Adding and Subtracting Polynomials (ALG.POL.03)

Add or subtract. Write each answer in standard form.

1. $(7m - 9m^2) + (5m - 2m^2)$ $-11m^2 + 12m$

2. $(9x^3 + 12x^2 - 2x) + (11x^2 - 10x^3 + 12x)$ $-x^3 + 23x^2 + 10x$

3. $(4p^2 - 2 - p^4 + 8p^3) + (5 - 3p^2 + 9p^3 + 9p^4)$ $8p^4 + 17p^3 + p^2 + 3$

4. $(5n^4 - 6n - 9n^2 - 9n^3) + (8n^2 + 9n^3 + 10n^4 + 9n)$ $15n^4 - n^2 + 3n$

5. $(5x - 8 - 2x^3) + (3 - x^4 + 6x^3) + (2x^3 - 10x^4 - x)$ $-11x^4 + 6x^3 + 4x - 5$

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

7. $(9d + 12 - 2d^3) - (9d^3 - 3 - d)$ $-11d^3 + 10d + 15$

8. $(u^2 + 8 - 6u^4 + 5u) - (-8u^2 + 7u + 7u^4 + 2u^3)$ $-13u^4 - 2u^3 + 9u^2 - 2u + 8$

9. $(f^2 + 8f^4 - 3f + 5) - (-3f + 2f^2 + f - 8f^4)$ $16f^4 - f^2 - f + 5$

10. $(m^4 + 9m^3 + 11m^2 + 7m - 5) - (7 + 8m^2 - 2m^4) - (-5m^3 - 2m - 10)$
    $3m^4 + 14m^3 + 3m^2 + 9m - 2$

11. $(g - g^2) - (g - 2g^3) + (g + 5)$ $2g^3 - g^2 + g + 5$

12. $(11c - 2c^2 + 5) + (3c^2 - 2c + 3) - (6 + c^2 - 7c)$ $16c + 2$

13. $(-d + 2d^2 - 3) - (d^2 + 2 - 3d) + (5 - 2d - d^2)$ 0

14. $(4k^2 - k + 3) + (-k^2 + 3k - 7) - (k^2 + 5) - (2k^2 - k - 8)$ $3k - 1$

15. During the summer months, Juan mows lawns on Monday through Friday to earn money. On a particular week, he mowed $(x^2 + 2x - 3)$ yards on Monday, $(x + 1)$ yards on Tuesday, and $(3x^2 - 5x + 4)$ on Wednesday.

   a. Write an algebraic expression (in terms of x) that represents the number of yards Juan mowed on Monday through Wednesday. $4x^2 - 2x + 2$

   b. If Juan mowed $(4x^2 + x + 4)$ total yards during the week, write an algebraic expression (in terms of x) that represents the number of yards he mowed on Thursday and Friday.
      $3x + 2$

   c. If $x = 2$, then how many yards did Juan mow during the week?   **22 yards mowed**

16. Joe and Sue each have money. Sue has $(5d - 3)$ dollars and Joe has $(45 - 3d)$ dollars.

    a. Write an algebraic expression (in terms of d) that represents the amount of money they have together. **$(2d + 42)$ dollars**

    b. If $d = 8$, how much money do they have together? **$58**

    c. Write an algebraic expression (in terms of d) that represents how much more money Joe has than Sue. **$(48 - 8d)$ dollars**

    d. If $d = 5$, how much more money does Joe have than Sue? **$8**

    e. For what value of d will Sue and Joe have the same amount of money? How much will that be? **$d = 6$; $27**

17. Dmitri is going to build a frame for a picture. If the height of the picture is $(x^2 - 5)$ inches, the width is $(2x^2 - 6x + 2)$ inches, and the materials need to exceed the dimensions by 1.5-inches on each side (see diagram), then write an algebraic expression that gives the length of materials Dmitri needs to purchase to frame the picture. **$(6x^2 - 12x)$ inches**

1.5 inches

1.5 inches

$(2x^2 - 6x + 2)$ inches

$(x^2 - 5)$ inches
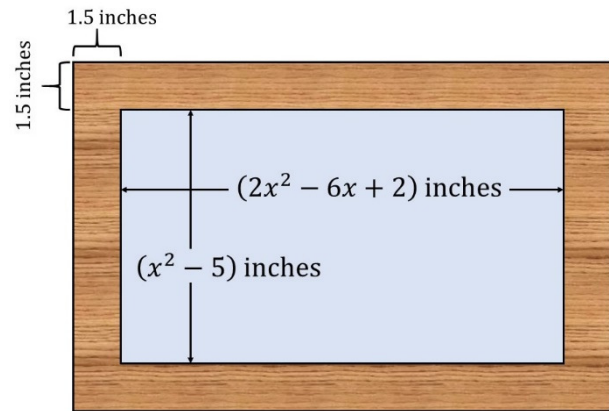
18. Use the composite figure in the diagram to answer each part.

    a. Write an algebraic expression in terms of x for the perimeter of the composite figure.
        $4x^2 + 33x + 4$

    b. If $x = \dfrac{3}{4}$ centimeters, then use the expression you wrote in **part a** to calculate the perimeter of the figure, including units. **31 centimeters**

    c. If $x = 4.5$ centimeters, then use the expression you wrote in **part a** to calculate the perimeter of the figure, including units. **233.5 centimeters**

    d. What is the relationship between the values of x given in **parts b and c**?
        The value for x in part c is 6 times the value for x in part b.

$4x^2 + 9x - 1$

$x + \dfrac{1}{2}$

$4x^2 + 5x - 1$

$10x - 4$

$2 - x$

    e. What is the relationship between the values of the perimeters you found in **parts b and c**?
        The value for the perimeter in part c is $\dfrac{467}{31}$ times the value of the perimeter in part b.

$2x - \dfrac{1}{2}$

$3 + 6x - 8x^2$

$\dfrac{13}{2} - 6x$

$2x - \dfrac{1}{2}$

$4x^2 + 5x - 1$