

1. Simplify:

a.  $b^5 \bullet b^3$

b.  $3^7 \bullet 3^4$

c.  $(a^9 b^2)(ab^3)$

d.  $\frac{x^9}{x^4}$

e.  $\frac{8^{11}}{8^3}$

f.  $\frac{8a^6 b^8}{12a^3 b^5}$

g.  $3^0$

h.  $2x^0$

i.  $(2x)^0$

j.  $a^7 \bullet a^0$

k.  $\frac{b^5}{b^0}$

l.  $(m^2)^3$

m.  $(2^5)^4$

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

o.  $\left(\frac{x}{3}\right)^3$

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2. a. Add:  $(-2x^2 + 3x - 4) + (5x^2 - 2x - 5)$

b. Add:  $12x^2 + 5x$  and  $x^2 - 2x$

c. Find the sum of:  $4x^2 + 7x + 2$  and  $x - 5$

d. Subtract:  $(7x^2 - 3x + 1) - (-2x^2 - 3x + 6)$

e. Subtract:  $(2x^3 + 5x^2) - (x^3 + 2x)$

f. Subtract:  $(5x^2 + 3x - 6) - (-3x^2 - 5x - 2)$

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Simplify:

a.  $(-6x^2 y^2)(-2xy^2)$

b.  $(3x^3)(-2x^4)$

c.  $(x^2 y)^3$

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

e.  $(x + 3)(x - 7)$

f.  $(x - 4)^2$

g.  $(3x + 2)(3x - 2)$

h.  $(2t + 3)(t^2 - 4t + 5)$

i.  $\frac{12x^2 - 6x}{6x}$

j.  $\left(\frac{8a^5 - 4a^4 + 6a^3}{2a^3}\right)$

k. 
$$\frac{16r^2 - 24r^5 + 8r}{-4r}$$

4. Rewrite with positive exponents. Simplify if possible:

a.  $x^{-3}$

b.  $5^{-2}$

c.  $\frac{1}{a^{-4}}$

d.  $\frac{1}{8^{-2}}$

e.  $3x^{-2}$

f.  $\frac{a^{-3}}{b}$

g.  $\frac{3^2}{3^{-1}}$

h.  $4^{-2} \bullet 4^5$

i.  $y^{-3} \bullet y^{-5}$

5. Factor by Grouping:

a)  $m(m + 7m) + n(m + 7m)$

b)  $v^2 + 3v + vp + 3p$

7. Factor each type of expression:

Factor GCF:

a.  $6x^2 - 6x$

b.  $10n^4 - 6n^2 + 2n$

c.  $10n^4 - 6n^3 + 2n^2$

Factor trinomials  $a = 1$ :

d.  $x^2 + x - 6$

e.  $x^2 + 3x - 28$

f.  $n^2 - 8n - 20$

g.  $a^2 - 14a + 49$

h.  $x^2 - 16x + 64$

i.  $3y^2 - 9y - 84$

ii: Factor Completely:  $2a^2 - 16a + 32$

Factor trinomials  $a > 1$ :

j.  $2x^2 + 7x - 4$

k.  $4t^2 + 12t + 5$

l.  $3x^2 - 17x - 6$

Factor out the Greatest Common Binomial Factor:  $2x(x + 4) - 3(x + 4)$

Factor by grouping:

n.  $4t^2 + 2t + 10t + 5$

o.  $6a^2 - 8a - 3a + 4$

p.  $2y^2 + 8y - y - 4$

Factor completely:

q.  $x^2 - 49$

r.  $6a^2 - 24$

s.  $2t^2 - 72$

t.  $3x^2 + 9x + 6$

u.  $36 - x^2$

v.  $5x - 13$

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9. **Sec. 4.2** For the polynomial,  $9y^3 - 7y^2 + 5y - 21$ , identify each term in the polynomial, the coefficient and the degree of each variable term and the constant

Term \_\_\_\_\_ Coefficient \_\_\_\_\_ Degree \_\_\_\_\_

Term \_\_\_\_\_ Coefficient \_\_\_\_\_ Degree \_\_\_\_\_

Term \_\_\_\_\_ Coefficient \_\_\_\_\_ Degree \_\_\_\_\_ Constant \_\_\_\_\_

|                                       |                                 |                            |
|---------------------------------------|---------------------------------|----------------------------|
| 1. (a) $b^8$                          | 1. (b) $3^{11}$                 | 1. (c) $a^{10}b^5$         |
| 1. (d) $x^5$                          | 1. (e) $8^8$                    | 1. (f) $\frac{2a^3b^3}{3}$ |
| 1. (g) 1                              | 1. (h) 2                        | 1. (i) 1                   |
| 1. (j) $a^7$                          | 1. (k) $b^5$                    | 1. (l) $m^6$               |
| 1. (m) $2^{20}$                       | 1. (n) $16x^6$                  | 1. (o) $\frac{x^3}{27}$    |
| 2. (a) $3x^2 + x - 9$                 | 2. (b) $13x^2 + 3x$             | 2. (c) $4x^2 + 8x - 3$     |
| 2. (d) $9x^2 - 5$                     | 2. (e) $x^3 + 5x^2 - 2x$        | 2. (f) $8x^2 + 8x - 4$     |
| 3. (a) $12x^3y^4$                     | 3. (b) $-6x^7$                  | 3. (c) $x^6y^3$            |
| 3. (d) $-12x^3 + 6x^2 - 3x$           | 3. (e) $x^2 - 4x - 21$          | 3. (f) $x^2 - 8x + 16$     |
| 3. (g) $9x^2 - 4$                     | 3. (h) $2t^3 - 5t^2 - 2t + 15$  | 3. (i) $2x - 1$            |
| 3. (j) $4a^2 - 2a + 3$                | 3. (k) $-4r + 6r^4 - 2$         | 4. (a) $\frac{1}{x^3}$     |
| 4. (b) $\frac{1}{5^2} = \frac{1}{25}$ | 4. (c) $a^4$                    | 4. (d) $8^2 = 64$          |
| 4. (e) $\frac{3}{x^2}$                | 4. (f) $\frac{1}{a^3b}$         | 4. (g) $3^3 = 27$          |
| 4. (h) $4^3 = 64$                     | 4. (i) $\frac{1}{y^8}$          |                            |
| 5(a) $(m+7)(m+n)$                     | (b) $(v+p)(v+3)$                |                            |
|                                       |                                 | 7. (a)<br>$6x(x-1)$        |
| 7. (b)<br>$2n(5n^3 - 3n + 1)$         | 7. (c)<br>$2n^2(5n^2 - 3n + 1)$ | 7. (d)<br>$(x+3)(x-2)$     |
| 7. (e)<br>$(x+7)(x-4)$                | 7. (f)<br>$(n-10)(n+2)$         | 7. (g)<br>$(a-7)(a-7)$     |
| 7. (h)<br>$(x-8)(x-8)$                | 7. (i)<br>$3(y+4)(y-7)$         | 7. (j)<br>$(2x-1)(x+4)$    |
| 7. (k)<br>$(2t+1)(2t+5)$              | 7. (l)<br>$(3x+1)(x-6)$         | 7. (m)<br>$2(a-4)(a-4)$    |
| 7. (n)<br>$(2t+1)(2t+5)$              | 7. (o)<br>$(2a-1)(3a-4)$        | 7. (p)<br>$(y+4)(2y-1)$    |

|                                      |  |                             |
|--------------------------------------|--|-----------------------------|
| 7. (q)<br>$(x - 7)(x + 7)$           | 7. (r)<br>$6(a^2 - 4) \rightarrow 6(a - 2)(a + 2)$ | 7. (s)<br>$2(t + 6)(t - 6)$ |
| 7. (t)<br>$3(x + 1)(x + 2)$          | 7. (u)<br>$(6 + x)(6 - x)$                         | 8. (a) $-2, 1$              |
| 8. (b) $0, 5$<br><br>8. (e) $(0, 4)$ | 8. (c) $-6, 1$<br><br>8. (f) $(6, -6)$             | 8(d) $-12, 4$               |