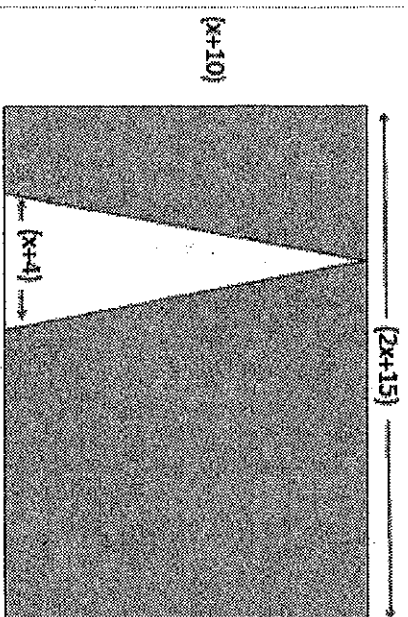Simplify

1. $(9p^2 - 6p^3 + 3 - 11p) + (7p^3 - 3p^2 + 4)$

2. $(8a^2b - 6a) - (2a^2b - 4a + 19)$

3. $(3k - 1)(4k + 9)$

4. $(-r + 7)(2r^2 - r - 9)$

5. $(-x - 2y)^2$

6. $(6x + y)(6x - y)$

7. During the period 1998-2002, the number A (in millions) of books for adults and the number J (in millions) of books for juveniles sold can be modeled by
   A=9.5t³-58t²+66t+500 and
   J=-15t²+64t+360

   Where t is the number of years since 1998.

   1. Write an equation that gives the total number (in millions) of books for adults and for juveniles sold as a function of the number of years since 1998.

   2. Were more books sold in 1998 or 2002?

8. Find the area of the shaded region.

   {x+4}

   {2x+15}

   {x+10}

Simplify each expression. Variables represent nonnegative numbers.

9. $\left(\sqrt[5]{x^{15}y^{25}}\right)^2$

10. $\dfrac{(4x^{-3}y^5)^3}{(16x^2y^{-2})^{-4}}$

11. $\left(\sqrt[3]{\dfrac{343}{125}}\right)^{-3}$

Determine if the following sets are closed under the given operation.

12. Whole numbers; division

13. Rational numbers; multiplication

14. {-4, -2, 0, 2, 4}; addition

15. {x, x+1, x+2, x+3, ...}; addition

Find the degree of each polynomial.

16. $4x^2y^2z^2$

17. $4x^2 - 3x + 2$

18. 15

19. $32b^3cde^7 + b^3d^{14} - b + d$

20. Determine which of the following are polynomials?

   a. 17   b. $-\dfrac{1}{2}$ c. a^{-3} d. $x^{\frac{2}{3}}$ e. $-\dfrac{1}{3}x^5y^7z^3$ f. 0

1. $(6p^2 - 6p^3 + 3 - 11p) + (7p^3 - 3p^2 + 4)$

$p^3 + 6p^2 - 11p + 7$

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

$6a^2b - 6a - 6a^2b + 4a - 19$ distribute

$6a^2b - 6a^2b - 2a - 19$

3. $(3k - 1)(4k + 9)$

$12k^2 + 27k - 4k - 9$

$12k^2 + 23k - 9$

4. $(-r + 7)(2r^2 - r - 9)$

$-2r^3 + r^2 + 9r + 14r^2 - 7r - 63$

$-2r^3 + 15r^2 + 2r - 63$

5. $(-x - 2y)^2$

$x^2 + 4xy + 4y^2$

6. $(6x + y)(6x - y)$

$36x^2 - y^2$

7. a. $9.5t^3 - 5t^2 + 16t^2 + 1500 + (-15t^2 + 6t^4 + 360)$

$9.5t^3 - 73t^2 + 130t + 2160$

b. 1998 is year 0   which means year 0

2008 is year 4

(circled) 1998

8. $\dfrac{\ell w - 3bh}{(x+10)(2x+5)} - \dfrac{5}{3}(x+4)(x+10)$

$\dfrac{x^2 + 15x + 50x + 50}{35x} - \dfrac{5}{3} \cdot \dfrac{x^2 + 14x + 40}{(\frac{1}{3}x^2 + 7x + 20)}$

$\dfrac{3}{2}x^2 + 2\cdot x + 130$ units

9. $\left(\sqrt[5]{x^{15}y^{25}}\right)^2$

$\left(x^{15}y^{25}\right)^{\frac{1}{5}}$

$\boxed{x^4y^{10}}$ $\quad \times 2$

10. $\dfrac{(4x^{-3}y^5)^3}{(16x^2y^{-3})^{-4}}$

$(4x^{-3}y^5)^3 (16x^2y^{-3})^4$

$(4^3x^{-9}y^{15})(16^4x^8y^{-12})$

$\dfrac{y^3 \cdot 16^4 y^4}{x^2 \cdot 16^4 y^7} \cdot \dfrac{4^3(4x)^4}{}$

11. $\left(\sqrt[3]{\dfrac{343}{125}}\right)^{-3}$

$\left(\dfrac{343}{125}\right)^{-1}$

$\boxed{\dfrac{125}{343}}$

12. 100; $\frac{5}{2}$ is not a whole number.

13. yes; $\frac{5}{8} \cdot \frac{5}{8} = \frac{25}{64}$

14. 100; $2+4=6$, which is not in the set

15. 100; $x+x=2x$, which is not in the set

16. $4x^2y^2+2z$

17. $4x^2-3x+2$ ⓖ ②

18. 15 ⓪

19. $3ab^3cde^7+b^3d^{14}-b+d$ ⑰

20. a. yes $-\frac{1}{12}$ yes
   b. $c-3$ no
   c. $x^{4/3}$ no
   d. $-3x^5y^7z^3$ yes
   yes