1. 9 \ S R þt W D M V ~ þW \ D U R] G L H O \ P Q R K R þO H Q R Y

2. 5 R] Q i V R E Y Œ U D] \

a) $[(7-a).3-5.(2-a)].4$

b) $5.[7.(x-2y)-6.(2x-y)]$

c) $1-[2.(3a-2b)+3.(2a-3b)]$

d) $-2x-[-3x-(-4x)]-[x-(-3x)]$

e) $5s-3.[(2s-1).8s-7]$

f) $-8a-\{-8a-[-8a-(-8a)]\}$

g) $(x^2+y^2).x-xy.(2y)$

h) $(0{,}2a-0{,}5b).7a-(0{,}4a+0{,}6b).3b$

i) $2.(2x-3y)-[8.(x-4y)-(2x-y)]$

j) $2.(x-1).(2x+2)^3.[4(x-1)+(2x+2)]$

k) $5x^2.(3x^2+1)^4.(6x)+(3x^2+1)^5.(2x)$

l) $4.(x-1)^2.(2x+2)^3.2+(2x+2)^4.2.(x-1)$

m) $(x^2+2)^2.[5.(x^2+2)^2-3].(2x)$

n) $(x^2-4).(x^2+4).(2x+8)-(x^2+8x-4).(4x^3)$

4. 9 \ S R þt W D M D] M H G Q R G X ª

a) $\frac{3x^2}{4}.5x^3$

b) $\frac{1}{4}a+\frac{7}{3}a$

c) $\frac{1}{5}b-\frac{2}{3}b$

d) $(-6x).\left(x+\frac{1}{3}\right)$

e) $\frac{3}{5}t-\frac{5}{3}t+\frac{5}{2}t-\frac{2}{5}t$

f) $\left(\frac{3}{4}x-\frac{1}{2}\right).10x$

g) $4ab^2c^5.\frac{1}{6}a^2b^2c^3$

h) $\frac{2}{3}x^3y^2z^5v^7.\frac{6}{7}x^9y^7z^2v^3$

i) $\left(\frac{3}{4}h^2-\frac{5}{6}h-\frac{2}{3}\right).(-12h)$

j) $14a^2b^6c^4.\frac{2}{7}a^2b^3c^2$

k) $\left(2+\frac{3}{5}k\right).\frac{1}{9}k$

l) $\left(2s^2t^4-\frac{1}{3}st^3\right).6s^2t^2$

m) $\frac{1}{2}x^2y.\frac{1}{3}xy^2.\frac{2}{5}xyz$

n) $\frac{5}{6}x^2-\frac{7}{9}x^2+\frac{3}{4}x-\frac{1}{2}x$

o) $\frac{3}{5}a.\left(\frac{25}{15}a-\frac{35}{21}a^3-\frac{5}{6}a^5\right)$

p) $-\frac{4}{6}.\left(\frac{3}{4}x^2-\frac{6}{8}x+\frac{3}{2}\right)$

q) $\frac{2}{3}c^2.\left(\frac{3}{8}c-12c^2-\frac{15}{4}\right)$

r) $\left(35x^2-\frac{7}{10}x+1\right).\frac{5}{7}x^3$

s) $\left(\frac{5}{4}p^5r^4-\frac{5}{8}p^6r^3\right):\frac{5}{8}p^3r^2$

t) $\left(\frac{5}{3}a+\frac{4}{9}ab\right).\left(\frac{9}{10}a^2-2b\right)$

u) $\left(\frac{2}{3}a+1\right).(a-1).\left(\frac{3}{2}a-2\right)$

5. 9 \ G H Y Œ U D] \

a) $25a^2 : 5a$

b) $10xyz : 5xy$

c) $20x^2y^6z^8 : 4x^2y^5z$

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

e) $(12 + 6z) : 6$

f) $(4ab - b^2) : b$

g) $(2a^2b^4 - 7a^2b^3) : a^2b^2$

h) $(xy^4 - x^4y^3 + y^2) : y^2$

i) $(-4s^3 + s^2) : (-s)$

j) $(-18p + 12q + 6r) : (-6)$

k) $(35a + 49ab - 21b) : 7$

l) $(5x^2y^4 - 15x^4y^4) : 5x^2y^3$

m) $(8m^3 - 6m^2 - 8mn) : 4m$

n) $16a^{10}b^8c^{14} : (-8a^7b^7c^{11})$

o) $(-14u^2v^3 - 6u^4v^2) : (-u^2v^2)$

p) $a^6b^4c^2de^3f^6 : a^4b^3cdef^4$

q) $(4u^2v^3 + 6uv^2 - uv) : (-uv)$

r) $(a - b)^2 : (a - b)$

s) $(a^2 - b^2) : (a - b)$

t) $(a^3 - b^3) : (a - b)$

6. 9 \ G H P Q R K R þO H Q D P Q R K R þO H Q R P

a) $(2x^3 + 3x^2 + x + 6) : (x + 2)$

b) $(x^3 - 2x^2 + 1) : (x - 1)$

c) $(2x^4 + 3x^3 - 3x^2 + 3x - 5) : (2x + 5)$

d) $(-x^4 + x^3 - 4x^2 + 7x - 3) : (-x + 1)$

e) $(2x^3 - 3x^2 - 10x + 3) : (x - 3)$

f) $(x^3 + 2x^2 - 13x + 10) : (x + 5)$

g) $(x^4 + x^3 - x - 1) : (x^2 - 1)$

h) $(x^4 - 2x^3 - 8x^2 + 18x - 9) : (x^2 - 9)$

i) $(9x^3 + 18x^2 - 18x - 9) : (3x - 3)$

j) $(x^4 - x^2 - 2x - 1) : (x^2 + x + 1)$

k) $(2x^3 - 27x^2 + 74x - 14) : (2x - 7)$

l) $(2x^3 - x^2 + x + 2) : (2x + 1)$

m) $(x^4 - 5x^3 + 5x^2 - 5x - 3) : (x - 4)$

n) $(6x^3 - 7x^2 + 5) : (2x - 1)$

7. = M H G Q R G X ª G D Q Œ Y Œ U D] D X U þL S R G P L H Q N \

a) $\dfrac{3x^2-3y^2}{12x-12y}$

b) $\dfrac{5a^2-5b^2}{25a^2+50ab+25b^2}$

c) $\dfrac{3ab-3a^2}{3a^2-6ab+3b^2}$

d) $\dfrac{(x+y)^2-z^2}{x+y+z}$

e) $(a-b).\left(\dfrac{1}{a}-\dfrac{1}{b}\right)$

f) $\dfrac{xy}{x-y}.\left(\dfrac{x}{y}-\dfrac{y}{x}\right)$

g) $(a^2-b^2).\left(1+\dfrac{a}{b}\right)$

h) $\dfrac{x^2}{x-y}.\left(\dfrac{1}{x}-\dfrac{1}{y}\right)$

i) $\left(\dfrac{3}{1+a}-1\right).\left(\dfrac{3}{2-a}-1\right)$

j) $(x-y):\left(\dfrac{1}{x}+\dfrac{1}{y}\right)$

k) $\dfrac{a^2-b^2}{c^2-d^2}:\dfrac{b-a}{c+d}$

l) $\dfrac{a^2-25}{a^2-3a}:\dfrac{a^2+5a}{a^2-9}$

m) $\dfrac{x+y}{x-y}.\dfrac{2x^2-2y^2}{x^2+xy}$

n) $\dfrac{(a-b)^2}{(a+b)^2}.\dfrac{a+b}{a-b}$

o) $\dfrac{b^2-25}{b^2-3b}.\dfrac{b^2-9}{b^2+5b}$

p) $\dfrac{x^2-y^2}{x^2}.\dfrac{x^4}{(x+y)^2}$

q) $\dfrac{1}{x^2-x}:\dfrac{1}{x^2-x^3}$

r) $\dfrac{a^2-b^2}{6a^2b^2}:\dfrac{a+b}{3ab}$

s) $\dfrac{x^2+2xy}{y}:(x^2-4y^2)$

t) $\left(x-\dfrac{3x}{x+1}\right).\left(\dfrac{x-1}{x-2}-\dfrac{x}{x-1}\right)$

u) $\dfrac{2x^2-2y^2}{xy}:\dfrac{x+y}{4x^2y^2}$

v) $\left(\dfrac{3}{x}-\dfrac{2}{x+1}\right).\left(\dfrac{3}{x}-\dfrac{2}{x-1}\right)$

w) $\left(\dfrac{1}{a+1}-\dfrac{2a}{a^2-1}\right).\left(\dfrac{1}{a}-1\right)$

x) $\left(\dfrac{a}{4}-1+\dfrac{1}{a}\right):\left(\dfrac{a}{2}-\dfrac{2}{a}\right)$

y) $\left(\dfrac{2x+1}{2x-1}-\dfrac{2x-1}{2x+1}\right):\dfrac{4x}{10x-5}$

z) $\left(\dfrac{x^2}{4y^2-x^2}+1\right):\left(1-\dfrac{x}{x-2y}\right)$

ž) $\left(4-\dfrac{x^2}{y^2}\right):\dfrac{2y-x}{y^2}$

8. 6 þt W D M Y Œ U D] \ V ~ þH W] M H G Q R G X ª D X U þL S R G P

a) $\frac{2x+1}{y}-\frac{3x+2}{2y}$

b) $\frac{2a-3b}{a}+\frac{4a^2-5b^2}{ab}$

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

d) $\frac{5a^2-b^2}{ab}-\frac{3a-2b}{b}$

e) $\frac{x}{ac}-\frac{x}{bc}+\frac{x}{ab}$

f) $\frac{a}{bc}+\frac{b}{ac}+\frac{c}{ba}$

g) $\frac{1}{x^4y^3}+\frac{2}{x^3y^4}$

h) $\frac{x+1}{x^2+1}-\frac{x+2}{2x^2-2}$

i) $\frac{a+1}{a^2-a}-\frac{a+2}{2a^2-2}$

j) $\frac{2x-3y}{x^2y}-\frac{4x-5y}{xy^2}$

k) $\frac{2a^2+3a-5}{a^2b}-\frac{1-4a}{ab}$

l) $\frac{1}{a-b}-\frac{1}{a+b}$

m) $\frac{5}{x-y}-\frac{3}{2x-2y}$

n) $\frac{4}{a-b}-\frac{1}{b-a}$

o) $\frac{4}{r+2}+\frac{3}{r-2}-\frac{7r}{r^2-4}$

p) $\frac{7a^2}{a^2-9}+\frac{5a}{a-3}+\frac{a}{a+3}$

q) $\frac{a-b}{2a+2b}+\frac{a^2+b^2}{a^2-a}$

r) $\frac{7x-1}{2x^2-6x}-\frac{3x-5}{x^2-9}$

s) $\frac{3a-b}{3a^2b}+\frac{a^2+b^2}{2a^2b^2}-\frac{a+b}{2ab^2}$

t) $\frac{3x}{4a^2b}-\frac{7}{6ab^5}-\frac{5x}{2ab^2}$

u) $\frac{5}{t-3}-\frac{t-2}{t^2-9}+\frac{t-1}{2t+6}$

v) $\frac{5}{a+2}+\frac{2a}{a^2+4a+4}-\frac{4}{a-2}$

w) $\frac{(a-1).a}{a^2-25}+\frac{a-2}{5-a}-\frac{a-3}{a+5}$

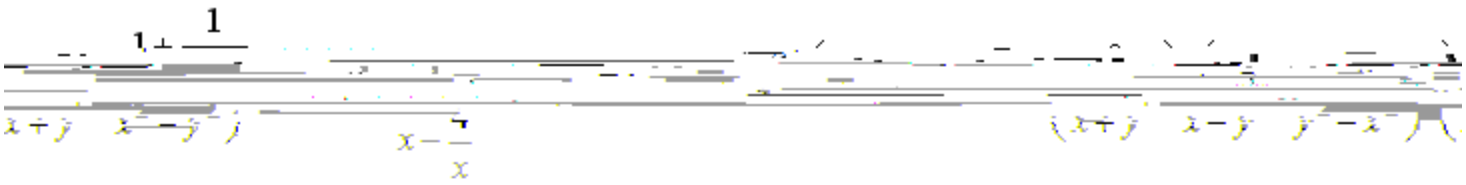
x) $\frac{2x-1}{2x}-\frac{2x}{2x-1}-\frac{1}{2x-4x^2}$

y) $\frac{r+1}{r^2-2r}+\frac{r+1}{r^2+2r}-\frac{2r}{r^2-4}$

z) $\frac{a+b}{2(a-b)}-\frac{a-b}{2(a+b)}-\frac{2b^2}{b^2-a^2}$

ž) $\frac{2x-y}{10x}-\frac{y}{2x}+\frac{2y-x}{15x}$

9. 9 \ S R þt W D M D] M H G Q R G X ª



$\frac{3}{2}\right)\frac{s^3+1}{s^2-s}$ **b)** $\frac{x^{-1}+y^{-1}}{x^{-2}-y^{-2}}$ **i)** $2s-\left(\frac{2s-3}{s+1}-\frac{s+1}{2-2s}-\frac{s^2+}{2s^2-}\right.$

c) $\frac{\frac{a^2-1}{a+1}}{\frac{1}{}}$ **j)** $\frac{k^2+1}{k-1}-k\left(1-\frac{2}{}\right.$

k) $\left(\frac{}{(a-b)^3}-\frac{}{a-b}\right)\left(\frac{}{a^2-ab+b^2}-\frac{}{a}\right)$ **o)** $\left(\frac{1}{z+1}-\frac{2}{z^2-1}\right)\left(\frac{}{z}-1\right)$

l) $\left[\frac{u+v}{2u-2v}+\frac{v-u}{2v+2u}+\frac{2v^2}{u^2-v^2}\right]\left(\frac{1}{v}-\frac{1}{u}\right)$ **e)** $\frac{a^2-y^2}{a+b}\cdot\frac{a^2-b^2}{ay+y^2}\cdot\left(a+\frac{ay}{a-y}\right.$

m) $\left[\frac{\frac{1}{x}}{1+\frac{1}{x}}+\frac{1-\frac{1}{x}}{\frac{1}{x}}\right]:\left[\frac{x^{-1}}{1+x^{-1}}-\frac{1-x^{-1}}{x^{-1}}\right]$ **f)** $\frac{\frac{1-x}{1-x+x^2}+\frac{1+x}{1+x+x^2}}{\frac{1+x}{1+x+x^2}-\frac{1-x}{1-x+x^2}}$

$\frac{a^2}{b^2}\right)\right]$ **n)** $\frac{a^3+b^3}{a+b}:(a^2-b^2)+\frac{2b}{a+b}-\frac{ab}{a^2-b^2}$ **g)** $\frac{a^4-b^4}{a^2b^2}:\left[\left(1+\frac{b^2}{a^2}\right)\left(1-\frac{2a}{b}+\right.\right.$

a) $\dfrac{(a^3b^{-3})^2.a}{a^{-4}b^2}$

b) $\dfrac{3x^{-5}.(3x^{-3})^4.x^3}{9x.\sqrt[3]{x^2}}$

c) $\dfrac{a^2.(a^3b^{-2})^3}{a^{-5}.\sqrt{b^2}}$

d) $\dfrac{\sqrt[3]{a}.\sqrt[4]{a}.\sqrt[5]{a}}{\sqrt[6]{a}.\sqrt[7]{a}.a^{\frac{1}{8}}}$

e) $\dfrac{4^{-3}.\sqrt{1024}.x^{\frac{1}{2}}}{256.\sqrt{x^3}.2^{-1}}$

f) $\dfrac{9x^{-3}.x^{\frac{2}{3}}.(3x^{-1})^{-5}}{81.\sqrt[5]{x^4}.\sqrt{x^5}}$

g) $\dfrac{3^{-2}.\left(\dfrac{1}{3x^2}\right)^{-1}.\sqrt{9x}.81^{-2}}{243^{-\frac{1}{2}}.\left(\sqrt{\dfrac{9}{x}}\right)^{-1}.3}$

h) $\dfrac{5^{\frac{1}{2}}.a^{\frac{2}{3}}.(125a^{-2})^{-3}.5^{-\frac{2}{5}}.a^{-\frac{1}{3}}}{625^{-1}.a^{-\frac{4}{3}}.\sqrt[3]{a^4}.\left(\dfrac{1}{25}\right)^{-1}}$

i) $\dfrac{x^{-\frac{1}{3}}.6^{-1}.\left(216x^{-\frac{2}{3}}\right)^{-1}.x^{\frac{3}{2}}.\sqrt{x}}{\sqrt{6^3}.\sqrt{x^{-1}}.\left(\dfrac{1}{x}\right)^{-2}.36}$

j) $\dfrac{9x^{-1}.(9x^{-2})^{-3}.3^3.x^{\frac{1}{2}}}{27^{-1}.x^{-\frac{3}{2}}.\sqrt{x^3}}$

k) $\dfrac{64y^{-3}.2^{-2}.\left(\dfrac{1}{2}y^{-2}\right)^{-2}}{16^{-1}.\sqrt[5]{2y}.y^{-\frac{5}{8}}}$

l) $\dfrac{2^{-6}.\sqrt{256x}.x^{-\frac{3}{2}}.\left(\dfrac{1}{x}\right)^{-2}}{32^{-1}.\left(\dfrac{1}{64x}\right)^{-2}.\sqrt{1024}}$

11. 9 \ S R W D M D] M H G Q R G X ª

a) $\dfrac{\sqrt{a.\sqrt[4]{b^{-3}}}}{\sqrt[5]{b^3.\sqrt{a^3}}}+\dfrac{\sqrt{b}}{b^2}$

b) $\left(\dfrac{\sqrt{2}}{(1-x^2)^{-1}}+\dfrac{2^{\frac{3}{2}}}{x^{-2}}\right):\left(\dfrac{x^{-2}}{1+x^{-2}}\right)^{-1}$

c) $\left(\dfrac{1}{a-\sqrt{2}}-\dfrac{a^2+4}{a^3-\sqrt{8}}\right):\left(\dfrac{a}{\sqrt{2}}+1+\dfrac{\sqrt{2}}{a}\right)^{-1}$

d) $\dfrac{\sqrt[3]{a^5b^{\frac{1}{2}}.\sqrt[4]{a^{-1}}}}{\left(a^2.\sqrt[5]{ab^3}\right)^2}$

e) $\dfrac{(\sqrt[5]{a^{\frac{4}{3}}})^{\frac{3}{2}}}{(\sqrt[5]{a^4})^3}.\dfrac{(\sqrt{a.\sqrt[3]{a^2b}})^4}{(\sqrt[3]{a\sqrt{b}})^6}$

f) $\left(\dfrac{a\sqrt{a}+b\sqrt{b}}{\sqrt{a}+\sqrt{b}}-\sqrt{ab}\right)\left(\dfrac{\sqrt{a}+\sqrt{b}}{a-b}\right)^2$

g) $\dfrac{a-a^{-2}}{a^{\frac{1}{2}}-a^{-\frac{1}{2}}}-\dfrac{2}{a^{\frac{3}{2}}}-\dfrac{1-a^{-2}}{a^{\frac{1}{2}}+a^{-\frac{1}{2}}}$

h) $\left(\dfrac{3}{\sqrt{1+x}}+\sqrt{1-x}\right):\left(\dfrac{3}{\sqrt{1-x^2}}+1\right)$

i) $\dfrac{\sqrt{x}+1}{1+\sqrt{x}+x}:\dfrac{1}{x^2-\sqrt{x}}$

j) $\dfrac{a-b}{a+b+2\sqrt{ab}}:\dfrac{a^{-\frac{1}{2}}-b^{-\frac{1}{2}}}{a^{-\frac{1}{2}}+b^{-\frac{1}{2}}}$

k) $a\left(\dfrac{\sqrt{a}+\sqrt{b}}{2b\sqrt{a}}\right)^{-1}+b\left(\dfrac{\sqrt{a}+\sqrt{b}}{2a\sqrt{b}}\right)^{-1}$

l) $\dfrac{b-x}{\sqrt{b}-\sqrt{x}}-\dfrac{b^{\frac{3}{2}}-x^{\frac{3}{2}}}{b-x}$

m) $\left(\dfrac{\sqrt{a}}{2}-\dfrac{1}{2\sqrt{a}}\right)^2.\left(\dfrac{\sqrt{a}-1}{\sqrt{a}+1}-\dfrac{\sqrt{a}+1}{\sqrt{a}-1}\right)$

n) $\left(\dfrac{p^{\frac{3}{2}}+q^{\frac{3}{2}}}{p-q}-\dfrac{p-q}{p^{\frac{1}{2}}+q^{\frac{1}{2}}}\right)\left(\sqrt{pq}.\dfrac{\sqrt{p}+\sqrt{q}}{p-q}\right)^{-1}$

12. 3 R X åL W t P Y K R G Q p K R Y] R U F D X S U D Y Y Œ U D]

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

b) $(2x-3y)^2$

c) $(10a-9b)^2$

d) $(5m+2n)(5m-2n)$

e) $(1-a)(1+a)$

f) $(-a+3b)^2$

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

h) $(-3x-5y)^2$

i) $(7u-11v)^2$

j) $(8c-13d)(8c+13d)$

k) $(a^4-b^4)^2$

l) $(6xy^2+7x^2y)^2$

m) $-(-6u-3v)(6u+3v)$

n) $(-uv+7a)^2$

o) $(-s+10t)(-s-10t)$

p) $(-5-3t)(-5+3t)$

q) $(12u-14v)^2$

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

s) $(5a-4b)^3$

t) $27a^3-8b^3$

u) $64x^6+125y^9$

13. 3 R X åL W t P Y K R G Q p K R Y] R U F D U R] O R å Y Œ U D] Q D V

a)	x^2-2x+1	**h)**	$9x^2-16(2x-3y)^2$	**o)**	$25k_1^2-625k_2^2$
b)	a^2-1	**i)**	$(x+2y)^2-4(x-y)^2$	**p)**	$-8a^2+16a-8$
c)	y^2+6y+9	**j)**	$36-(a^2-4a)^2$	**q)**	$16c^4-81d^4$
d)	x^2-16	**k)**	$(t-1)^2-(t+1)^2$	**r)**	$1000a^3-1000b^3$
e)	$9x^2-25y^2$	**l)**	u^4-v^4	**s)**	$121f^2+264fg+144g^2$
f)	$36a^2+108ab+81b^2$	**m)**	$27x^3-64y^3$	**t)**	$2a^3+6a^2b+6ab^2+2b^3$
g)	$100-m^2$	**n)**	$(2d)^2-(3c)^2$	**u)**	$8x^3+36x^2y+54xy^2+27y^3$

14. 9 \ Q t P D Q t P S U H G] i W Y R U N X U R] O R å Y Œ U D] Q D V ~

a)	xy^2-x^2y	**j)**	$9a^2b-27a^2b^2+15b^2$	**s)**	$36u^2v^3+60uv^2-24u^3v^4$
b)	$x^4+5x^2+x^3y$	**k)**	$6x^3y^5+4x^4y^3-24xy$	**t)**	$8x^5y^3+6x^4y^4-4x^2y^5$
c)	$a^2b^3+a^3b^5$	**l)**	$ab-a-b+1$	**u)**	$2.(x-3)-y.(x-3)$
d)	$12x^2y^8z^6-18xyz^4$	**m)**	$3f+3+fg+g$	**v)**	$21a^3b^2-14a^4b-7a^3b^2$
e)	$2p^2r^2s+8p^5r^7-4p^9$	**n)**	$6x^3+x^2-24x-4$	**w)**	$y.(3-z)+x.(z-3)$
f)	$15a^4b^2-10a^4b+5a^5b^3$	**o)**	$x.(a-1)+a-1$	**x)**	$6r_1^2r_2^2r_3^2-8r_1^3r_2^3+4r_1^4r_3^4$
g)	$a^3b^4c^5d^6-a^6b^5c^4d^3$	**p)**	k^4-4k^3-k+4	**y)**	$5px-py-5rx+ry$
h)	$s^5t^2u^4v^4+s^2t^2v^2$	**q)**	$ax-ay-bx+by$	**z)**	$(1+a).x-y.(-1-a)$
i)	$9m^2-12m+6$	**r)**	$10a+15b+20c$	**ž)**	$x.(x^2-z^2)-z.(z^2-x^2)$

15. 5 R] O R å Y Œ U D] Q D V ~ þL Q
S R X åL Y \ Q t P D Q L H S U H G] i W Y R U N X Y K R G Q Œ
N Y D G U D W L F N p K R W U R M þO H Q D

a) $6ac+3bc-4ad-2bd$

b) $4a^2-b^2$

c) $4x^2+4x+1$

d) $10-14x-12x^2$

e) $3x^2-4x-4$

f) $3x^3-x^2+3x-1$

g) $12x^2-3y^2$

h) $9a^2x^2+6ax+1$

i) $x^2-2x-15$

j) $12x^2-x-6$

k) $xyz+z-2xy-2$

l) $16-a^4$

m) $9a^2-12ab+4b^2$

n) $3x^2-6x-24$

o) $18x^2+3x-6$

p) $12x^2-2x-30$

q) $8a^2-2ab-6b^2$

r) x^6+125

s) $9x^2-16y^2$

t) $e^{-x}-xe^{-x}$

u) x^3-27

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

w) $27x^3+64y^3$

x) $2ye^{xy^2}+2xy^3e^{xy^2}$

y) $2y^6-xy^3-3x^2$

z) $16a^3-2b^6$

ž) $3x^{2/3}-2x^{1/3}+4x^{4/3}$