Unit 4 Polynomials Practice Test

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Which of the following expressions are monomials with degree 2?
i) $2x^2 + 2x$
ii) $2x^2$
iii) x^2
iv) $2x$
a. ii and iii b. ii and iv c. iii and iv d. i and ii

____ 2. Identify the polynomial that is equivalent to $4 - 6v - 7v^2$.
i) $7v^2 + 6v - 4$
ii) $4 + 7v^2 - 6v$
iii) $-7v^2 - 6v + 4$
iv) $-7v^2 - 4 + 6v$
a. iv b. ii c. i d. iii

____ 3. From the list, which terms are like $5x$?
$5x^2$, $4x$, 3, $-8x$, $-5x$, $9x^2$, 5
a. $-5x$
b. $5x^2$, 5
c. $4x$, $-8x$, $-5x$
d. $5x^2$, $-5x$, $-5x^2$

____ 4. Combine like terms. Sketch algebra tiles if it helps.
$3x^2 - 3 - 7x - 6x^2 + 5$
a. $-3x^2 - 7x - 2$
b. $-3x^2 - 7x + 2$
c. $3x^2 - 7x + 2$
d. $3x^2 - 7x - 2$

____ 5. Add: $(3x^2 - 4x + 8) + (-x^2 - 2x - 8)$
a. $2x^2 - 6x$ b. $2x^2 - 2x$ c. $2x^2 - 6x + 1$ d. $2x^2 + 6x$

____ 6. Subtract: $(6x - 3) - (11x - 8)$
a. $-5x + 11$ b. $-5x + 5$ c. $-5x - 5$ d. $-5x - 11$

____ 7. Subtract: $(2p - 3) - (3 - 2p)$
a. $-4p + 6$ b. 0 c. $4p - 6$ d. $4p + 6$

____ 8. Subtract: $(5r^2 - 4) - (8r^2 + 7r + 8)$
a. $3r^2 - 7r - 12$
b. $-3r^2 - 7r - 12$
c. $-3r^2 + 7r + 4$
d. $3r^2 + 7r + 4$

____ 9. Subtract: $(3x - 7x^2 + 2) - (4x^2 - 5 + 6x)$
a. $-11x^2 + 3x - 7$
b. $-11x^2 - 9x - 3$
c. $-11x^2 - 3x + 7$
d. $11x^2 + 3x - 7$

____ 10. Multiply: $3(4x)$

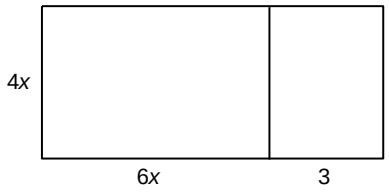
a. $9x$ b. $7x$ c. $12x$ d. 6

____ 11. Divide: $12x^2 \div 3$

a. $3x^2$ b. $9x^2$ c. $4x^2$ d. $9x$

____ 12. Which of these multiplication sentences is modelled by the rectangle below?

i) $4x(6x - 3)$
ii) $4x(-6x + 3)$
iii) $6x(4x + 3)$
iv) $4x(6x + 3)$



a. iii b. ii c. i d. iv

____ 13. Divide: $(9x^2) \div (-3x)$

a. $-3x$ b. $-12x^2$ c. $6x^2$ d. $-3x^2$

____ 14. Multiply: $(5y - 7)(-y)$

a. $-5y^2 + 7y$ b. $4y^2 - 7$ c. $-5y^2 - 7$ d. $4y^2 + 7y$

____ 15. Multiply: $-4c(2c - 3)$

a. $-2c^2 + 7$ b. $-8c^2 - 3$ c. $-8c^2 - 12c$ d. $-8c^2 + 12c$

Short Answer

16. A large white square represents an x^2-tile, a large black square represents a $-x^2$-tile, a white rectangle represents an x-tile, a black rectangle represents a $-x$-tile, a small white square represents a 1-tile, and a small black square represents a −1-tile.

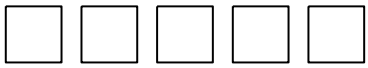
Match each polynomial with its corresponding algebra tile model.

i) $3 - 2t + 4t^2$
ii) $3a^2 - 6$
iii) $4s - 7 - 2s^2$
iv) $5m^2$
v) $-3p + 8$
vi) $-4c^2 + 6c - 2$

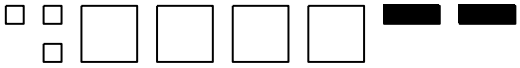
Model A

Model B

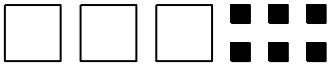
Model C



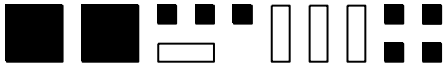
Model D



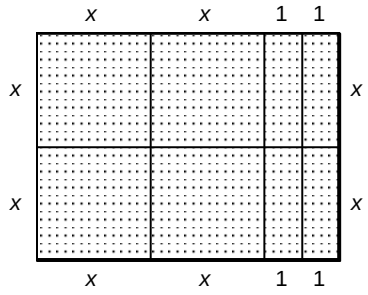
Model E



Model F



17. Write a polynomial to represent the perimeter of the rectangle.



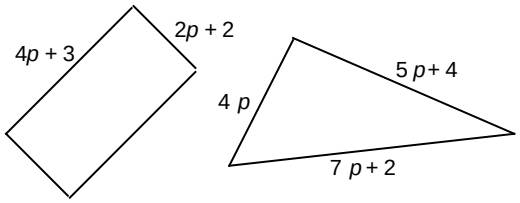
18. Multiply: $5(-2x^2 - 5)$

19. Divide: $(-30x^2 - 12x + 18) \div 6$

Problem

20. What polynomial must be added to $3x^2 + 4x + 7$ to obtain a sum of 0?

21. a) Write a simplified polynomial for the perimeter of each shape below.
    b) Subtract the perimeter of the rectangle from the perimeter of the triangle.
    c) If $p = 4$, which shape has the greater perimeter?



22. Which expressions are equivalent? Explain how you know.

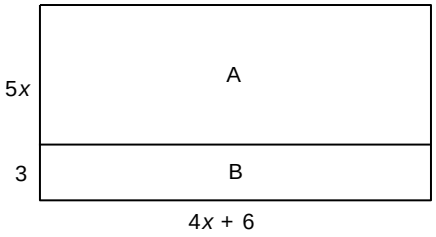
i) $\frac{35x + 14x^2 - 21}{7}$

ii) $\frac{-15 + 9x + 6x^2}{3}$

iii) $\frac{24x - 40 + 16x^2}{8}$

iv) $\frac{10 + 4x^2 + 6x}{2}$

23. a) Write a polynomial to represent the area of rectangle A.
b) Write a polynomial to represent the area of rectangle B.
c) Write a polynomial to represent the total area of rectangle A added to rectangle B.



24. Simplify: $[(3x^2 + 5xy) - (6x^2 - 4xy)] \div 4x$.

Unit 4 Polynomials Practice Test
Answer Section

MULTIPLE CHOICE

1. ANS: A PTS: 1 DIF: Easy REF: 5.1 Modelling Polynomials
   LOC: 9.PR5 TOP: Patterns and Relations (Variables and Equations)
   KEY: Conceptual Understanding
2. ANS: D PTS: 1 DIF: Moderate REF: 5.1 Modelling Polynomials
   LOC: 9.PR5 TOP: Patterns and Relations (Variables and Equations)
   KEY: Procedural Knowledge
3. ANS: C PTS: 1 DIF: Easy REF: 5.2 Like Terms and Unlike Terms
   LOC: 9.PR5 TOP: Patterns and Relations (Variables and Equations)
   KEY: Conceptual Understanding
4. ANS: B PTS: 1 DIF: Moderate REF: 5.2 Like Terms and Unlike Terms
   LOC: 9.PR5 TOP: Patterns and Relations (Variables and Equations)
   KEY: Procedural Knowledge
5. ANS: A PTS: 1 DIF: Moderate REF: 5.3 Adding Polynomials
   LOC: 9.PR6 TOP: Patterns and Relations (Variables and Equations)
   KEY: Procedural Knowledge
6. ANS: B PTS: 1 DIF: Easy REF: 5.4 Subtracting Polynomials
   LOC: 9.PR6 TOP: Patterns and Relations (Variables and Equations)
   KEY: Procedural Knowledge
7. ANS: C PTS: 1 DIF: Easy REF: 5.4 Subtracting Polynomials
   LOC: 9.PR6 TOP: Patterns and Relations (Variables and Equations)
   KEY: Procedural Knowledge
8. ANS: B PTS: 1 DIF: Moderate REF: 5.4 Subtracting Polynomials
   LOC: 9.PR6 TOP: Patterns and Relations (Variables and Equations)
   KEY: Procedural Knowledge
9. ANS: C PTS: 1 DIF: Moderate REF: 5.4 Subtracting Polynomials
   LOC: 9.PR6 TOP: Patterns and Relations (Variables and Equations)
   KEY: Procedural Knowledge
10. ANS: C PTS: 1 DIF: Easy
    REF: 5.5 Multiplying and Dividing a Polynomial by a Constant
    LOC: 9.PR7 TOP: Patterns and Relations (Variables and Equations)
    KEY: Procedural Knowledge
11. ANS: C PTS: 1 DIF: Easy
    REF: 5.5 Multiplying and Dividing a Polynomial by a Constant
    LOC: 9.PR7 TOP: Patterns and Relations (Variables and Equations)
    KEY: Procedural Knowledge
12. ANS: D PTS: 1 DIF: Easy
    REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial
    LOC: 9.PR7 TOP: Patterns and Relations (Variables and Equations)
    KEY: Procedural Knowledge
13. ANS: A PTS: 1 DIF: Easy
    REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial
    LOC: 9.PR7 TOP: Patterns and Relations (Variables and Equations)
    KEY: Procedural Knowledge

14. ANS: A PTS: 1 DIF: Moderate
REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial
LOC: 9.PR7 TOP: Patterns and Relations (Variables and Equations)
KEY: Procedural Knowledge
15. ANS: D PTS: 1 DIF: Moderate
REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial
LOC: 9.PR7 TOP: Patterns and Relations (Variables and Equations)
KEY: Procedural Knowledge

SHORT ANSWER

16. ANS:
Model A: v
Model B: vi
Model C: iv
Model D: i
Model E: ii
Model F: iii

PTS: 1 DIF: Moderate REF: 5.1 Modelling Polynomials
LOC: 9.PR5 TOP: Patterns and Relations (Variables and Equations)
KEY: Procedural Knowledge
17. ANS:
$8x + 4$

PTS: 1 DIF: Difficult REF: 5.2 Like Terms and Unlike Terms
LOC: 9.PR5 TOP: Patterns and Relations (Variables and Equations)
KEY: Procedural Knowledge
18. ANS:
$-10x^2 - 25$

PTS: 1 DIF: Moderate REF: 5.5 Multiplying and Dividing a Polynomial by a Constant
LOC: 9.PR7 TOP: Patterns and Relations (Variables and Equations)
KEY: Procedural Knowledge
19. ANS:
$-5x^2 - 2x + 3$

PTS: 1 DIF: Moderate REF: 5.5 Multiplying and Dividing a Polynomial by a Constant
LOC: 9.PR7 TOP: Patterns and Relations (Variables and Equations)
KEY: Procedural Knowledge

PROBLEM

20. ANS:
To get 0, make the coefficients of like terms opposites. So, add $-3x^2 - 4x - 7$.
$(3x^2 + 4x + 7) + (-3x^2 - 4x - 7)$

$= 3x^2 + 4x + 7 - 3x^2 - 4x - 7$

$= 3x^2 - 3x^2 + 4x - 4x + 7 - 7$

$= 0$

PTS: 1 DIF: Difficult REF: 5.3 Adding Polynomials
LOC: 9.PR6 TOP: Patterns and Relations (Variables and Equations)
KEY: Problem-Solving Skills | Communication

21. ANS:

a) Perimeter of rectangle: $(2p + 2) + (4p + 3) + (2p + 2) + (4p + 3) = 12p + 10$
Perimeter of triangle: $4p + (5p + 4) + (7p + 2) = 16p + 6$

b) Perimeter of triangle – perimeter of rectangle = $(16p + 6) - (12p + 10) = 4p - 4$

c) Substitute $p = 4$ into the polynomial for the perimeter of the rectangle.

$12p + 10$

$= 12(4) + 10$

$= 48 + 10$

$= 58$

Substitute $p = 4$ into the polynomial for the perimeter of the triangle.

$16p + 6$

$= 16(4) + 6$

$= 64 + 6$

$= 70$

So, the triangle has the greater perimeter.

PTS: 1 DIF: Difficult REF: 5.4 Subtracting Polynomials
LOC: 9.PR6 TOP: Patterns and Relations (Variables and Equations)
KEY: Problem-Solving Skills | Communication

22. ANS:

i) $\dfrac{35x + 14x^2 - 21}{7}$

$= \dfrac{35x}{7} + \dfrac{14x^2}{7} + \dfrac{-21}{7}$

$= 5x + 2x^2 + (-3)$

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

ii) $\dfrac{-15 + 9x + 6x^2}{3}$

$= \dfrac{-15}{3} + \dfrac{9x}{3} + \dfrac{6x^2}{3}$

$= (-5) + 3x + 2x^2$

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

iii) $\dfrac{24x - 40 + 16x^2}{8}$

$= \dfrac{24x}{8} + (\dfrac{-40}{8}) + \dfrac{16x^2}{8}$

$= 3x + (-5) + 2x^2$

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

iv) $\dfrac{10 + 4x^2 + 6x}{2}$

$= \dfrac{10}{2} + \dfrac{4x^2}{2} + \dfrac{6x}{2}$

$= 5 + 2x^2 + 3x$

Expressions ii and iii are equivalent because the quotients are the same.

PTS: 1 DIF: Difficult REF: 5.5 Multiplying and Dividing a Polynomial by a Constant
LOC: 9.PR7 TOP: Patterns and Relations (Variables and Equations)
KEY: Problem-Solving Skills | Communication

23. ANS:

Area of rectangle A $= 5x(4x + 6)$
$= 20x^2 + 30x$

Area of rectangle B $= 3(4x + 6)$
$= 12x + 18$

Total area of rectangle A and rectangle B $= 20x^2 + 30x + 12x + 18$
$= 20x^2 + 42x + 18$

PTS: 1 DIF: Difficult
REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial
LOC: 9.PR7 TOP: Patterns and Relations (Variables and Equations)
KEY: Problem-Solving Skills

24. ANS:

$[(3x^2 + 5xy) - (6x^2 - 4xy)] \div 4x$
$= [3x^2 + 5xy - 6x^2 + 4xy] \div 4x$
$= [-3x^2 + 9xy] \div 4x$
$= \frac{-3x^2}{4x} + \frac{9xy}{4x}$
$= \frac{-3x}{4} + \frac{9y}{4}$

PTS: 1 DIF: Difficult
REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial
LOC: 9.PR7 TOP: Patterns and Relations (Variables and Equations)
KEY: Problem-Solving Skills