

- 1) (a) $(-3s - t) + 2(s - 4t)$;
 (b) $(1/(s^3t)) \cdot (s/t^4)^2$.
- 2) (a) $(-3u + 4v) - 3(2u - 4v)$;
 (b) $(v^4/u^3)/(u^2/v^4)^3$.
- 3) (a) $3(-p + q) - 2(3p + 5q)$;
 (b) $(q/p)^3/(p^3q^5)^2$.
- 4) (a) $3(n - m) - (n + m)$;
 (b) $(n/m)^3/(nm)$.
- 5) (a) $2(3r + 4s) - 3(3r + 5s)$;
 (b) $(r^3s^4)^2/(r^3s^5)^3$.
- 6) (a) $3(3x - y) + 3(3x - y)$;
 (b) $(x^3/y)^3 \cdot (x^3/y)^3$.
- 7) (a) $(-2r + 5s) + 2(-5r + 5s)$;
 (b) $(s^5/r^2) \cdot (s^5/r^5)^2$.
- 8) (a) $3(2p - 3q) + 3(-4p - 4q)$;
 (b) $(p^2/q^3)^3 \cdot (1/(p^4q^4))^3$.
- 9) (a) $3(-3x - y) + 3(-5x + 5y)$;
 (b) $(1/(x^3y))^3 \cdot (y^5/x^5)^3$.
- 10) (a) $2(-4g - 5h) - 3(-5g + 2h)$;
 (b) $(1/(g^4h^5))^2/(h^2/g^5)^3$.
- 11) (a) $(u - v) + 3(u - v)$;
 (b) $(u/v) \cdot (u/v)^3$.
- 12) (a) $(-2w + z) - 3(2w + 3z)$;
 (b) $(z/w^2)/(w^2z^3)^3$.
- 13) (a) $2(-5a + 5b) - 3(-5a - 4b)$;
 (b) $(b^5/a^5)^2/(1/(a^5b^4))^3$.
- 14) (a) $3(-4a + 5b) + 3(-a - 5b)$;
 (b) $(b^5/a^4)^3 \cdot (1/(ab^5))^3$.
- 15) (a) $3(b - 2c) + 2(b - 3c)$;
 (b) $(b/c^2)^3 \cdot (b/c^3)^2$.
- 16) (a) $3(3b + 4c) - 2(-3b + 4c)$;
 (b) $(b^3c^4)^3/(c^4/b^3)^2$.
- 17) (a) $3(2w - 2z) + 2(-3w + 2z)$;
 (b) $(w^2/z^2)^3 \cdot (z^2/w^3)^2$.
- 18) (a) $(-2w + 4z) - 3(-2w + 4z)$;
 (b) $(z^4/w^2)/(z^4/w^2)^3$.
- 19) (a) $3(-b + 3c) + 2(-b - 4c)$;
 (b) $(c^3/b)^3 \cdot (1/(bc^4))^2$.
- 20) (a) $2(-4r - 2s) - 3(-4r - 2s)$;
 (b) $(1/(r^4s^2))^2/(1/(r^4s^2))^3$.
- 21) (a) $2(-n + 2m) + (-3n - 4m)$;
 (b) $(m^2/n)^2 \cdot (1/(n^3m^4))$.
- 22) (a) $2(-3p + 4q) + (3p - 4q)$;
 (b) $(q^4/p^3)^2 \cdot (p^3/q^4)$.
- 23) (a) $2(b - 3c) - 3(-b + 4c)$;
 (b) $(b/c^3)^2/(c^4/b)^3$.
- 24) (a) $2(3g - 4h) + 3(-4g - 3h)$;
 (b) $(g^3/h^4)^2 \cdot (1/(g^4h^3))^3$.
- 25) (a) $2(-2b - 4c) + (2b - c)$;
 (b) $(1/(b^2c^4))^2 \cdot (b^2/c)$.
- 26) (a) $(-s - 5t) - (s + 5t)$;
 (b) $(1/(st^5))/(st^5)$.
- 27) (a) $2(-4s + 4t) - (-s + 4t)$;
 (b) $(t^4/s^4)^2/(t^4/s)$.
- 28) (a) $(-u - 2v) + 2(-u - 2v)$;
 (b) $(1/(uv^2)) \cdot (1/(uv^2))^2$.
- 29) (a) $3(-3n - 3m) + (-3n - 3m)$;
 (b) $(1/(n^3m^3))^3 \cdot (1/(n^3m^3))$.
- 30) (a) $3(-3g + 3h) + 2(-g + 4h)$;
 (b) $(h^3/g^3)^3 \cdot (h^4/g)^2$.
- 31) (a) $3(2x + 2y) - (-4x + y)$;
 (b) $(x^2y^2)^3/(y/x^4)$.
- 32) (a) $(-5u - 5v) + 2(5u - 5v)$;
 (b) $(1/(u^5v^5)) \cdot (u^5/v^5)^2$.
- 33) (a) $2(-4a - 4b) + 2(-5a + 4b)$;
 (b) $(1/(a^4b^4))^2 \cdot (b^4/a^5)^2$.
- 34) (a) $2(-3p - 4q) - 3(-3p + q)$;
 (b) $(1/(p^3q^4))^2/(q/p^3)^3$.

- 35) (a) $2(3n + 2m) - 3(-n + 3m)$;
 (b) $(n^3 m^2)^2 / (m^3 / n)^3$.
- 36) (a) $2(-5g + 4h) + (-4g + 4h)$;
 (b) $(h^4 / g^5)^2 \cdot (h^4 / g^4)$.
- 37) (a) $3(-3r + 4s) + 2(-3r + 4s)$;
 (b) $(s^4 / r^3)^3 \cdot (s^4 / r^3)^2$.
- 38) (a) $3(3p + 5q) - 2(-3p - 3q)$;
 (b) $(p^3 q^5)^3 / (1 / (p^3 q^3))^2$.
- 39) (a) $2(-5p + 4q) + 3(-5p - 4q)$;
 (b) $(q^4 / p^5)^2 \cdot (1 / (p^5 q^4))^3$.
- 40) (a) $(4x - 4y) + 3(-5x - 4y)$;
 (b) $(x^4 / y^4) \cdot (1 / (x^5 y^4))^3$.
- 41) (a) $(-2b + 4c) - (b - 5c)$;
 (b) $(c^4 / b^2) / (b / c^5)$.
- 42) (a) $2(w - 5z) - (w - 5z)$;
 (b) $(w / z^5)^2 / (w / z^5)$.
- 43) (a) $(s + 4t) + 3(s - 2t)$;
 (b) $(st^4) \cdot (s / t^2)^3$.
- 44) (a) $3(-2w - z) - (2w - 4z)$;
 (b) $(1 / (w^2 z))^3 / (w^2 / z^4)$.
- 45) (a) $(3a - 5b) + 2(3a - 5b)$;
 (b) $(a^3 / b^5) \cdot (a^3 / b^5)^2$.
- 46) (a) $(-4b + 3c) + 3(-4b + 3c)$;
 (b) $(c^3 / b^4) \cdot (c^3 / b^4)^3$.
- 47) (a) $(2g + 4h) + 2(-2g + 4h)$;
 (b) $(g^2 h^4) \cdot (h^4 / g^2)^2$.
- 48) (a) $3(-2u + 2v) + (-2u + 2v)$;
 (b) $(v^2 / u^2)^3 \cdot (v^2 / u^2)$.
- 49) (a) $(5g + 4h) - 2(-4g - h)$;
 (b) $(g^5 h^4) / (1 / (g^4 h))^2$.
- 50) (a) $2(5n + 5m) - 3(-4n - 5m)$;
 (b) $(n^5 m^5)^2 / (1 / (n^4 m^5))^3$.
- 51) (a) $3(-4b + 5c) - (4b + 5c)$;
 (b) $(c^5 / b^4)^3 / (b^4 c^5)$.
- 52) (a) $3(-5a + 5b) + (-5a + 5b)$;
 (b) $(b^5 / a^5)^3 \cdot (b^5 / a^5)$.
- 53) (a) $2(5p - 2q) - 3(-2p + 2q)$;
 (b) $(p^5 / q^2)^2 / (q^2 / p^2)^3$.
- 54) (a) $3(5a - 3b) - (2a - 5b)$;
 (b) $(a^5 / b^3)^3 / (a^2 / b^5)$.
- 55) (a) $2(-4u + v) - (-4u + v)$;
 (b) $(v / u^4)^2 / (v / u^4)$.
- 56) (a) $2(-4n - 4m) + 2(4n + 5m)$;
 (b) $(1 / (n^4 m^4))^2 \cdot (n^4 m^5)^2$.
- 57) (a) $3(-2w - 5z) - (-4w + 5z)$;
 (b) $(1 / (w^2 z^5))^3 / (z^5 / w^4)$.
- 58) (a) $(-n + 5m) - (n - 5m)$;
 (b) $(m^5 / n) / (n / m^5)$.
- 59) (a) $2(-4w + 4z) + (-3w - 4z)$;
 (b) $(z^4 / w^4)^2 \cdot (1 / (w^3 z^4))$.
- 60) (a) $2(-3p - 3q) - 2(3p + 3q)$;
 (b) $(1 / (p^3 q^3))^2 / (p^3 q^3)^2$.
- 61) (a) $(-2n - 5m) - (-5n - 3m)$;
 (b) $(1 / (n^2 m^5)) / (1 / (n^5 m^3))$.
- 62) (a) $2(-3u - 3v) + (-3u + 3v)$;
 (b) $(1 / (u^3 v^3))^2 \cdot (v^3 / u^3)$.
- 63) (a) $2(-2s + 2t) + 3(-2s + 2t)$;
 (b) $(t^2 / s^2)^2 \cdot (t^2 / s^2)^3$.
- 64) (a) $2(3g - 2h) - 3(3g + 2h)$;
 (b) $(g^3 / h^2)^2 / (g^3 h^2)^3$.
- 65) (a) $3(3u - v) - (3u + 3v)$;
 (b) $(u^3 / v)^3 / (u^3 v^3)$.
- 66) (a) $3(3n - m) - (-3n + m)$;
 (b) $(n^3 / m)^3 / (m / n^3)$.
- 67) (a) $2(3n - 2m) + 3(-3n + 3m)$;
 (b) $(n^3 / m^2)^2 \cdot (m^3 / n^3)^3$.
- 68) (a) $2(4a - b) + (a + 5b)$;
 (b) $(a^4 / b)^2 \cdot (ab^5)$.

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| 1) (a) $-s - 9t$; | 18) (a) $4w - 8z$; | 35) (a) $9n - 5m$; | 52) (a) $-20a + 20b$; |
| (b) $1/(st^9)$. | (b) $w^4/z^8, w \neq 0$. | (b) $n^9/m^5, n \neq 0$. | (b) b^{20}/a^{20} . |
| 2) (a) $-9u + 16v$; | 19) (a) $-5b + c$; | 36) (a) $-14g + 12h$; | 53) (a) $16p - 10q$; |
| (b) $v^{16}/u^9, v \neq 0$. | (b) $c/b^5, c \neq 0$. | (b) h^{12}/g^{14} . | (b) $p^{16}/q^{10}, p \neq 0$. |
| 3) (a) $-9p - 7q$; | 20) (a) $4r + 2s$; | 37) (a) $-15r + 20s$; | 54) (a) $13a - 4b$; |
| (b) $1/(p^9q^7)$. | (b) $r^4s^2, r \neq 0, s \neq 0$. | (b) s^{20}/r^{15} . | (b) $a^{13}/b^4, a \neq 0$. |
| 4) (a) $2n - 4m$; | 21) (a) $-5n$; | 38) (a) $15p + 21q$; | 55) (a) $-4u + v$; |
| (b) $n^2/m^4, n \neq 0$. | (b) $1/n^5, m \neq 0$. | (b) $p^{15}q^{21}, p \neq 0, q \neq 0$. | (b) $v/u^4, v \neq 0$. |
| 5) (a) $-3r - 7s$; | 22) (a) $-3p + 4q$; | 39) (a) $-25p - 4q$; | 56) (a) $2m$; |
| (b) $1/(r^3s^7)$. | (b) $q^4/p^3, q \neq 0$. | (b) $1/(p^{25}q^4)$. | (b) $m^2, n \neq 0, m \neq 0$. |
| 6) (a) $18x - 6y$; | 23) (a) $5b - 18c$; | 40) (a) $-11x - 16y$; | 57) (a) $-2w - 20z$; |
| (b) x^{18}/y^6 . | (b) $b^5/c^{18}, b \neq 0$. | (b) $1/(x^{11}y^{16})$. | (b) $1/(w^2z^{20})$. |
| 7) (a) $-12r + 15s$; | 24) (a) $-6g - 17h$; | 41) (a) $-3b + 9c$; | 58) (a) $-2n + 10m$; |
| (b) s^{15}/r^{12} . | (b) $1/(g^6h^{17})$. | (b) $c^9/b^3, c \neq 0$. | (b) $m^{10}/n^2, m \neq 0$. |
| 8) (a) $-6p - 21q$; | 25) (a) $-2b - 9c$; | 42) (a) $w - 5z$; | 59) (a) $-11w + 4z$; |
| (b) $1/(p^6q^{21})$. | (b) $1/(b^2c^9)$. | (b) $w/z^5, w \neq 0$. | (b) $z^4/w^{11}, z \neq 0$. |
| 9) (a) $-24x + 12y$; | 26) (a) $-2s - 10t$; | 43) (a) $4s - 2t$; | 60) (a) $-12p - 12q$; |
| (b) $y^{12}/x^{24}, y \neq 0$. | (b) $1/(s^2t^{10})$. | (b) s^4/t^2 . | (b) $1/(p^{12}q^{12})$. |
| 10) (a) $7g - 16h$; | 27) (a) $-7s + 4t$; | 44) (a) $-8w + z$; | 61) (a) $3n - 2m$; |
| (b) $g^7/h^{16}, g \neq 0$. | (b) $t^4/s^7, t \neq 0$. | (b) $z/w^8, z \neq 0$. | (b) $n^3/m^2, n \neq 0$. |
| 11) (a) $4u - 4v$; | 28) (a) $-3u - 6v$; | 45) (a) $9a - 15b$; | 62) (a) $-9u - 3v$; |
| (b) u^4/v^4 . | (b) $1/(u^3v^6)$. | (b) a^9/b^{15} . | (b) $1/(u^9v^3)$. |
| 12) (a) $-8w - 8z$; | 29) (a) $-12n - 12m$; | 46) (a) $-16b + 12c$; | 63) (a) $-10s + 10t$; |
| (b) $1/(w^8z^8)$. | (b) $1/(n^{12}m^{12})$. | (b) c^{12}/b^{16} . | (b) t^{10}/s^{10} . |
| 13) (a) $5a + 22b$; | 30) (a) $-11g + 17h$; | 47) (a) $-2g + 12h$; | 64) (a) $-3g - 10h$; |
| (b) $a^5b^{22}, a \neq 0, b \neq 0$. | (b) h^{17}/g^{11} . | (b) h^{12}/g^2 . | (b) $1/(g^3h^{10})$. |
| 14) (a) $-15a$; | 31) (a) $10x + 5y$; | 48) (a) $-8u + 8v$; | 65) (a) $6u - 6v$; |
| (b) $1/a^{15}, b \neq 0$. | (b) $x^{10}y^5, x \neq 0, y \neq 0$. | (b) v^8/u^8 . | (b) $u^6/v^6, u \neq 0$. |
| 15) (a) $5b - 12c$; | 32) (a) $5u - 15v$; | 49) (a) $13g + 6h$; | 66) (a) $12n - 4m$; |
| (b) b^5/c^{12} . | (b) $u^5/v^{15}, u \neq 0$. | (b) $g^{13}h^6, g \neq 0, h \neq 0$. | (b) $n^{12}/m^4, n \neq 0$. |
| 16) (a) $15b + 4c$; | 33) (a) $-18a$; | 50) (a) $22n + 25m$; | 67) (a) $-3n + 5m$; |
| (b) $b^{15}c^4, b \neq 0, c \neq 0$. | (b) $1/a^{18}, b \neq 0$. | (b) $n^{22}m^{25}, n \neq 0, m \neq 0$. | (b) $m^5/n^3, m \neq 0$. |
| 17) (a) $-2z$; | 34) (a) $3p - 11q$; | 51) (a) $-16b + 10c$; | 68) (a) $9a + 3b$; |
| (b) $1/z^2, w \neq 0$. | (b) $p^3/q^{11}, p \neq 0$. | (b) $c^{10}/b^{16}, c \neq 0$. | (b) $a^9b^3, b \neq 0$. |