**Skill:** Combine like terms

1. $(10a^2 - 6ab + b^2) - (5a^2 - 2b^2)$

2. $14w^3 + 26w^2 - 17^3 + 12w - 5w^2$

**Concept:** Multiply

1. $7w(2w^2 + 8w - 5)$
2. $(3y + 4)(2y - 3)$
3. $(3w + 1)^2$

**Extension:**

1. $3y(2y^2 - 1)(y + 4)$

**Skill:** Combine like terms

1. $(10a^2 - 6ab + b^2) - (5a^2 - 2b^2)$

$5a^2 - 6ab + 3b^2$

2. $14w^3 + 26w^2 - 17^3 + 12w - 5w^2$

$14w^3 + 21w^2 + 12w - 17^3$

**Concept:** Multiply

1. $7w(2w^2 + 8w - 5)$ $14w^3 + 56w^2 - 35w$
2. $(3y + 4)(2y - 3)$ $6y^2 - y - 12$
3. $(3w + 1)^2$ $9w^2 + 6w + 1$

$(3w+1)(3w+1)$

**Extension:**

1. $3y(2y^2 - 1)(y + 4)$

$(6y^3 - 3y)(y+4)$

$6y^4 + 24y^3 - 3y^2 - 12y$

28. $(6a^2 + 5a + 10) - (4a^2 + 6a + 12)$

ANSWER:

$2a^2 - a - 2$

29. $(7b^2 + 6b - 7) - (4b^2 - 2)$

ANSWER:

$3b^2 + 6b - 5$

30. $3p(np - z)$

ANSWER:

$3np^2 - 3pz$

31. $4x(2x^2 + y)$

ANSWER:

$8x^3 + 4xy$

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

ANSWER:

$x^3 + x^2y - xy^2 - y^3$

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

ANSWER:

$a^4 + a^3b - 3a^2b - 4ab^2 - b^3$

34. $4(a^2 + 5a - 6) - 3(2a^3 + 4a - 5)$

ANSWER:

$-6a^3 + 4a^2 + 8a - 9$

35. $5c(2c^2 - 3c + 4) + 2c(7c - 8)$

*ANSWER:*

$10c^3 - c^2 + 4c$

36. $5xy(2x - y) + 6y^2(x^2 + 6)$

*ANSWER:*

$10x^2y - 5xy^2 + 6x^2y^2 + 36y^2$

37. $3ab(4a - 5b) + 4b^2(2a^2 + 1)$

*ANSWER:*

$12a^2b + 8a^2b^2 - 15ab^2 + 4b^2$

Divide: $735 \div 6$

$$
\begin{array}{r}
122 \\
6\overline{)735} \\
-6\downarrow \\
\hline
13 \\
-12 \\
\hline
15 \\
-12 \\
\hline
3
\end{array}
$$

Divide
Mult.
Subtract
Bring down
Repeat

Middle: 122 r3

HS: $122\frac{3}{6} = 122.5$

**Example #1**: Simplify

*Divide by monomial

$\frac{x^3}{x^1} = \frac{x \cdot x \cdot x}{x} \rightarrow x^2$

a) $\frac{12x + 20}{4}$

$\frac{3}{\cancel{12}x}{\cancel{4}1} + \frac{20}{4}$

$3x + 5$

b) $\frac{12x^3 - 4x - 8}{4x}$

$\frac{12x^3}{4x} - \frac{4x}{4x} - \frac{8}{\cancel{4}x}^2$

$3x^2 - 1 - \frac{2}{x}$

**Example #2**: Divide using long division

DMSBR

a) $\dfrac{u^3 + 5u - 12}{u-3}$

$0u^2$

① Write polynomials in standard form
↓
(exp. from greatest to least)

② Write as long ÷

* Add placeholders if necessary

$$u-3 \overline{)\, u^3+0u^2+5u-12}$$

$u^2 + 3u + 14$

$+(-u^3 + 3u^2)$

$3u^2 + 5u$

$+(-3u^2 + 9u)$

$14u - 12$

$-(14u - 42)$

$30$

Quotient: $u^2 + 3u + 14 + \dfrac{30}{u-3}$

$(u-3)(u^2+3u+14)+30$

**Example #2**: Divide using long division

b) $\dfrac{2x^3 - x^2 - 19x + 15}{x-3}$

$2x^2+5x-4$

$x-3 \overline{)\,2x^3-x^2-19x+15}$

$-(2x^3-6x^2)$

$5x^2-19x$

$-(5x^2-15x)$

$-4x+15$

$-(-4x+12)$

$3$

Quotient:

$$2x^2+5x-4+\frac{3}{x-3}$$

**Example #2**: Divide using long division

c) $(d^2 + 4d + 3) \div (d + 1)$

$$d+1 \overline{)\, d^2+4d+3}$$

$$d+3$$

$$-(d^2+d)$$

$$3d+3$$

$$-(3d+3)$$

$$0$$

D

M: by both terms!!

S

B

R

**Example #2**: Divide using long division

d) $(4p^3 - 3p^2 + 2p) \div (p - 1)$

$$p-1 \overline{)\, 4p^3 - 3p^2 + 2p + 0}$$

$$4p^2 + p + 3$$

$$-(4p^3 - 4p^2)$$

$$p^2 + 2p$$

$$-(p^2 - p)$$

$$3p + 0$$

$$-(3p - 3)$$

$$3$$

D

M

S

B

R

$Q: 4p^2 + p + 3 + \frac{3}{p-1}$