2}a - \frac{23}{2}b$$

10. $A = 0,75a - 0,6b$; $B = 1,5a + \frac{3}{2}b = 1,5a + 1,5b$

a). $2A + 3B$

$$= 2(0,75a - 0,6b) + 3(1,5a + 1,5b)$$

$$= 1,5a - 1,2b + 4,5a + 4,5b = 6a + 3,3b$$

b). $2A - 3B$

$$= 2(0,75a - 0,6b) - 3(1,5a + 1,5b)$$

$$= 1,5a - 1,2b - 4,5a - 4,5b = -3a - 5,7b$$

c). $10A + \frac{1}{100}B$

$$= 10(0,75a - 0,6b) + \frac{1}{100}(1,5a + 1,5b)$$

$$= 7,5a - 6b + 0,015a + 0,015b$$

$$= 7,515a - 5,985b$$

d). $\frac{1}{100}A - 25B$

$$= \frac{1}{100}(0,75a - 0,6b) - 25(1,5a + 1,5b)$$

$$= -0,0075a + 0,006b - 37,5a - 37,5b$$

$$= -37,5075a - 37,494b$$

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1. a. $a = 3u - 4v$; $u = 0,1$; $v = 0,5$

$$\Rightarrow a = 3(0,1) - 4(0,5) = 0,3 - 2 = -1,7$$

b. $a = 2pr(h+r)$, $r = 7$, $h = 13$, $p = 3\frac{1}{7} = \frac{22}{7}$

$$\Rightarrow a = 2 \cdot \frac{22}{7} \cdot (13+7) = 44 \cdot 20 = 880 //$$

c. $a = \frac{1}{2}(c+b) \cdot h$ dengan $c = 14$, $b = 13$, $h = 12$

$$\Rightarrow a = \frac{1}{2}(14+13) \cdot \frac{6}{2} = 27 \times 6 = 162 //$$

2. $F = \frac{9c}{5} + 32$

a. $c = 25 \Rightarrow F = \frac{9(25)}{5} + 32 = 45 + 32 = 77 //$

b. $c = -6 \Rightarrow F = \frac{9(-6)}{5} + 32 = -\frac{54}{5} + 32$

$$= 32 - 10\frac{4}{5} = 20 + \frac{5}{5} - \frac{4}{5} = 20\frac{1}{5} //$$

3. $F = \frac{9}{4}R + 32$

a. $R = 20 \Rightarrow F = \frac{9}{4} \times 20 + 32 = 45 + 32 = 77 //$

b. $R = -90 \Rightarrow F = \frac{9}{4} \times (-90) + 32 = -90 + 32 = -58 //$

4. Dik: $s = \left(\frac{u+v}{2}\right) \cdot t$, $u = 4,2$ ~~m/det~~
 $v = 6,8$; $t = 4,2$

$$\Rightarrow s = \left(\frac{4,2+6,8}{2}\right) \times 4,2$$

$$\Rightarrow s = \frac{11}{2} \times 4,2 = 23,1 \times 2 = 46,2 \text{ m} //$$

5. Jarak yang dapat dilihat dari x meter

$$y = 123x$$

Dik: $x = 10 \text{ meter} \Rightarrow y = 123 \cdot 10 \text{ m} = 1230 \text{ m} //$

1. a). Jumlah dari $(5a+9)$ dan $(9a-7)$
 $= (5a+9) + (9a-7) = 5a+9+9a-7$
 $= 14a+2$

b). Jumlah dari $(3b-9)$ dan $(9b+2)$
 $= (3b-9) + (9b+2) = 3b-9+9b+2 = 12b-7$

c). Jumlah dari $(6p-7)$ dan $(-5p-9)$
 $= (6p-7) + (-5p-9) = 6p-7-5p-9 = p-16$

2. a). Jumlah dari $(4x^2-7x+3)$ dan $(-6x-7)$
 $= (4x^2-7x+3) + (-6x-7) = 4x^2-7x+3-6x-7$
 $= 4x^2-13x-4$

b). Jumlah dari $(3x^2+3x+7)$ dan $(-7x^2-10x-6)$
 $= (3x^2+3x+7) + (-7x^2-10x-6)$
 $= 3x^2+3x+7-7x^2-10x-6$
 $= -4x^2-7x+1$

c). Jumlah dari $(-7x^2+2x-7)$ dan $(9x^2-6x+20)$
 $= (-7x^2+2x-7) + (9x^2-6x+20)$
 $= -7x^2+2x-7+9x^2-6x+20$
 $= 2x^2-4x+13$

3. a). Jumlah dari $(5x^2+9x+2)$ dan $(-7x^2-9x+0)$
 $= (5x^2+9x+2) + (-7x^2-9x+0)$
 $= 5x^2+9x+2-7x^2-9x+0$
 $= -2x^2+10$

b). Jumlah dari $(4a^2+0a+1)$ dan $(6a^2-7a+9)$
 $= (4a^2+0a+1) + (6a^2-7a+9)$
 $= 4a^2+0a+1+6a^2-7a+9$
 $= 10a^2-7a+10$

c). Jumlah dari $(-5b^2-0b+10)$ dan $(-7b^2+9b-13)$
 $= (-5b^2-0b+10) + (-7b^2+9b-13)$
 $= -5b^2-0b+10-7b^2+9b-13$
 $= -12b^2+9b-3$

4. a). $6(-3x+2) = 6 \cdot (-3x) + 6 \cdot 2 = -18x+12$

b). $12(-5x-7) = 12(-5x) + 12(-7) = -60x-84$

c). $-5(7a^2-2a) = -5(7a^2) - 5(-2a) = -35a^2+10a$

d). $-3(7b^2+0b-2)$
 $= (-3)(7b^2) + (-3)(0b) + (-3)(-2)$
 $= -21b^2-24b+6$

5. a). $3(2x-5) + 7(5x+4)$
 $= 3(2x) + 3(-5) + 7(5x) + 7(4)$
 $= 6x-15+35x+28 = 41x+13$

b). Jumlah dari $-3(6a-1)$ dan $8(-3a+1)$
 $= -3(6a-1) + 8(-3a+1)$
 $= (-3)(6a) + (-3)(-1) + 8(-3a) + 8(1)$
 $= -18a+3-24a+8 = -42a+11$

c). Jumlah dari $-7(-5b+6)$ dan $9(-3b-1)$
 $= -7(-5b+6) + 9(-3b-1)$
 $= (-7)(-5b) + (-7)(6) + 9(-3b) + 9(-1)$
 $= 35b-42-27b-9 = 8b-51$

d). Jumlah dari $2(1-3c)$ dan $10(4c+5)$
 $= 2(1-3c) + 10(4c+5)$
 $= 2(1) + 2(-3c) + 10(4c) + 10(5)$
 $= 2-6c+40c+50 = 34c+52$

$$1.a. (6y+7) - (-5y-2) = 6y+7+5y+2 \\ = 11y+9 //$$

$$b. (-8a-9) - (9a+4) = -8a-9-9a-4 \\ = -17a-13 //$$

$$c. (10b-5) - (-6b+3) = 10b-5+6b-3 \\ = 16b-8 //$$

$$d. (-3c-2) - (-8c-3) = -3c-2+8c+3 \\ = 5c+1 //$$

$$2. A = 2p-3q, B = 5p-7q, C = -p+4q$$

$$a. A-B = (2p-3q) - (5p-7q) \\ = 2p-3q-5p+7q = -3p+4q //$$

$$b. B-C = (5p-7q) - (-p+4q) \\ = 5p-7q+p-4q = 6p-11q //$$

$$c. A-C = (2p-3q) - (-p+4q) \\ = 2p-3q+p-4q = 3p-7q //$$

$$3. a. (5x^2-7x+2) - (9x^2+x-4) \\ = 5x^2-7x+2-9x^2-x+4 \\ = -4x^2-8x+6 //$$

$$b. (10y^2+9y+1) - (-y^2+6y+9) \\ = 10y^2+9y+1+y^2-6y-9 \\ = 11y^2+3y-8 //$$

$$c. (10a^2-3a+2) - (4a^2+6a-7) \\ = 10a^2-3a+2-4a^2-6a+7 \\ = 6a^2-9a+9 //$$

$$d. (3p^2-5p+8) - (-5p^2+7p-2) \\ = 3p^2-5p+8+5p^2-7p+2 \\ = 8p^2-12p+10 //$$

$$4. a. 4(x^2-5x-2) - (-7x^2+2x+5) \\ = 4x^2-20x-8+7x^2-2x-5 \\ = 11x^2-22x-13 //$$

$$4. b. 2(5y^2-7y-1) - 7(y^2+2y-1) \\ = 10y^2-14y-2-7y^2-14y+7 \\ = 3y^2-28y+5 //$$

$$c. -5(2a^2+5a-7) + 2(-3a^2+2a-1) \\ = -10a^2-25a+35-6a^2+4a-2 \\ = -16a^2-21a+33 //$$

$$d. -3(3p^2-2p+2) - 7(-2p^2+4p-5) \\ = -9p^2+6p-6+14p^2-28p+35 \\ = 5p^2-22p+29 //$$

$$5. M = -2a^2+5a+3, N = -a^2-2a+1$$

$$a. 2M-N = 2(-2a^2+5a+3) - (-a^2-2a+1) \\ = -4a^2+10a+6+a^2+2a-1 \\ = -3a^2+12a+5 //$$

$$b. 5M+3N = 5(-2a^2+5a+3) + 3(-a^2-2a+1) \\ = -10a^2+25a+15-3a^2-6a+3 \\ = -13a^2+19a+18 //$$

$$c. 3M+N = 3(-2a^2+5a+3) + (-a^2-2a+1) \\ = -6a^2+15a+9-a^2-2a+1 \\ = -7a^2+13a+10 //$$

$$d. -5M-2N = -5(-2a^2+5a+3) - 2(-a^2-2a+1) \\ = 10a^2-25a-15+2a^2+4a-2 \\ = 12a^2-21a-17 //$$

$$1.a). (5a^2b)(7a^3b^2) = 5 \cdot 7 \cdot a^2 \cdot a^3 \cdot b \cdot b^2$$

$$= 35 \cdot a^5 \cdot b^3 = 35a^5b^3$$

$$b). (-3a^3b^4)(5a^2b^3) = (-3) \cdot 5 \cdot a^3 \cdot a^2 \cdot b^4 \cdot b^3$$

$$= (-15) \cdot a^5 \cdot b^7 = -15a^5b^7$$

$$c). (5a^2b^3)(-4a^5b^2) = 5 \cdot (-4) \cdot a^2 \cdot a^5 \cdot b^3 \cdot b^2$$

$$= -20a^7b^5$$

$$d). (-3a^3b^2)(-7a^5b^5) = (-3)(-7) \cdot a^3 \cdot a^5 \cdot b^2 \cdot b^5$$

$$= 21 \cdot a^8 \cdot b^7$$

$$2.a). \frac{25a^2b}{3a^2b} = \frac{25}{3}$$

$$b). \frac{45a^6b^3}{3a^2b^2} = \frac{15 \cdot 3 \cdot a \cdot a \cdot a^4 \cdot b \cdot b \cdot b}{3 \cdot a \cdot a \cdot b \cdot b}$$

$$= 15a^4b$$

$$c). \frac{-36a^5b^3}{-4a^4b^3} = \frac{(-4) \cdot 9 \cdot a \cdot a^4 \cdot b^3}{(-4) \cdot a^4 \cdot b^3} = 9a$$

$$d). \frac{45a^6b^3}{9a^2b^2} = \frac{5 \cdot 9 \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot b \cdot b \cdot b}{9 \cdot a \cdot a \cdot b \cdot b}$$

$$= 5 \cdot a^4 \cdot b$$

$$3.a). \frac{25a^2b^3}{5a^2b^2} \times a^3b^5 = \frac{5 \cdot 5 \cdot a^2 \cdot b \cdot b \cdot b}{5 \cdot a^2 \cdot b^2} \times a^3b^5$$

$$= 5 \cdot b \times a^3 \cdot b^5 = 5a^3b^6$$

$$b). \frac{3a^2b^4}{5a^5b^7} \times a^2b^2$$

$$= \frac{3 \cdot a \cdot a \cdot b \cdot b \cdot b \cdot b}{5 \cdot a \cdot a \cdot a \cdot a \cdot a \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b} \times a \cdot a \cdot b \cdot b$$

$$= \frac{3}{5ab}$$

$$c). \frac{54a^4b^5}{9a^2b^8} \times \frac{a^3b^2}{ab}$$

$$= \frac{6 \cdot 9 \cdot a \cdot a \cdot a \cdot a \cdot b \cdot b \cdot b \cdot b \cdot b}{9 \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b} \times \frac{a \cdot a \cdot a \cdot b \cdot b}{a \cdot b}$$

$$= \frac{6}{ab^2}$$

$$3.d). \frac{9}{a^2b^3} \times \frac{7}{a^5b^6} = \frac{9 \times 7}{a^2a^5 \cdot b^3 \cdot b^6} = \frac{63}{a^7 \cdot b^9}$$

$$4.a). (-5a)(-4a+3b)$$

$$= (-5a)(-4a) + (-5a)(3b) = 20a^2 - 15ab$$

$$b). (2a+3b)(7b)$$

$$= (2a)(7b) + (3b)(7b) = 14ab + 21b^2$$

$$c). (3a-5b)(2a+7b)$$

$$= 3a(2a+7b) - 5b(2a+7b)$$

$$= (3a)(2a) + (3a)(7b) - (5b)(2a) - (5b)(7b)$$

$$= 6a^2 + 21ab - 10ab - 35b^2$$

$$= 6a^2 + 11ab - 35b^2$$

$$d). (-5a+2b)(-3a-7b)$$

$$= -5a(-3a-7b) + 2b(-3a-7b)$$

$$= (-5a)(-3a) + (-5a)(-7b) + 2b(-3a) + 2b(-7b)$$

$$= 15a^2 + 35ab - 6ab - 14b^2$$

$$= 15a^2 + 29ab - 14b^2$$

$$5.a). (a+b)^2 = (a+b)(a+b) = a(a+b) + b(a+b)$$

$$= a^2 + ab + ab + b^2 = a^2 + 2ab + b^2$$

$$b). (a-b)^2 = (a-b)(a-b) = a(a-b) - b(a-b)$$

$$= a^2 - ab - ab + b^2 = a^2 - 2ab + b^2$$

$$c). (a+b)(a-b) = a(a-b) + b(a-b)$$

$$= a^2 - ab + ab - b^2 = a^2 - b^2$$

$$d). (a+b)(a^2-ab+b^2)$$

$$= a(a^2-ab+b^2) + b(a^2-ab+b^2)$$

$$= a^3 - a^2b + ab^2 + a^2b - ab^2 + b^3$$

$$= a^3 + b^3$$

$$e). (a+b)^3 = (a+b)(a+b)^2 = (a+b)(a^2+2ab+b^2)$$

$$= a(a^2+2ab+b^2) + b(a^2+2ab+b^2)$$

$$= a^3 + 2a^2b + ab^2 + a^2b + 2ab^2 + b^3$$

$$= a^3 + 3a^2b + 3ab^2 + b^3 \rightarrow \text{bagian a.}$$

$$f). (a-b)^3 = (a-b)(a-b)^2 = (a-b)(a^2-2ab+b^2)$$

$$= a(a^2-2ab+b^2) - b(a^2-2ab+b^2)$$

$$= a^3 - 2a^2b + ab^2 - a^2b + 2a^2b - b^3$$

$$= a^3 - 3a^2b + 3ab^2 - b^3$$

6. $A = 3a + 2b$, $B = 4a - 5b$

$$\begin{aligned} a) AB &= (3a + 2b)(4a - 5b) \\ &= 3a(4a - 5b) + 2b(4a - 5b) \\ &= 12a^2 - 15ab + 8ab - 10b^2 \\ &= 12a^2 - 7ab - 10b^2 \end{aligned}$$

$$\begin{aligned} b) A^2 - B^2 &= (3a + 2b)^2 - (4a - 5b)^2 \\ &= (3a)^2 + 2(3a)(2b) + (2b)^2 \\ &\quad - [(4a)^2 - 2(4a)(5b) + (5b)^2] \\ &= 9a^2 + 12ab + 4b^2 - [16a^2 \\ &\quad - 40ab + 25b^2] \\ &= -7a^2 + 52ab - 21b^2 \end{aligned}$$

c). $(A+B)(A-B) = A^2 - B^2 = -7a^2 + 52ab - 21b^2$

d). $(A+B)^2 - (A-B)^2 - 4AB \leftarrow \text{lihat no. 5, a, b.}$

$$\begin{aligned} &= A^2 + 2AB + B^2 - [A^2 - 2AB + B^2] - 4AB \\ &= \cancel{A^2} + 2AB + \cancel{B^2} - \cancel{A^2} + 2AB - \cancel{B^2} - 4AB \\ &= 2AB + 2AB - 4AB = 4AB - 4AB = 0 \end{aligned}$$

7. Lihat no. 5 bagian c.

a). $(x-3)(x+3) = x^2 - 3^2 = x^2 - 9$

b). $(x-4)(x+4) = x^2 - 4^2 = x^2 - 16$

c). $(x-a)(x+a) = x^2 - a^2$

d). $(x-p)(x+p) = x^2 - p^2$

8. Luas total = $L_I + L_{II} + L_{III}$

$$\begin{aligned} x(3x+2y+5) &= x(3x) + x(2y) + x(5) \\ &= 3x^2 + 2xy + 5x \end{aligned}$$

9. Untuk menyelesaikan soal-soal ini, perlu diketahui bahwa 2 buah polinomial dikatakan sama jika semua koefisien yang berada pada suku yang sama bernilai sama.

a). $3x(ax+by+c) = 6x^2 - 9xy + 12x$

$$\begin{aligned} \Leftrightarrow 3ax^2 + 3bxy + 3cx &= 6x^2 - 9xy + 12x \\ \Rightarrow 3a &= 6 \Leftrightarrow a = 2; 3b = -9 \Leftrightarrow b = -3; 3c = 12 \\ &\Leftrightarrow c = 4. \end{aligned}$$

$$\Leftrightarrow 3x(2x + (-3)y + 4) = 6x^2 - 9xy + 12x$$

9. b). $4x(3x+by+2) = 9x^2 - 6xy + cx$

$$\Leftrightarrow 3ax^2 + abxy + 2ax = 9x^2 - 6xy + cx$$

$$\Rightarrow 3a = 9 \Leftrightarrow a = 3$$

$$\Rightarrow ab = -6 \Rightarrow 3b = -6 \Leftrightarrow b = -2$$

$$\Rightarrow 2a = c, a = 3 \Rightarrow c = 2(3) = 6$$

$$\Leftrightarrow 3x(3x + (-2)y + 2) = 9x^2 - 6xy + 6x$$

c). $ay(bx+7y-3) = 9xy - 21y^2 + cy$

$$\Leftrightarrow abxy + 7ay^2 - 3ay = 9xy - 21y^2 + cy$$

$$\Rightarrow ab = 9 \Rightarrow -3b = 9 \Leftrightarrow b = -3$$

$$\Rightarrow 7a = -21 \Leftrightarrow a = -3$$

$$\Rightarrow -3a = c \Leftrightarrow c = -3(-3) = 9$$

$$\Leftrightarrow (-3)y((-3)x + 7y - 3) = 9xy - 21y^2 + 9y$$

d). $2y(4x-ay+5) = bxy + 10y^2 - cy$

$$\Leftrightarrow 8xy - 2ay^2 + 10y = bxy + 10y^2 - cy$$

$$\Rightarrow b = 8; -2a = 10 \Leftrightarrow a = -5; 10 = -c \Leftrightarrow c = -10$$

$$\Leftrightarrow 2y(4x - (-5)y + 5) = 8xy + 10y^2 - (-10)y$$

10. Jika panjang = p dan lebar = l

maka keliling = $2p + 2l$ dan Luas = pl .

Karena Panjang = 23 cm dan lebar = 15 cm

maka keliling = $2(23 \text{ cm}) + 2(15 \text{ cm})$

$$= 46 \text{ cm} + 30 \text{ cm} = 76 \text{ cm}$$

dan Luas = $(23 \text{ cm}) \times (15 \text{ cm})$

$$= 23 \times 15 \text{ cm}^2$$

$$= 345 \text{ cm}^2$$

1.a). $7a, 11a$: FPB: Pangkat rendah
 $\Rightarrow 7a = 7^1 \cdot 11^0 \cdot a^1$: KPK: Pangkat tinggi
 $\Rightarrow 11a = 7^0 \cdot 11^1 \cdot a^1$: Dari setiap unsur
 $\Rightarrow \text{FPB}(7a, 11a) = 7^0 \cdot 11^0 \cdot a^1 = 1 \cdot 1 \cdot a = a$
 $\Rightarrow \text{KPK}(7a, 11a) = 7^1 \cdot 11^1 \cdot a^1 = 7 \cdot 11 \cdot a = 77a$

b). $5a = 2^0 \cdot 5^1 \cdot a^1 \cdot b^0$
 $10b = 2^1 \cdot 5^1 \cdot a^0 \cdot b^1$
 $\Rightarrow \text{FPB}(5a, 10b) = 2^0 \cdot 5^1 \cdot a^0 \cdot b^0 = 1 \cdot 5 \cdot 1 \cdot 1 = 5$
 $\Rightarrow \text{KPK}(5a, 10b) = 2^1 \cdot 5^1 \cdot a^1 \cdot b^1 = 2 \cdot 5 \cdot a \cdot b = 10ab$

c). $30x = 2^1 \cdot 3^1 \cdot 5^1 \cdot x^1 \cdot y^0$
 $18y = 2^1 \cdot 3^2 \cdot 5^0 \cdot x^0 \cdot y^1$
 $\Rightarrow \text{FPB}(30x, 18y) = 2^1 \cdot 3^1 \cdot 5^0 \cdot x^0 \cdot y^0 = 2 \cdot 3 = 6$
 $\Rightarrow \text{KPK}(30x, 18y) = 2^1 \cdot 3^2 \cdot 5^1 \cdot x^1 \cdot y^1 = 2 \cdot 9 \cdot 5 \cdot x \cdot y = 90xy$

d). $54x = 2^1 \cdot 3^3 \cdot x^1$
 $24x^2 = 2^3 \cdot 3^1 \cdot x^2$
 $\Rightarrow \text{FPB}(54x, 24x^2) = 2^1 \cdot 3^1 \cdot x^1 = 2 \cdot 3 \cdot x = 6x$
 $\Rightarrow \text{KPK}(54x, 24x^2) = 2^3 \cdot 3^3 \cdot x^2 = 8 \cdot 27 \cdot x^2 = 216x^2$

2.a). $15x^2 = 2^0 \cdot 3^1 \cdot 5^1 \cdot x^2 \cdot y^0$
 $30xy = 2^1 \cdot 3^1 \cdot 5^1 \cdot x^1 \cdot y^1$
 $\Rightarrow \text{FPB}(15x^2, 30xy) = 2^0 \cdot 3^1 \cdot 5^1 \cdot x^1 \cdot y^0 = 15x$
 $\Rightarrow \text{KPK}(15x^2, 30xy) = 2^1 \cdot 3^1 \cdot 5^1 \cdot x^2 \cdot y^1 = 30x^2y$

b). $24x^2 = 2^3 \cdot 3^1 \cdot 2^0 \cdot x^2 \cdot y^0$
 $42y^2 = 2^1 \cdot 3^1 \cdot 7^1 \cdot x^0 \cdot y^2$
 $\Rightarrow \text{FPB}(24x^2, 42y^2) = 2^1 \cdot 3^1 \cdot 7^0 \cdot x^0 \cdot y^0 = 6$
 $\Rightarrow \text{KPK}(24x^2, 42y^2) = 2^3 \cdot 3^1 \cdot 7^1 \cdot x^2 \cdot y^2 = 168x^2y^2$

c). $10x^3y^2 = 2^1 \cdot 3^0 \cdot x^3 \cdot y^2$
 $24x^5y^2 = 2^3 \cdot 3^1 \cdot x^5 \cdot y^2$
 $\Rightarrow \text{FPB}(10x^3y^2, 24x^5y^2) = 2^1 \cdot 3^0 \cdot x^3 \cdot y^2 = 2x^3y^2$

$\Rightarrow \text{KPK}(10x^3y^2, 24x^5y^2) = 2^3 \cdot 3^1 \cdot x^5 \cdot y^2 = 72x^5y^2$

2-d). $A = 6x^1y = 2^1 \cdot 3^1 \cdot x^1 \cdot y^1$
 $B = 8xy^2 = 2^3 \cdot 3^0 \cdot x^1 \cdot y^2$
 $\Rightarrow \text{FPB}(A, B) = 2^1 \cdot 3^0 \cdot x^1 \cdot y^1 = 2xy$
 $\Rightarrow \text{KPK}(A, B) = 2^3 \cdot 3^1 \cdot x^1 \cdot y^2 = 24x^2y^2$

3.a). $A = 54a^2 = 2^1 \cdot 3^3 \cdot a^2 \cdot b^0 \cdot c^0$
 $B = 24b^2 = 2^3 \cdot 3^1 \cdot a^0 \cdot b^2 \cdot c^0$
 $C = 18c^2 = 2^1 \cdot 3^2 \cdot a^0 \cdot b^0 \cdot c^2$
 $\Rightarrow \text{FPB}(A, B, C) = 2^1 \cdot 3^1 \cdot a^0 \cdot b^0 \cdot c^0 = 6$
 $\text{KPK}(A, B, C) = 2^3 \cdot 3^3 \cdot a^2 \cdot b^2 \cdot c^2 = 216a^2b^2c^2$

b). $A = 12p^2q^2 = 2^2 \cdot 3^1 \cdot p^2 \cdot q^2$
 $B = 18p^2q^3 = 2^1 \cdot 3^2 \cdot p^2 \cdot q^3$
 $C = 24p^3q^3 = 2^3 \cdot 3^1 \cdot p^3 \cdot q^3$
 $\Rightarrow \text{FPB}(A, B, C) = 2^1 \cdot 3^1 \cdot p^2 \cdot q^2 = 6p^2q^2$
 $\text{KPK}(A, B, C) = 2^3 \cdot 3^2 \cdot p^3 \cdot q^3 = 72p^3q^3$

c). $A = 8xyz = 2^3 \cdot 3^0 \cdot x^1 \cdot y^1 \cdot z^1$
 $B = 12x^2yz = 2^2 \cdot 3^1 \cdot x^2 \cdot y^1 \cdot z^1$
 $C = 54xy^2z = 2^1 \cdot 3^3 \cdot x^1 \cdot y^2 \cdot z^1$
 $\Rightarrow \text{FPB}(A, B, C) = 2^1 \cdot 3^0 \cdot x^1 \cdot y^1 \cdot z^1 = 2xyz$
 $\text{KPK}(A, B, C) = 2^3 \cdot 3^3 \cdot x^2 \cdot y^2 \cdot z^1 = 216x^2y^2z$

d). $A = 10a^3bc = 2^1 \cdot 3^0 \cdot a^3 \cdot b^1 \cdot c^1$
 $B = 24abc^3 = 2^3 \cdot 3^1 \cdot a^1 \cdot b^1 \cdot c^3$
 $C = 36ab^4c^2 = 2^2 \cdot 3^2 \cdot a^1 \cdot b^4 \cdot c^2$
 $\Rightarrow \text{FPB}(A, B, C) = 2^1 \cdot 3^0 \cdot a^1 \cdot b^1 \cdot c^1 = 6abc$
 $\text{KPK}(A, B, C) = 2^3 \cdot 3^2 \cdot a^3 \cdot b^4 \cdot c^3 = 72a^3b^4c^3$

4. Bentuk Aljabar 1 = $B_1 = 4a^2 = 2^2 \cdot a^2 \cdot b^0$
 Bentuk Aljabar 2 = $B_2 = 2^0 \cdot a^1 \cdot b^2$
 $\text{FPB}(B_1, B_2) = 2^0 \cdot a^1 \cdot b^0$

$x=1, y=1, z=2$
 $\text{KPK}(B_1, B_2) = 4a^2b^2 = 2^2 \cdot a^2 \cdot b^2$
 $\therefore B_2 = 2^1 \cdot a^1 \cdot b^2 = 2ab^2$

5. Bentuk Aljabar 1 = $B_1 = 4a^2b^2 = 2^2 \cdot a^2 \cdot b^2 \cdot c^0$
 Bentuk Aljabar 2 = $B_2 = 2^1 \cdot 13^1 \cdot a^2 \cdot b^3 \cdot c^1$
 $\text{FPB}(B_1, B_2) = 2^1 \cdot a^2 \cdot b^2 \cdot c^0, y=1, k=3, l=1$
 $x=1, z=1$
 $\text{KPK}(B_1, B_2) = 52a^2b^3c = 2^2 \cdot 13^1 \cdot a^2 \cdot b^3 \cdot c^1$
 $\therefore B_2 = 2^1 \cdot 13^1 \cdot a^1 \cdot b^3 \cdot c^1 = 26ab^3c$

$$1.a). \frac{5x}{11} + \frac{14x}{11} = \frac{19x}{11}$$

$$b). \frac{5x}{3} + \frac{x}{6} = \frac{5x(2)}{3(2)} + \frac{x}{6} = \frac{10x}{6} + \frac{x}{6} = \frac{11x}{6}$$

$$c). \frac{a}{b} - \frac{7a}{3} = \frac{a(3)}{b(3)} - \frac{7a(6)}{3(6)} = \frac{3a}{3b} - \frac{7ab}{3b} = \frac{3a-7ab}{3b}$$

$$d). \frac{a}{b} + \frac{b}{a} = \frac{a \cdot a}{b \cdot a} + \frac{b \cdot b}{a \cdot b} = \frac{a^2+b^2}{ab}$$

$$2.a). \frac{a-2}{3} + \frac{3a-5}{3} = \frac{(a-2)+(3a-5)}{3} = \frac{4a-7}{3}$$

$$b). \frac{5a-6}{2} + \frac{a-7}{2} = \frac{(5a-6)+(a-7)}{2} = \frac{6a-13}{2}$$

$$3.a). \frac{x+1}{x^2y} - \frac{y+2}{xy^2} = \frac{(x+1)(y)}{(x^2y)(y)} - \frac{(y+2)(x)}{(xy^2)(x)}$$

$$= \frac{xy+y-(xy+2x)}{x^2y^2}$$

$$= \frac{-2x+y}{x^2y^2}$$

$$b). \frac{3}{x^3y} + \frac{5}{xy^3} = \frac{3(y^2)}{x^3y(y^2)} + \frac{5(x^2)}{xy^3(x^2)} = \frac{5x^2+3y^2}{x^3y^3}$$

$$c). \frac{7}{x^2y^2} - \frac{9}{x^3y} = \frac{7 \cdot x}{x^2y^2 \cdot x} - \frac{9 \cdot y}{x^3y \cdot y} = \frac{7x-9y}{x^3y^2}$$

$$d). \frac{1}{xy^2} - \frac{1}{x^2y} = \frac{1 \cdot x}{xy^2 \cdot x} - \frac{1 \cdot y}{x^2y \cdot y} = \frac{x-y}{x^2y^2}$$

$$e). \frac{a}{b} + \frac{b}{c} + \frac{c}{a} = \frac{a \cdot ac}{b \cdot ac} + \frac{b \cdot ab}{c \cdot ab} + \frac{c \cdot bc}{a \cdot bc}$$

$$= \frac{a^2c+b^2a+c^2b}{abc}$$

$$f). \frac{a}{b^2} - \frac{b}{ca^2} + \frac{c}{a^2} = \frac{a(a^2c)}{b^2(a^2c)} - \frac{b \cdot b^2}{ca^2 \cdot b^2} + \frac{c(b^2c)}{a^2(b^2c)}$$

$$= \frac{a^3c-b^3+b^2c^2}{a^2b^2c^2}$$

$$g). \frac{a}{bc^2} + \frac{b}{ca^2} - \frac{c}{ab^2} = \frac{a(a^2b)}{bc^2(a^2b)} + \frac{b(b^2c)}{ca^2(b^2c)} - \frac{c(c^2a)}{ab^2(c^2a)}$$

$$= \frac{a^3b+b^3c-c^3a}{a^2b^2c^2}$$

$$3.h). \frac{a}{b+c} - \frac{b}{c+a} + \frac{c}{a+b}$$

$$= \frac{a(c+a)(a+b) - b(b+c)(a+b) + c(b+c)(c+a)}{(b+c)(c+a)(a+b)}$$

$$= \frac{(a(c+a^2))(a+b) - (b^2+bc)(a+b) + (b+c^2)(c+a)}{(b+c)(c+a)(a+b)}$$

$$= \frac{a^2c(a^3+abc+a^2b-ab^2-abc-b^3-b^2c}{abc+ac^2+a^2b+a^2c+b^2c+bc^2+ab^2+abc$$

$$+ \frac{bc^2+c^3+abc+ac^2}{abc+ac^2+a^2b+a^2c+b^2c+bc^2+ab^2+abc}$$

$$= \frac{a^3-b^3+c^3+a^2b+a^2c-ab^2-b^2c+ac^2+bc^2+abc}{2a(bc+a^2b+a^2c+b^2a+b^2c+c^2a+c^2b)}$$

$$4.a). \frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$$

$$b). \frac{2}{p} \times \frac{q}{q} = \frac{2 \times q}{p \times q} = \frac{q}{qp}$$

$$c). \frac{a}{b} : \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$$

$$d). \frac{3}{p} : \frac{q}{q} = \frac{3}{p} \times \frac{q}{q} = \frac{3 \times q}{p \times q} = \frac{q}{3p}$$

$$5.a). \frac{3ab}{xy^2} \times \frac{x^2y}{6a^2b} = \frac{3ab \cdot x \cdot y}{x \cdot y \cdot 6 \cdot a \cdot a \cdot b} = \frac{x}{2y}$$

$$b). \frac{6a^4b^2}{x^2y} : \frac{2a^3b^2}{xy^2} = \frac{6a^4b^2}{x^2y} \times \frac{xy \cdot y}{2a^3b^2} = \frac{3a}{x}$$

$$c). \frac{3(x-2)^2}{(x+3)^3} : \frac{(x-2)^3}{(x+3)} = \frac{3(x-2)^2}{(x+3)(x+3)^2} \times \frac{(x+3)}{(x-2)^3}$$

$$= \frac{3}{(x^2+6x+9)(x-2)}$$

$$= \frac{3}{x^3+6x^2+9x-2x^2-12x-18}$$

$$= \frac{3}{x^3+4x^2-3x-18}$$

$$d). \frac{2(x+3)}{(x-5)^2} : \frac{(x+3)^2}{(x-5)} = \frac{2(x+3)}{(x-5)(x-5)} \times \frac{(x-5)}{(x+3)(x+3)}$$

$$= \frac{2}{(x-5)(x+3)} = \frac{2}{x^2-5x+3x-15}$$

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

1. Pers: $2x^2 + y^2 - 4x + 2y - xy + 4$
 $= 2x^2 + y^2 + (-4)x + 2y + (-1)xy + 4$
 koefisien xy .

B. -1

2. Bentuk aljabar $5x + 5xy - 6y - 7xy$
 \Rightarrow suku sejenis dari aljabar di atas adalah

C. $5xy$ dan $-7xy$

3. Penjumlahan $(2p - 3q)$ dengan $(-7p + 4q)$
 $= (2p - 3q) + (-7p + 4q) = -5p + q \Rightarrow$

B. $-5p + q$

4. Penjumlahan $4x - 3y + 6z$ dengan $-x + 2y - 5z$
 $= (4x - 3y + 6z) + (-x + 2y - 5z) =$

B. $3x - y + z$

5. $P = a - 2$, $Q = a + 4$, $R = a + 3$
 $\Rightarrow P^2 - Q \times R = (a - 2)^2 - (a + 4)(a + 3)$
 $= a^2 - 4a + 4 - (a^2 + 7a + 12)$
 $=$

A. $-11a - 8$

6. $(a + b - c)^2 = (a + b - c)(a + b - c)$
 $= a(a + b - c) + b(a + b - c) - c(a + b - c)$
 $= a^2 + ab - ac + ab + b^2 - bc - ac - bc + c^2$
 $=$

D. $a^2 + b^2 + c^2 + 2ab - 2ac - 2bc$

7. $(4a - b)(2a + b - 3)$
 $= 4a(2a + b - 3) - b(2a + b - 3)$
 $= 8a^2 + 4ab - 12a - 2ab - b^2 + 3b$
 $=$

C. $8a^2 - b^2 + 2ab - 12a + 3b \rightarrow (0)$

8. Pengurangan $7p - 8q + 6r$ dari $2p - aq + 4r$ adalah
 $-5p + 6q + r$
 $\Leftrightarrow (2p - aq + 4r) - (7p - 8q + 6r) = -5p + 6q + r$
 $\Leftrightarrow (2 - 7)p + (-a + 8)q + (4 - 6)r = (-5)p + 6q + (1)r$
 $\Rightarrow -a + 8 = 6 \Rightarrow a = 8 - 6 = 2$
 $\Rightarrow 4 - b = 1 \Rightarrow b = 4 - 1 = 3$

A. 2 dan 3

9. $3x^2y^3 = 3^1 \cdot 7^0 \cdot x^2 \cdot y^3$
 $7xy^4 = 3^0 \cdot 7^1 \cdot x^1 \cdot y^4$
 $\Rightarrow \text{KKP}(3x^2y^3, 7xy^4) = 3^1 \cdot 7^1 \cdot x^2 \cdot y^4 = 21x^2y^4$
 $\Rightarrow \text{FPB}(3x^2y^3, 7xy^4) = 3^0 \cdot 7^0 \cdot x^1 \cdot y^3 = xy^3$

D. $21x^2y^4$ dan xy^3

10. Diketahui $q \leq 6$, $p = q - 2$, $l = q + 4$
 $\Rightarrow p \leq 6 - 2 = 4 \Rightarrow p$ terbesar = 4
 $\Rightarrow l \leq 6 + 4 = 10 \Rightarrow l$ terbesar = 10
 \Rightarrow Luas terbesar = $4 \times 10 = 40 \text{ cm}^2$

C. 40 cm^2

11. Panjang sisi = $(x + 19) \text{ cm}$
 Luas persegi = Panjang sisi \times panjang sisi
 $= (x + 19)(x + 19)$
 $= x^2 + 2(x)(19) + (19)^2$
 $= (x^2 + 38x + 361) \text{ cm} \rightarrow (A)$

12. Hasil kali $(ax - 6)$ dan $(x + 3)$ adalah $2x^2 - 18$
 $\Leftrightarrow (ax - 6)(x + 3) = 2x^2 - 18$
 $\Leftrightarrow ax(x + 3) - 6(x + 3) = 2x^2 - 18$
 $\Leftrightarrow ax^2 + 3ax - 6x - 18 = 2x^2 - 18$
 $\Rightarrow a = 2 \Leftrightarrow a - 2 = 2 - 2 =$

0 $\rightarrow (B)$

13. $\frac{1}{x} + \frac{1}{2y} = \frac{1 \cdot 2y}{x \cdot 2y} + \frac{1 \cdot x}{2y \cdot x} = \frac{x + 2y}{2xy} \rightarrow (C)$

14. $B1 = (2x - 7)(3x + 1)$
 koefisien x^2 dari $B1 = p$
 konstanta dari $B1 = q$
 $\Rightarrow B1 = (2x - 7)(3x + 1) = 2x(3x + 1) - 7(3x + 1)$
 $= 6x^2 + 2x - 21x - 7 =$
 $\Leftrightarrow 2pq = 2 \cdot 6 \cdot (-7) =$

-84 $\rightarrow (A)$

15. $(x - 1)(x - 2)(x - 3)$
 $= [x(x - 2) - 1(x - 2)](x - 3)$
 $= [x^2 - 2x - x + 2](x - 3)$
 $= [x^2 - 3x + 2](x - 3)$
 $= [x^2 - 3x + 2](x) + [x^2 - 3x + 2](-3)$
 $= x^3 - 3x^2 + 2x - 3x^2 + 9x - 6$
 $= x^3 - 6x^2 + 11x - 6 \rightarrow (C)$

16. $\frac{5x}{3} + \frac{3y}{2} - \frac{7}{5} = \frac{5x \cdot 10}{3 \cdot 10} + \frac{3y \cdot 15}{2 \cdot 15} - \frac{7 \cdot 6}{5 \cdot 6}$
 $= \frac{50x}{30} + \frac{45y}{30} - \frac{42}{30}$
 $= \frac{50x + 45y - 42}{30} \rightarrow D$

$$\begin{aligned}
 17. \frac{x-1}{x+1} - \frac{x+1}{x-1} &= \frac{(x-1)(x-1)}{(x+1)(x-1)} - \frac{(x+1)(x+1)}{(x-1)(x+1)} \\
 &= \frac{(x^2-2x+1) - (x^2+2x+1)}{x^2-1^2} \\
 &= \frac{-4x}{x^2-1} = \boxed{\frac{4x}{1-x^2} \rightarrow D}
 \end{aligned}$$

$$18. \frac{x^2y}{2xy^2} : \frac{5y^3}{6x} = \frac{x^2 \cdot \cancel{y}}{2\cancel{x}y^2} \times \frac{2 \cdot 3 \cdot \cancel{x}}{5 \cdot \cancel{y} \cdot y^2} = \boxed{\frac{3x^2}{5y^4} \rightarrow D}$$

$$\begin{aligned}
 19. \left(\frac{1}{x} - \frac{2}{y}\right)^2 &= \left(\frac{1}{x}\right)^2 - 2\left(\frac{1}{x}\right)\left(\frac{2}{y}\right) + \left(\frac{2}{y}\right)^2 \\
 &= \boxed{\frac{1}{x^2} - \frac{4}{xy} + \frac{4}{y^2} \rightarrow (A)}
 \end{aligned}$$

$$\begin{aligned}
 20. \frac{1}{1 + \frac{1}{1-x}} &= \frac{1}{\frac{1 \cdot (1-x)}{1 \cdot (1-x)} + \frac{1}{(1-x)}} \\
 &= \frac{1}{\frac{1-x+1}{1-x}} = \frac{1-x}{2-x}
 \end{aligned}$$

$$\boxed{C. \frac{1-x}{2-x}}$$

SOAL URAIAN BAB 4

1. Uang Amir = M juta rupiah

a). Uang Badu dua kali lebih banyak dari Uang Amir

$$\Rightarrow \text{Uang Badu} = 2 \times M \text{ juta rupiah} \\ = 2M \text{ juta rupiah}$$

b). Uang Badu 5 juta rupiah lebih banyak dari Uang Amir

$$\Rightarrow \text{Uang Badu} = M \text{ juta rupiah} + 5 \text{ juta rupiah} \\ = (M+5) \text{ juta rupiah}$$

c). Uang Badu 7 juta lebih sedikit dari Uang Amir

$$\Rightarrow \text{Uang Badu} = M \text{ juta rupiah} - 7 \text{ juta rupiah} \\ = (M-7) \text{ juta rupiah}$$

d). Uang Badu sepertiga dari Uang Amir

$$\Rightarrow \text{Uang Badu} = \frac{1}{3} \times M \text{ juta rupiah} = \frac{M}{3} \text{ juta rupiah}$$

2. $a=7, b=-3, c=9$

$$a). a^2 - 3ab + c^2 = 7^2 - 3(7)(-3) + 9^2 = 49 + 63 + 81 = 193$$

$$b). ab - 7bc + 9ca = (7)(-3) - 7(-3)(9) + 9(9)(7) \\ = -21 + 189 + 567 = 735$$

$$c). 10a^2b - 9b^2c = 10(7)^2(-3) - 9(-3)^2(9) \\ = -1470 + 729 = -741$$

$$d). \frac{a}{b+c} - \frac{b}{a+c} + \frac{c}{a+b} = \frac{7}{(-3)+9} - \frac{-3}{7+9} + \frac{9}{7+(-3)} \\ = \frac{7}{6} + \frac{3}{16} + \frac{9}{4} \\ = \frac{7 \times 8}{6 \times 8} + \frac{3 \times 3}{6 \times 3} + \frac{9 \times 12}{4 \times 12} \\ = \frac{56}{48} + \frac{9}{48} + \frac{108}{48} = \frac{173}{48} = 3 \frac{29}{48}$$

3. a). $3a - 7a + 9a = 5a$

$$b). x + x^2 - 7x - 8x^2 = -7x^2 - 6x$$

$$c). 3a - 7b + 9a - 10b = 12a - 17b$$

$$d). 8a - 7 - 9a + 22 = -a + 15$$

$$e). 3(a+2b) - 5(3a-7b) = 3a+6b-15a+35b \\ = -12a+41b$$

$$f). -3(a+2b) + 5(3a-7b) = -(12a+41b) = -12a-41b$$

Halaman 7/16

$$4.a). 125x^2y^3 \cdot \frac{1}{5}xy^5 = \frac{5 \cdot 25}{5} x^3y^8 = 25x^3y^8$$

$$b). 35x^2y^3 \times \frac{1}{7} \frac{1}{xy^2} = \frac{5 \cdot 7 \cdot x^2}{7 \cdot x \cdot y^2} \cdot \frac{y^3}{y^2} = 5xy$$

$$c). \frac{x^3y^2}{75} \times \frac{5x}{y^5} = \frac{5x^4 \cdot y^2}{5 \cdot 15 \cdot y^3 \cdot y^3} = \frac{x^4}{15y^3}$$

$$d). \frac{y^3}{x^2} \times \frac{y^2}{x^3} = \frac{y^5}{x^5}$$

$$e). (-5x^2y) : (3xy^2) = \frac{-5x^2y}{3xy^2} = -\frac{5x}{3y}$$

$$f). (-7x^3y^2) : \left(\frac{10y^3}{49x^2}\right) = (-7x^3y^2) \times \frac{49x^2}{10y^3y} \\ = -\frac{343x^5}{10y}$$

$$g). (-3x^3y^2) \times (-7xy^3) = 21x^4y^5$$

$$h). (-2x^3y^2) : \left(-\frac{5x^5}{y^3}\right) = (-2x^3y^2) \times \left(-\frac{y^3}{5x^2x^3}\right) \\ = \frac{2y^5}{5x^2}$$

$$5. (1+x^2+x^4+\dots+x^{2014})(x^{2016}+1) = 2016x^{2015}$$

$$\Leftrightarrow (1+x^2+x^4+\dots+x^{2014}) \\ + x^{2016} + x^{2018} + x^{2020} + \dots + x^{4030} = 2016x^{2015}$$

↓
berpangkat genap $\Rightarrow x^{2015} > 0$

$$\Leftrightarrow \underbrace{1+x^{2 \cdot 1}+x^{2 \cdot 2}+\dots+x^{2 \cdot 2015}}_{2015 \text{ suku}} = \frac{2016 \cdot x^{2015}}{x^{2016}}$$

$$\Rightarrow x=1$$

MODEL SOAL AKM BAB 4

Halaman: ...

Dik: Tinggi Potensial Genetik (TPG).

$$\begin{aligned} \text{Laki-laki: } TPG_L &= \frac{(x+13)+y}{2} \pm 0,5 \\ &= \frac{x+y}{2} + 6,5 \pm 0,5 \end{aligned}$$

\Rightarrow TPG_L berada pada rentang.

$$\frac{x+y}{2} - 2 \leq \frac{x+y}{2} + 15.$$

• dan untuk Perempuan

$$\begin{aligned} TPG_P &= \frac{(x+(-13))+y}{2} \pm 0,5 \\ &= \frac{x+y}{2} - \frac{13}{2} \pm 0,5 = \frac{x+y}{2} - 6,5 \pm 0,5 \end{aligned}$$

\Rightarrow TPG_P berada pada rentang.

$$\frac{x+y}{2} - 15 \leq \frac{x+y}{2} + 2.$$

— " — Pertanyaan 1 — " —

• Pernyataan 1: X

"Berdasarkan rumus prediksi tinggi badan anak, perkiraan hanya dipengaruhi oleh tinggi badan ayah."

\Rightarrow Salah, karena terdapat pengaruh tinggi badan ibu pada perkiraan tinggi anak yang di simbolkan oleh variabel x .

• Pernyataan 2: ✓

"Berdasarkan rumus prediksi tinggi badan anak, semakin tinggi badan orangtua semakin tinggi perkiraan anak."

\Rightarrow Benar, karena koefisien dari variabel x dan y positif dan berbanding lurus dengan prediksi tinggi anak.

• Pernyataan 3: X.

"Berdasarkan rumus prediksi tinggi anak, perkiraan tinggi anak laki-laki selalu lebih tinggi dari anak perempuan."

\Rightarrow Salah, karena terdapat kemungkinan sebaliknya yakni pada rentang

$$\frac{x+y}{2} - 2 \leq \text{Prediksi tinggi} \leq \frac{x+y}{2} + 2$$

• Pernyataan 4: X.

"Berdasarkan rumus prediksi tinggi anak, perkiraan tinggi anak perempuan selalu lebih tinggi dari anak laki-laki"

\Rightarrow Salah, alasan serupa dengan Pernyataan 3.

— " — Pertanyaan 2 — " —

a. Bentuk aljabar

\hookleftarrow dapat dilihat pada bagian pojok kiri

b. Variabel bentuk aljabar.

terdapat 2 variabel yang dapat diidentifikasi ~~ke~~ sebagai simbol yang abstrak (huruf) yaitu x dan y . (Variabel merupakan peubah)

c. konstanta ada 4 yakni $-2, +2, -15, +15$

d. koefisiennya sendiri bisa dilihat dengan memecah

$$\frac{x+y}{2} \text{ menjadi } \frac{1}{2}x + \frac{1}{2}y$$

$$\text{koefisien } x: \frac{1}{2}, \text{ koefisien } y: \frac{1}{2}$$

— " — Pertanyaan 3 — " —

Dik: $x = 159 \text{ cm}, y = 170 \text{ cm}$,

Lanjut di \Rightarrow ~~TPGP~~ 159.

TPG_L berada di rentang

$$\frac{159+170}{2} - 2 \leq \frac{159+170}{2} + 15 \Rightarrow 160 \text{ cm} - 172 \text{ cm}$$

MODEL SOAL AKM BAB 4

— " — Pertanyaan — " —

Dik: tinggi anak perempuan = 156 cm.

maka tinggi ayah dan ibunya adalah

o Opsi 1: $y = 150 \text{ cm}$, $x = 145 \text{ cm}$. X. ←

$$\frac{150+145}{2} - 15 \leq \text{TPGP} \leq \frac{150+145}{2} + 2.$$

$$\Leftrightarrow 147,5 - 15 \leq \text{TPGP} \leq 147,5 + 2.$$

$$\Leftrightarrow 132,5 \leq \text{TPGP} \leq 149,5 \quad \text{X. } 156$$

o Opsi 2: $y = 156$, $x = 150$ X ←

$$\Rightarrow \frac{150+156}{2} - 15 \leq \text{TPGP} \leq \frac{150+156}{2} + 2.$$

$$\Leftrightarrow 130 \leq \text{TPGP} \leq 155 \quad \text{X } 156$$

o Opsi 3: $y = 160 \text{ cm}$, $x = 165 \text{ cm}$. ✓ ←

$$\Rightarrow \frac{165+160}{2} - 15 \leq \text{TPGP} \leq \frac{165+160}{2} + 2.$$

$$147,5 \leq \text{TPGP} \leq 164,5 \quad \text{✓ } 156$$

o Opsi 4: $y = 172 \text{ cm}$, $x = 168 \text{ cm}$. ✓ ←

$$\Rightarrow \frac{168+172}{2} - 15 \leq \text{TPGP} \leq \frac{168+172}{2} + 2.$$

$$155 \leq \text{TPGP} \leq 172 \quad \text{✓ } 156$$