BECA / Huson / Algebra 2: Polynomials Jan 2023 Regents Name:
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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. The expression $\dfrac{x^4 - 5x^2 + 4x + 14}{x+2}$ is equivalent to
   (a) $x^3 - 2x^2 - x + 6 - \dfrac{2}{x+2}$
   (b) $x^3 - 5x + 4 - \dfrac{14}{x+2}$
   (c) $x^3 + 2x^2 - x + 2 + \dfrac{18}{x+2}$
   (d) $x^3 + 2x^2 - 9x + 22 - \dfrac{30}{x+2}$

3. 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 $f(x)$

4. If $(6-ki)^2 = 27 - 36i$, the value of k is
   (a) -36
   (b) -3
   (c) 3
   (d) 6

5. What is the solution set of the equation $\dfrac{x+2}{x} + \dfrac{x}{3} = \dfrac{2x^2+6}{3x}$?
   (a) $\{-3\}$
   (b) $\{-3, 0\}$

(c) $\{3\}$

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

6. 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

7. 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) $x^3 + y^3 = (x - y)(x^2 + xy + y^2)$