

BECA / Huson / Algebra 2: Polynomials Jan 2023 Regents Name:
23 December 2023

Regents problems: Polynomials

1. Which expression is equivalent to $(x + 2)^2 - 5(x + 2) + 6$?
 - (a) $x(x + 1)$
 - (b) $(x - 3)(x + 2)$
 - (c) $(x - 4)(x + 3)$
 - (d) $(x - 6)(x + 1)$

2. To the *nearest tenth*, the solution to the equation $4300e^{0.07x} - 123 = 5000$ is
 - (a) 1.1
 - (b) 2.5
 - (c) 6.3
 - (d) 68.5

3. The value of an automobile t years after it was purchased is given by the function $V = 38000(0.84)^t$. Which statement is true?
 - (a) The value of the car increases 84% each year.
 - (b) The value of the car decreases 84% each year.
 - (c) The value of the car increases 16% each year.
 - (d) The value of the car decreases 16% each year.

4. Which function represents exponential decay?
 - (a) $p(x) = \left(\frac{1}{4}\right)^x$
 - (b) $q(x) = 1.8^{-x}$
 - (c) $r(x) = 2.3^{2x}$
 - (d) $s(x) = 4^{\frac{x}{2}}$

5. The expression $\frac{x^4 - 5x^2 + 4x + 14}{x + 2}$ is equivalent to
 - (a) $x^3 - 2x^2 - x + 6 - \frac{2}{x + 2}$
 - (b) $x^3 - 5x + 4 - \frac{14}{x + 2}$

(c) $x^3 + 2x^2 - x + 2 + \frac{18}{x+2}$

(d) $x^3 + 2x^2 - 9x + 22 - \frac{30}{x+2}$

6. The sum of the first 20 terms of the series $2 - 6 + 18 - 54 + \dots$ is

(a) -610

(b) -59

(c) $1,743,392,200$

(d) $2,324,522,934$

7. If $f(x) = 2x^4 - x^3 - 16x + 8$, then $f\left(\frac{1}{2}\right)$

(a) equals 0 and $2x + 1$ is a factor of $f(x)$

(b) equals 0 and $2x - 1$ is a factor of $f(x)$

(c) does not equal 0 and $2x + 1$ is not a factor of $f(x)$

(d) does not equal 0 and $2x - 1$ is a factor of $f(x)$

8. If $(6 - ki)^2 = 27 - 36i$, the value of k is

(a) -36

(b) -3

(c) 3

(d) 6

9. What is the solution set of the equation $\frac{x+2}{x} + \frac{x}{3} = \frac{2x^2+6}{3x}$?

(a) $\{-3\}$

(b) $\{-3, 0\}$

(c) $\{3\}$

(d) $\{0, 3\}$

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10. How many real solutions exist for the system of equations below?

$$y = \frac{1}{4}x - 8$$
$$y = \frac{1}{2}x^2 + 2x$$

- (a) 1
- (b) 2
- (c) 3
- (d) 0

11. Which equation represents a polynomial identity?

- (a) $x^3 + y^3 = (x + y)^3$
- (b) $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$
- (c) $x^3 + y^3 = (x + y)(x^2 - xy - y^2)$
- (d) $x^3 + y^3 = (x - y)(x^2 + xy + y^2)$

12. Given $x > 0$, the expression $\frac{1}{x^2-1}$ can be rewritten as

- (a) $\frac{3}{x} - 1$
- (b) $\frac{2}{10x^3}$
- (c) $\frac{10}{x^3}$
- (d) $\frac{3}{x^{10}}$

13. Given $x > 0$, the expression $\frac{1}{\sqrt[3]{x^2-1}}$ can be rewritten as

- (a) $\frac{1}{\sqrt[3]{x-1}}$
- (b) $\frac{1}{\sqrt[3]{x+1}}$
- (c) $\frac{1}{\sqrt{x-1}}$
- (d) $\frac{1}{\sqrt{x+1}}$