on 5.1: Modelling Polynomials

lentify the polynomials in the following expressions.

) $2m^2+1$ Bi

b) $3x^{\frac{1}{2}}$ Not

c) $-4x$ Mono

d) $\frac{1}{x^2+x}$ Not

e) $0.25y^2$ Mono

lame the coefficients, variable, degree, and constant term of each polynomial.

) $-8y$ b) 12 c) $-2b^2-b+10$ d) $-4-b$

-8	ø	-2, -1	-1	coefficients
y	ø	b	b	variable
1	0	2	1	degree
ø	12	10	-4	constant

dentify each polynomial as a monomial, binomial, or trinomial.

) $19t$ Mono b) $g-4g^2+5$ Tri c) $-1+xy+y^2$ Tri d) $4-11w$ Bi

dentify the equivalent polynomials.

) $-h^2-3+4h$ $-h^2+4h-3$

b) $-3+4h-h^2$ $-h^2+4h-3$

) $5m-3$

d) $-2+y^2+5xy$ $y^2+5xy-2$

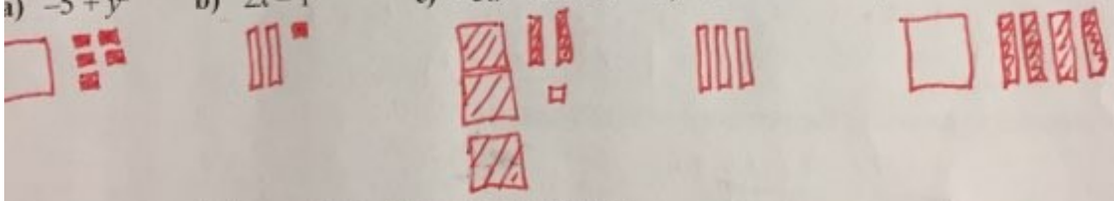
) $y^2+5xy-2$

f) $-3+5m$ $5m-3$

Answer:
a ↔ b
c → f
d → e

Use algebra tiles to model each polynomial. Sketch the tiles.

a) $-5+y^2$ b) $2x-1$ c) $-3a^2-2a+1$ d) $3z$ e) v^2-4v



Write a polynomial to match the following conditions.

a) 2 terms, degree 1, with a constant term of 4

$3t+4$ $-2t+4$ Answers may vary

b) 3 terms, degree 2, with the coefficient on the 2nd degree term –2

$3x^2-2x+2$ $5x^2-2x+7$ Answers may vary

Master 5.20 **Extra Practice 2**

esson 5.2: Like Terms and Unlike Terms

1. From the list, identify terms that are like $2w^2$.

$-5w$, $-6w^2$, -2, $4w$, $3w^2$, $-w^2$, $11w$, 2

Combine like terms then simplified polynomial.

a) $4 + x + 1 + 5x + 1$

$x + 5x + 4 + 1 + 1$

$6x + 6$

b) $-3y^2 + 3y - 2$

$-3y^2 + 3y - 2$

c) $2x^2 + 8 - 11 - 4x^2 + 5x^2$

$2x^2 - 4x^2 + 5x^2 + 8 - 11$

$3x^2 - 3$

d) $3y + 7y^2 + 1 - y - 2y - 3y^2$

$7y^2 - 3y^2 + 3y - y - 2y + 1$

$4y^2 + 1$

g) $-4 + 2a + 7 - 4a$

$2a - 4a - 4 + 7$

$-2a + 3$

i) $3a^2 - 2a - 4 + 2a - 3a^2 + 5$

$3a^2 - 3a^2 - 2a + 2a - 4 + 5$

1

j) $7z - z^2 + 3 + z^2 - 7$

$-z^2 + z^2 + 7z - 7 + 3$

$7z - 4$

l) $-6x^2 + 10x - 4 + 4 - 12x - 7x^2$

$-6x^2 - 7x^2 + 10x - 12x - 4 + 4$

$-13x^2 - 2x$

Identify the equivalent polynomials. Justify your responses.

a) $-5y^2 - 3y - 4$ b) $10x - 1$ c) $1 + x - x^2$ d) $2y^2 - 4 - 16 - 7y^2 - 3y + 16$

$-x^2 + x + 1$

$2y - 7y^2 - 3y - 4 + 16$

$-5y^2 - 3y + 12$

a ↔ d

b ↔ e

c ↔

e) $-7 + 5x - 7x - 8 + 14 + 12x$

$12x + 5x - 7x - 7 - 8 + 14$

$10x - 1$

f) $5x^2 + 7 + 4x - 6x^2 - 6 - x - 2x$

$5x^2 - 6x^2 + 4x - x - 2x + 7 - 6$

$-x^2 - x + 1$

Write a polynomial to represent the perimeter of each rectangle.

a)

$P = 2x + 2x + 6 + 6$

$P = 4x + 12$

$P = 3x + 3x + 3x + 3x$

$P = 12x$

Master 5.21

Extra Practice 3

Lesson 5.3: Adding Polynomials

1. Add these polynomials.

a) $(x-5)+(2x+2)$

$x-5+2x+2$

$x+2x-5+2$

$3x-3$

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

b^2+3b+b^2-3b

$b^2+b^2+3b-3b$

$2b^2$

c) $(y^2+6y)+(-7y^2+2y)$

$y^2+6y-7y^2+2y$

$y^2-7y^2+6y+2y$

$-6y^2+8y$

d) $(5n^2+5)+(-1-3n^2)$

$5n^2+5-1-3n^2$

$5n^2-3n^2+5-1$

$2n^2+4$

2. Add these polynomials.

a) $(-7x+5)$

$+(2x-8)$

$-5x-3$

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

$+(-8x^2-1)$

$-4x^2-4$

c) (x^2-4x+3)

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

$-6x$

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

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

x^2+2

3. Add.

a) $(y^2+6y-5)+(-7y^2+2y-2)$

$y^2+6y-5-7y^2+2y-2$

$y^2-7y^2+6y+2y-5-2$

$-6y^2+8y-7$

b) $(-2n+2n^2+2)+(-1-7n^2+n)$

$-2n+2n^2+2-1-7n^2+n$

$2n^2-7n^2-2n+n+2-1$

$-5n^2-n+1$

c) $(3m^2+m)+(-10m^2-m-2)$

$3m^2+m-10m^2-m-2$

$3m^2-10m^2+m-m-2$

$-7m^2-2$

d) $(-3d^2+2)+(-2-7d^2+d)$

$-3d^2+2-2-7d^2+d$

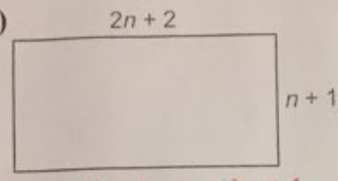
$-3d^2-7d^2+d+2-2$

$-10d^2+d$

Name _____

4. a) For each shape below, write the perimeter as a sum of polynomials and in simplest form.

i)

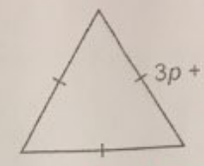


$P = (2n+2) + (2n+2) + (n+1) + (n+1)$

$= 2n + 2n + n + n + 2 + 2 + 1 + 1$

$P = 6n + 6$

ii)

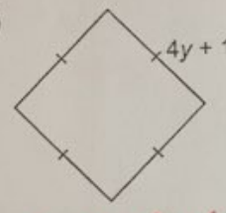


$P = (3p+4) + (3p+4) + (3p+4)$

$P = 3p + 3p + 3p + 4 + 4 + 4$

$P = 9p + 12$

iii)

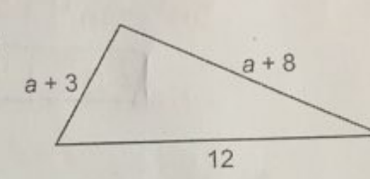


$P = (4y+1) + (4y+1) + (4y+1) + (4y+1)$

$P = 4y + 4y + 4y + 4y + 1 + 1 + 1 + 1$

$P = 16y + 4$

iv)



$P = (a+3) + (a+8) + 12$

$P = a + a + 3 + 8 + 12$

$P = 2a + 23$

5. The sum of two polynomials is $4r + 5 - 3r^2$. One polynomial is $-8 - 2r^2 + 2r$; what is the other polynomial? Explain how you found your answer.

$$\begin{array}{r} -2r^2 + 2r - 8 \\ +\ (-r^2 + 2r + 13) \\ \hline -3r^2 + 4r + 5 \end{array}$$

Name _____ Date _____

Master 5.22

Extra Practice 4

Lesson 5.4: Subtracting Polynomials

1. Subtract these polynomials.

a) $(2s^2 + 3s + 6) - (s^2 + s + 2)$

$2s^2 + 3s + 6 - s^2 - s - 2$

$2s^2 - s^2 + 3s - s + 6 - 2$

$s^2 + 2s + 4$

b) $(-12x^2 + 5x + 16) - (-x^2 + 2x + 12)$

$-12x^2 + 5x + 16 + x^2 - 2x - 12$

$-12x^2 + x^2 + 5x - 2x + 16 - 12$

$-11x^2 + 3x + 4$

c) $(4 - 8w) - (7w + 1)$

$4 - 8w - 7w - 1$

$-8w - 7w + 4 - 1$

$-15w + 3$

d) $(xy - x - 5y + 4y^2) - (6y^2 + 9y - xy)$

$xy - x - 5y + 4y^2 - 6y^2 - 9y - xy$

$4y^2 - 6y^2 + xy + xy - x - 5y - 9y$

$-2y^2 + 2xy - x - 14y$

e) $(x^2 + 2x - 4) - (4x^2 + 2x - 2)$

$x^2 + 2x - 4 - 4x^2 - 2x + 2$

$x^2 - 4x^2 + 2x - 2x - 4 + 2$

$-3x^2 - 2$

f) $(-9z^2 - z - 2) - (3z^2 - z - 3)$

$-9z^2 - z - 2 - 3z^2 + z + 3$

$-9z^2 - 3z^2 - z + z - 2 + 3$

$-12z^2 + 1$

a) $(mn - 5m - 7) - (-6n + 2m + 1)$

$mn - 5m - 7 + 6n - 2m - 1$

$6n - 5m - 2m + mn - 7 - 1$

$6n - 7m + mn - 8$

b) $(2a + 3b - 3a^2 + b^2) - (-a^2 + 8b^2 + 3a - b)$

$2a + 3b - 3a^2 + b^2 + a^2 - 8b^2 - 3a + b$

$-3a^2 + a^2 + b^2 - 8b^2 + 2a - 3a + 3b + b$

$-2a^2 - 7b^2 - a + 4b$

Explain why the student's solution is incorrect

$(3y^2 + 5y + 2) - (4y^2 + 3y + 2)$

$= 3y^2 + 5y + 2 - 4y^2 - 3y - 2$

$= 3y^2 - 4y^2 - 5y - 3y - 2 - 2$

$= -y^2 - 8y - 4$

$3y^2 + 5y + 2 - 4y^2 - 3y - 2$

$3y^2 - 4y^2 + 5y - 3y + 2 - 2$

$-y^2 + 2y$

The difference between two polynomials is $(5x + 3)$. One of the two polynomials is $(4x + 1 - 3x^2)$. What is the other polynomial? Explain how you found your answer.

$-3x^2 + 4x + 1$

$-3x^2 + 4x + 1$

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

$5x + 3$

Lesson 5.5: Multiplying and [illegible]

1. Multiply.
   a) $2(3b)$ → $6b$
   b) $-2(6h)$ → $-12h$
   c) $4(2b^2)$ → $8b^2$
   d) $-2(2x^2)$ → $-4x^2$
   e) $-2(-y^2)$ → $2y^2$
   f) $-3(-2f)$ → $6f$

2. Divide.
   a) $12d \div 4$ → $3d$
   b) $-20d \div 5$ → $-4d$
   c) $8d \div -4$ → $-2d$
   d) $12y^2 \div 4$ → $3y^2$
   e) $-14x^2 \div 2$ → $-7x^2$
   f) $-10q \div -5$ → $2q$

3. Determine each product.
   a) $4(3a + 2)$ → $12a + 8$
   b) $(d^2 + 2d)(-3)$ → $-3d^2 - 6d$
   c) $2(4c^2 - 2c + 3)$ → $8c^2 - 4c + 6$
   d) $(-2n^2 + n - 1)(6)$ → $-12n^2 + 6n - 6$
   e) $-3(-5m^2 + 6m + 7)$ → $15m^2 - 18m - 21$

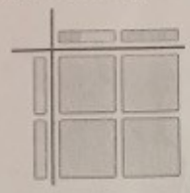
4. Explain why the student's solution is incorrect.
   $(-5k^2 - k - 3)(-2)$ ⇒ $(-5k^2)(-2)$ $(-k)(-2)$ $(-3)(-2)$
   $= -2(5k^2) - 2(k) - 2(3)$ = $10k^2 + 2k + 6$
   $= -10k^2 - 2k - 6$

5. Determine each quotient.
   a) $(16v + 16) \div (8)$ → $2v + 2$
   b) $(25k^2 - 15k) \div (5)$ → $5k^2 - 3k$
   c) $(20 - 8n) \div (-4)$ → $-5 + 2n$
   d) $(18x^2 - 6x + 6) \div (6)$ → $3x^2 - x + 1$
   e) $(7 - 7y + 14y^2) \div (-7)$ → $-1 + y - 2y^2$

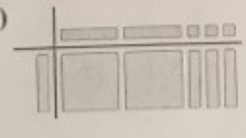
6. Explain why the student's solution is incorrect.
   $(-12r^2 - 8r - 16) \div (-4)$ = $\frac{-12r^2}{-4}$ $\frac{-8r}{-4}$ $\frac{-16}{-4}$
   $= \frac{-12r^2}{4} + \frac{-8r}{4} + \frac{-16}{4}$ = $3r^2 + 2r + 4$
   $= -3r^2 - 2r + 4$

Lesson 5.6 Multiplying and Dividing a Polynomial by a Monomial

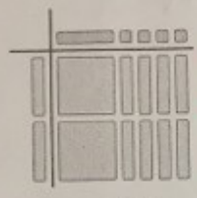
1. Write the multiplication sentence modelled by each set of algebra tiles.

a) 

$(2x)(2x)$
$= 4x^2$

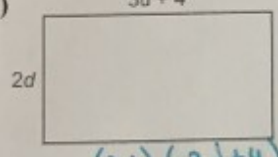
b) 

$(x)(2x+3)$
$= 2x^2 + 3x$

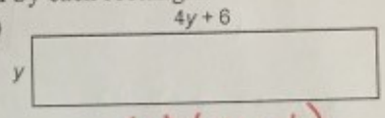
c) 

$(2x)(x+4)$
$= 2x^2 + 8x$

2. Write the multiplication sentence modelled by each rectangle.

a) 

$(2d)(3d+4)$
$= 6d^2 + 8d$

b) 

$(y)(4y+6)$
$= 4y^2 + 6y$

5. Multiply.

a) $3c(5c+2)$ $15c^2 + 6c$

b) $(8+4y)(6y)$ $48y + 24y^2$

c) $5p(-5-2p)$ $-25p - 10p^2$

e) $(7k-3)(-m)$ $-7km + 3m$

f) $(-1-10r)(-r)$ $r + 10r^2$

6. Divide.

a) $(6x+3) \div 3$ $2x + 1$

b) $(14w-7) \div -7$ $-2w + 1$

c) $(-15-10q) \div 5$ $-3 - 2q$

d) $(8z^2+4z) \div 2z$ $4z + 2$

e) $(12c^2-6c) \div 3c$ $4c - 2$

f) $(9xy-6x) \div -3x$ $-3y + 2$

7. Explain why the student's solution is incorrect.

$(-12x^2-9x-12xy) \div (-3x)$

$= \frac{-12x^2}{-3x} + \frac{9x}{-3x} + \frac{-12xy}{-3x}$

$= 4x + 3 + 4xy$

$\Rightarrow \frac{-12x^2}{-3x} \frac{-9x}{-3x} \frac{-12xy}{-3x}$

$= 4x + 3 + 12y$