3.5 – Collect Like Terms

MPM1D

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SOLUTIONS

1. Which polynomial contains no like terms?

A) $2x + 5 - 3x + 2xy$
B) $3x^2 + 3xy + 3$
C) $4 - 9x + 9y + 3$
D) $-4a^3 + 5b - 2a^2 + 7b$

2. Classify each pair of terms as either like or unlike.

a) $2x$ *and* $-5x$

like

b) $3y$ *and* $3z$

unlike

c) $-x^2$ *and* $\frac{1}{2}x^2$

like

d) $4a^2$ *and* $3a^3$

unlike

e) $2ab$ *and* $3a^2$

unlike

f) $5x^2y$ *and* $-2xy^2$

unlike

g) $3uv$ *and* $2vu$

like

h) $9p^2q^3$ *and* $-4q^3p^2$

like

3. Simplify where possible

a) $3x + 6x$

$= 9x$

b) $2m + 5n$

can't simplify

c) $5h + 8h + 2h$

$= 15h$

d) $7u + 4u + u$

$= 12u$

4. Simplify if possible

a) $4k - 2k$

$= 2k$

b) $8n - n$

$= 7n$

c) $3z - 7z$

$= -4z$

d) $p - 6$

can't simplify

5. Simplify by collecting like terms.

a) $3x + 5 + 2x + 1$

$= 3x+2x+5+1$

$= 5x+6$

b) $2k + 3m + 4m + 6k$

$= 2k+6k+3m+4m$

$= 8k+7m$

c) $8n + 5 - 3n - 2$

$= 8n-3n+5-2$

$= 5n+3$

6. Simplify

a) $3x - 8 - 4 + 3$

$= 3x - 9$

b) $2x^2 + 7x + 4x^2 + x$

$= 2x^2+4x^2+7x+x$

$= 6x^2+8x$

c) $7m + 6m^2 - 2m + m^2$

$= 6m^2+m^2+7m-2m$

$= 7m^2+5m$

d) $3k - 5 + 8 - k + 1 - 4k$

$= 3k-k-4k-5+8+1$

$= -2k+4$

e) $-3u + 2 - u^2 - 5 + 3u + 2u^2 - 3$

$= -u^2+2u^2-3u+3u+2-5-3$

$= u^2-6$

7. Simplify

a) $2a^2 - 3ab - 6 + 4b^2 + 7 + 5ab - 3b - 2a^2$

$= 2a^2-2a^2+4b^2-3ab+5ab-3b-6+7$

$= 4b^2+2ab-3b+1$

b) $3mn + 6m^2 - n^2 + 3 - m^2 - 3mn + 2n^2 - 4$

$= 6m^2-m^2-n^2+2n^2+3mn-3mn+3-4$

$= 5m^2+n^2-1$

8. The length of a rectangular field is three times its width. $l = 3w$

a) Write an expression for the perimeter of the field.

$P = 2l + 2w$
$= 2(3w) + 2w$
$= 6w + 2w$
$= 8w$

$P = 8w$

b) Find the perimeter if the field is 300 m wide.

$P = 8(300)$
$= 2400$

2400 m

c) Find the length and width of the field if the perimeter is 1600 m.

$1600 = 8(w)$
$w = \frac{1600}{8}$
$w = 200$

$l = 3(200)$
$= 600$

$l = 600$ m
$w = 200$ m

9 (extension).

a) An equilateral triangle has an unknown side length, x. Write a simplified expression for its perimeter.

$P = 3x$

b) A right isosceles triangle has two sides equal to x. Which triangle, the equilateral triangle in part a) or the right isosceles triangle, has the greater perimeter? Use algebraic reasoning.

$P_{isosceles} = 2x + x\sqrt{2}$
$= 3.4x$

$3.4x > 3x$

∴ the isosceles triangle has a greater perimeter.