

GSE Algebra II Unit 2 Operations with Polynomials

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Adding and Subtracting Polynomials

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Area and Volume Model Problems

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Review/Catch Up Day

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Polynomial Operations Quiz

Polynomial Operations Examples

Adding Polynomials

$$(5x^2 + x - 7) + (-3x^2 - 6x - 1)$$

Subtracting Polynomials

$$(3x^2 - 2x + 4) - (x^2 + 4x - 6)$$

Adding & Subtracting Polynomials

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

Distributing

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

Adding and Subtracting Polynomials

Simplify each expression.

1) $(5p^2 - 3) + (2p^2 - 3p^3)$

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

3) $(4 + 2n^3) + (5n^3 + 2)$

4) $(4n - 3n^3) - (3n^3 + 4n)$

5) $(3a^2 + 1) - (4 + 2a^2)$

6) $(4r^3 + 3r^4) - (r^4 - 5r^3)$

7) $(5a + 4) - (5a + 3)$

8) $(3x^4 - 3x) - (3x - 3x^4)$

9) $(-4k^4 + 14 + 3k^2) + (-3k^4 - 14k^2 - 8)$

10) $(3 - 6n^5 - 8n^4) - (-6n^4 - 3n - 8n^5)$

11) $(12a^5 - 6a - 10a^3) - (10a - 2a^5 - 14a^4)$

12) $(8n - 3n^4 + 10n^2) - (3n^2 + 11n^4 - 7)$

13) $(-x^4 + 13x^5 + 6x^3) + (6x^3 + 5x^5 + 7x^4)$

14) $(9r^3 + 5r^2 + 11r) + (-2r^3 + 9r - 8r^2)$

15) $(13n^2 + 11n - 2n^4) + (-13n^2 - 3n - 6n^4)$

16) $(-7x^5 + 14 - 2x) + (10x^4 + 7x + 5x^5)$

17) $(7 - 13x^3 - 11x) - (2x^3 + 8 - 4x^5)$

18) $(13a^2 - 6a^5 - 2a) - (-10a^2 - 11a^5 + 9a)$

19) $(3v^5 + 8v^3 - 10v^2) - (-12v^5 + 4v^3 + 14v^2)$

20) $(8b^3 - 6 + 3b^4) - (b^4 - 7b^3 - 3)$

21) $(k^4 - 3 - 3k^3) + (-5k^4 + 6k^3 - 8k^5)$

22) $(-10k^2 + 7k + 6k^4) + (-14 - 4k^4 - 14k)$

23) $(-7n^2 + 8n - 4) - (-11n + 2 - 14n^2)$

24) $(14p^4 + 11p^2 - 9p^5) - (-14 + 5p^5 - 11p^2)$

25) $(8k + k^2 - 6) - (-10k + 7 - 2k^2)$

26) $(-9v^2 - 8u) + (-2uv - 2u^2 + v^2) + (-v^2 + 4uv)$

27) $(4x^2 + 7x^3y^2) - (-6x^2 - 7x^3y^2 - 4x) - (10x + 9x^2)$

28) $(-5u^3v^4 + 9u) + (-5u^3v^4 - 8u + 8u^2v^2) + (-8u^4v^2 + 8u^3v^4)$

29) $(-9xy^3 - 9x^4y^3) + (3xy^3 + 7y^4 - 8x^4y^4) + (3x^4y^3 + 2xy^3)$

30) $(y^3 - 7x^4y^4) + (-10x^4y^3 + 6y^3 + 4x^4y^4) - (x^4y^3 + 6x^4y^4)$

Polynomial Operations Examples

Multiplying Binomials
 $(3x - 1)(5x - 2)$

Multiplying Polynomials
 $(2m - 3)(3m^2 + 4m - 2)$

Multiplying Three Binomials
 $(a + 2)(a - 5)(2a + 4)$

Multiplying Polynomials

Find each product.

1) $6v(2v + 3)$

2) $7(-5v - 8)$

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

4) $-4(v + 1)$

5) $(2n + 2)(6n + 1)$

6) $(4n + 1)(2n + 6)$

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

8) $(8p - 2)(6p + 2)$

9) $(6p + 8)(5p - 8)$

10) $(3m - 1)(8m + 7)$

11) $(2a - 1)(8a - 5)$

12) $(5n + 6)(5n - 5)$

$$13) (4p - 1)^2$$

$$14) (7x - 6)(5x + 6)$$

$$15) (6n + 3)(6n - 4)$$

$$16) (8n + 1)(6n - 3)$$

$$17) (6k + 5)(5k + 5)$$

$$18) (3x - 4)(4x + 3)$$

$$19) (4a + 2)(6a^2 - a + 2)$$

$$20) (7k - 3)(k^2 - 2k + 7)$$

$$21) (7r^2 - 6r - 6)(2r - 4)$$

$$22) (n^2 + 6n - 4)(2n - 4)$$

$$23) (6n^2 - 6n - 5)(7n^2 + 6n - 5)$$

Multiplying Special Case Polynomials

Find each product.

1) $(x + 5)(x - 5)$

2) $(n - 1)(n + 1)$

3) $(p - 1)^2$

4) $(x - 3)(x + 3)$

5) $(x - 4)^2$

6) $(n + 3)^2$

7) $(x - 5)(x + 5)$

8) $(n - 5)^2$

9) $(2k^2 + 1)^2$

10) $(8a^2 + 4)(8a^2 - 4)$

11) $(2 + 5n^2)^2$

12) $(3x - 7)(3x + 7)$

$$13) (3 + 7v^2)(3 - 7v^2)$$

$$14) (7v^2 - 6)(7v^2 + 6)$$

$$15) (2 + v)^2$$

$$16) (6v + 3)(6v - 3)$$

$$17) (8a^2 - 2)(8a^2 + 2)$$

$$18) (4a + 7)^2$$

$$19) (2n - 7)^2$$

$$20) (-m + 5n)(-m - 5n)$$

$$21) (7u + 4v)(7u - 4v)$$

$$22) (-y - 3x)(-y + 3x)$$

$$23) (-9x^2 - 10y)^2$$

$$24) (4u + 9v)^2$$

$$25) (7u + 6v)(7u - 6v)$$

$$26) (-6x - 7y^2)^2$$

Dividing Polynomials

Divide.

1) $(m^2 - 7m - 11) \div (m - 8)$

2) $(n^2 - n - 29) \div (n - 6)$

3) $(n^2 + 10n + 18) \div (n + 5)$

4) $(k^2 - 7k + 10) \div (k - 1)$

5) $(n^2 - 3n - 21) \div (n - 7)$

6) $(a^2 - 28) \div (a - 5)$

7) $(r^2 + 14r + 38) \div (r + 8)$

8) $(x^2 + 5x + 3) \div (x + 6)$

9) $(2x^2 - 17x - 38) \div (2x + 3)$

10) $(42x^2 - 33) \div (7x + 7)$

$$11) (x^2 - 74) \div (x - 8)$$

$$12) (2p^2 + 7p - 39) \div (2p - 7)$$

$$13) (n^3 + 7n^2 + 14n + 3) \div (n + 2)$$

$$14) (p^3 - 10p^2 + 20p + 26) \div (p - 5)$$

$$15) (v^3 - 2v^2 - 14v - 5) \div (v + 3)$$

$$16) (x^3 - 13x^2 + 40x + 18) \div (x - 7)$$

$$17) (k^3 - 30k - 18 - 4k^2) \div (3 + k)$$

$$18) (-5k^2 + k^3 + 8k + 4) \div (-1 + k)$$

$$19) (x^3 + 5x^2 - 32x - 7) \div (x - 4)$$

$$20) (50k^3 + 10k^2 - 35k - 7) \div (5k - 4)$$

GSE Algebra II
Synthetic Division

Name: _____

Divide using synthetic division.

1. $(x^3 - 7x - 6) \div (x - 2)$

5. $(10x^4 + 5x^3 + 4x^2 - 9) \div (x + 1)$

2. $(4x^2 + 5x - 4) \div (x + 1)$

6. $(x^3 - 14x + 8) \div (x + 4)$

3. $(2x^2 + 7x + 8) \div (x - 2)$

7. $(x^2 - 4x + 3) \div (x - 2)$

4. $(x^2 + 10) \div (x + 4)$

8. $(x^4 - 6x^3 - 40x + 33) \div (x - 7)$

$$9. (2x^4 - 6x^3 + x^2 - 3x - 3) \div (x - 3)$$

$$12. (t^3 - t^2 + t - 1) \div (t - 1)$$

$$10. (y^3 + 6y + 12y + 8) \div (y + 2)$$

$$13. (x^2 + 4x - 14) \div (x + 6)$$

$$11. (x^3 - 8) \div (x - 2)$$

$$14. (x^4 - 81) \div (x - 3)$$

Advanced Algebra
Operations on Polynomials WS

Name: _____

I. Add or subtract the following polynomials. Write your answers in **standard form**.

1. $(2a^2 - 4a + 3) + (6a^2 + 4a - 3)$	2. $(2x^3 + 3x^2 + x + 2) - (x^2 - x + 4)$
3. $(9x - 2) + (2x^4 - 5x + 1)$	4. $(7m^2 - 3m + 8) - (-3m^2 - 6m + 5)$
5. $(x + 3) - (x^2 - 4x + 9)$	6. $(x^2 + 3x - 1) - (2x^2 - x + 3)$
7. $(x^2 + 1) - (x^2 - 1) + (x^2 + 1)$	8. $(2x^2 + 1) + (x^2 - 2x + 1) - (2x^2 + 8)$
9. $(3x + 5) - (x^2 - 1) - (2x^2 + x)$	10. $(2x - 3) - (5 - 4x) - (6x + 1)$

II. Multiply or Divide the following. Write your answers in standard form.

11. $-3x(5x^2 - 4x)$	12. $2x(x^3 + 5x^2 + 2 + 3x)$	13. $x^2(x^4 + 2x - 4)$
14. $(x^2 + 4)(x - 3)$	15. $(c + 6)(c - 6)$	16. $(a + 3)(a + 5)$
17. $(x - 9)^2$	18. $(2x^2 + 5x - 4) \div (x + 3)$	19. $(x^2 - 1) \div (x + 2)$
20. $(x^2 + 7x - 11) \div (2x + 1)$	21. $(15x^2 - 25x) \div 5x$	22. $(4x^2 + 30x + 7) \div (x + 7)$

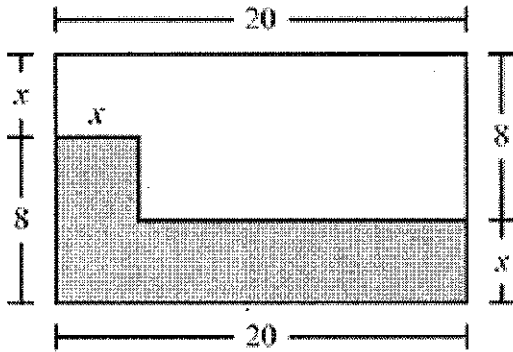
1. Which expression is equivalent to $(2 - x)^3$?

- A. $6 - x^3$
- B. $8 - x^3$
- C. $1 - 3x - 3x^2 - x^3$
- D. $8 - 12x + 6x^2 - x^3$

2. A train travels at a rate of $(4x + 5)$ miles per hour. How many miles can it travel at that rate in $(x - 1)$ hours?

- A. $3x - 4$ miles
- B. $5x - 4$ miles
- C. $4x^2 + x - 5$ miles
- D. $4x^2 - 9x - 5$ miles

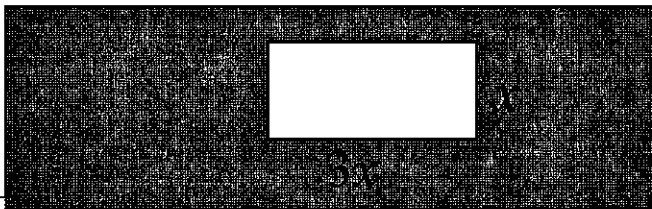
3. This rectangle shows the floor plan of an office.



The shaded part of the plan is an area that is getting new tile. Write an algebraic expression that represents the area of the office that is getting new tile.

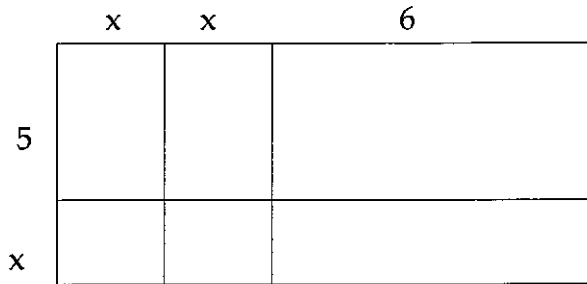
4. Find the area of the shaded region.

$$5x + 1$$



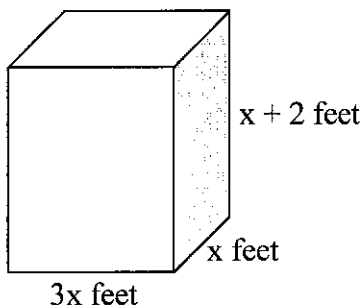
$$2x - 1$$

5. What is the product of the expression represented by the model below?



- A. $3x + 11$
- B. $x^3 + 30$
- C. $2x^2 + 10x + 36$
- D. $2x^2 + 16x + 30$

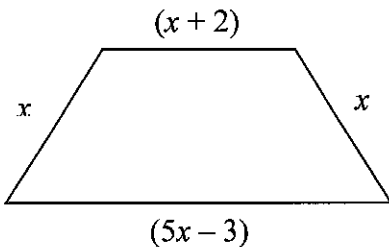
6. This diagram shows the dimensions of a cardboard box.



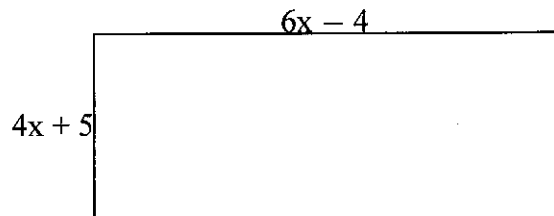
Which expression represents the volume, in cubic feet, of the box?

- A. $3x^3 + 2$ cubic feet
- B. $5x^3 + 2$ cubic feet
- C. $3x^3 + 6x^2$ cubic feet
- D. $5x^3 + 6x^2$ cubic feet

7. Find the perimeter of the trapezoid.



8. Find the perimeter and area of the rectangle.



9. Find the perimeter and area of the figure.

