Name: Date:

Assessment

Polynomial Relationships

Unit Assessment

Circle the letter of the best answer.

1. What is the degree of the polynomial $-4x^7+3x^5+7x+6$?

   a. -4
   b. 13
   c. 14
   d. 7

2. What is the result of $\left(8x^4-12x^3+6\right)-\left(4x^3+2x-9\right)$?

   a. $4x+14x+15$
   b. $8x^4-8x^3+2x-9$
   c. $8x^4-16x^3-2x+15$
   d. $8x^4-16x^3+2x-3$

3. What is the result of $\left(4x^3+5x^2+3\right)\left(4x^2-9\right)$?

   a. $16x^5+20x^4-36x^3-33x^2-27$
   b. $16x^6+5x^4-36x^3-33x^2-27$
   c. $16x^5+20x^4+36x^3+57x^2+27$
   d. $16x^5+20x^4+12x^2$

4. Which expression represents a factored form of x^4-16?

   a. $(x+4)(x-4)$
   b. $(x+8)(x-8)$
   c. $(x^2+8)(x^2-8)$
   d. $(x^2+4)(x^2-4)$

5. Which option shows the solution(s) to the equation $0 = 6x^2 + 6x - 252$?

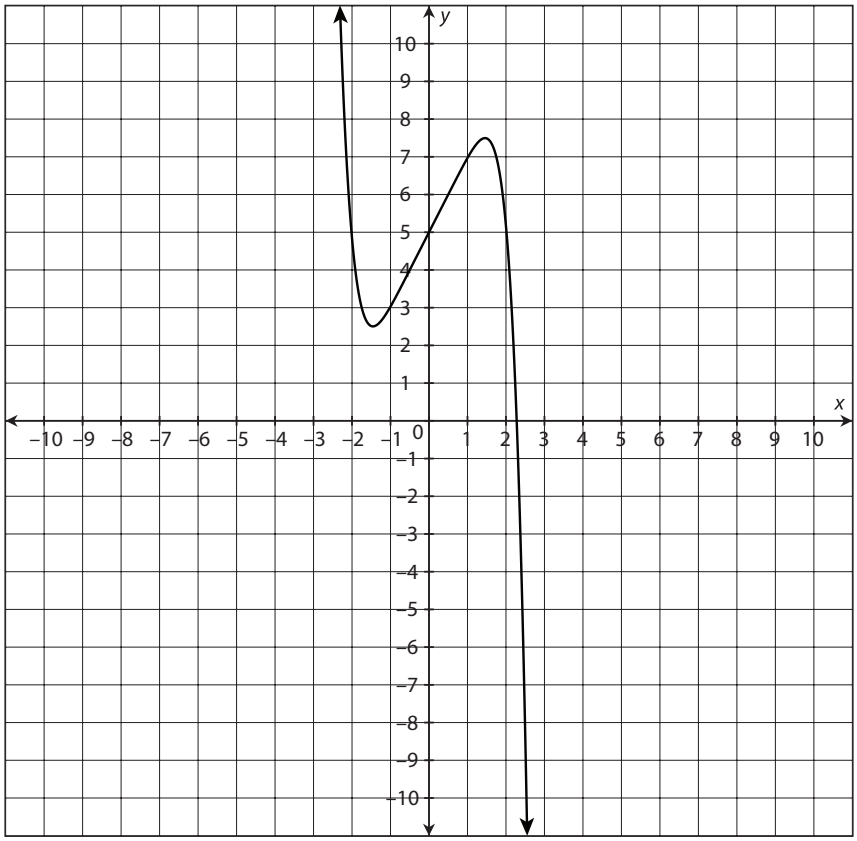
   a. $x = -7$ and $x = 6$
   b. $x = -6$ and $x = 7$
   c. $x = -7$
   d. $x = 6$

6. What is the equation of the parabola with focus (0, 4) and directrix $y = -6$?

   a. $(x + 1)^2 = 20(y - 0)$
   b. $(x - 0)^2 = 20(y + 1)$
   c. $(x + 1)^2 = 0.05(y - 0)$
   d. $(x - 0)^2 = 0.05(y + 1)$

continued

7. What must be true about the degree and the leading coefficient of the graphed polynomial?



a. The polynomial is an odd-degree polynomial and has a positive coefficient.

b. The polynomial is an odd-degree polynomial and has a negative coefficient.

c. The polynomial is an even-degree polynomial and has a positive coefficient.

d. The polynomial is an even-degree polynomial and has a negative coefficient.

8. Which polynomial function has zeros of –3, –1, and 2?

a. $f(x) = x^3 - 7x - 6$

b. $f(x) = x^3 + 4x^2 + x - 6$

c. $f(x) = x^3 - 2x^2 - 5x + 6$

d. $f(x) = x^3 + 2x^2 - 5x - 6$

continued

9. What are all the possible rational roots for the polynomial equation $5x^3 - 3x^2 + 6x - 20 = 0$?

   a. $\pm\frac{1}{4}, \pm\frac{1}{5}, \pm\frac{1}{20}, \pm\frac{5}{4}, \pm 1, \pm 5$

   b. $\pm 1, \pm 4, \pm 5, \pm 20$

   c. $\pm\frac{1}{5}, \pm\frac{2}{5}, \pm\frac{4}{5}, \pm 1, \pm 2, \pm 4, \pm 5, \pm 10, \pm 20$

   d. $\pm 1, \pm 2, \pm 4, \pm 5, \pm 10, \pm 20$

10. Which expression is equilvalent to $(3 + 4i) - (2 - 9i)$?

    a. $5 - 5i$

    b. $5 + 13i$

    c. $1 + 5i$

    d. $1 + 13i$

11. What is the sum of the following series, if a sum exists?

$$\sum_{k=1}^{\infty} 3\left(\frac{5}{4}\right)^{k-1}$$

    a. $\frac{5}{4}$

    b. $\frac{15}{4}$

    c. $\frac{12}{5}$

    d. No sum exists.

12. What is the expansion of the following series?

$$\sum_{k=1}^{4} 0.02(1.2)^{k-1}$$

    a. $0.02 + 0.024 + 0.029 + 0.0346$

    b. $0.02 + 0.024 + 0.0288 + 0.03456$

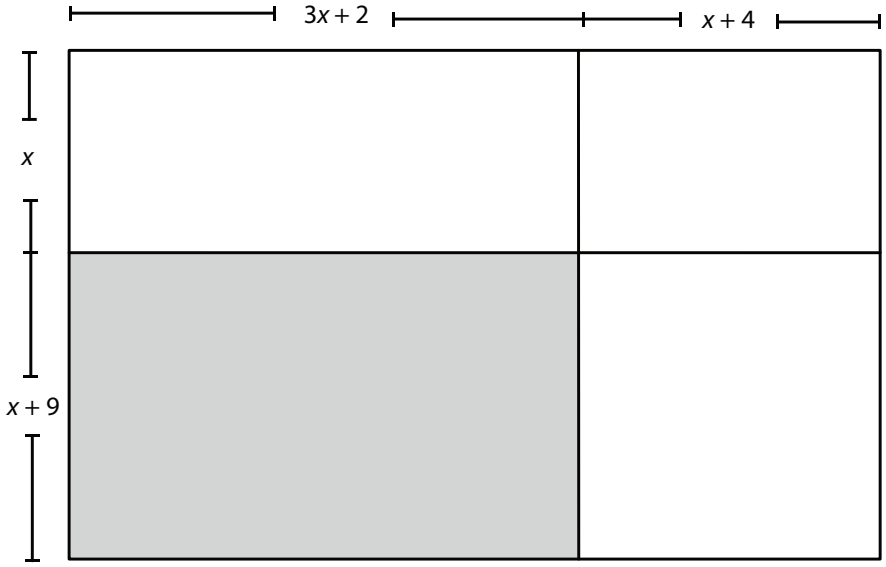
    c. $0.024 + 0.029 + 0.0346 + 0.0415$

    d. $0.024 + 0.0288 + 0.03456 + 0.041472$

continued

Use what you have learned about polynomial relationships to complete all parts of problems 13–15.

13. Lia is creating a banner for her brother's surprise birthday party. The banner will be a large rectangle, divided into sections for text and pictures. The figure below represents Lia's design for the banner. Use the diagram to answer the questions that follow. All units are in inches.



a. What is the perimeter of the shaded portion of the banner?

b. What is the area of the entire rectangular banner?

continued

14. A third-degree polynomial with rational coefficients has the roots 4 and $(3 + i)$.

    a. What are the additional roots?

    b. What is this polynomial?

    c. What is the degree of this polynomial?

    d. Identify the end behavior and maximum number of turning points of the graph of the polynomial.

continued

15. Troy is purchasing a new home. His loan is for $192,000 for 20 years with an annual percentage rate of 3%, compounded monthly. The amount of Troy's monthly mortgage payment can be calculated using the following formula:

$$P = \sum_{k=1}^{n} A\left(\frac{1}{1+i}\right)^{k-i}$$

a. What is the value of i?

b. What is the value of r?

c. For how many months is the loan?

d. What is Troy's approximate monthly mortgage payment, A?