

ANSWER KEY

COMMON CORE ALGEBRA II HOMEWORK #1-9 POLYNOMIAL LONG DIVISION

1. Write each of the following rational expressions in the form $a + \frac{r}{x-b}$. Try the shortcut.

$$\begin{aligned} \text{(a)} \quad \frac{x+6}{x+2} &= \frac{x+2+4}{x+2} \\ &= \frac{x+2}{x+2} + \frac{4}{x+2} \\ &= 1 + \frac{4}{x+2} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad \frac{2x+5}{x+2} &= \frac{2x+4+1}{x+2} = \frac{2x+4}{x+2} + \frac{1}{x+2} \\ &= \frac{2(x+2)}{x+2} + \frac{1}{x+2} = 2 + \frac{1}{x+2} \end{aligned}$$

2. If the expression $\frac{10x+11}{2x+1}$ was placed in the form $5 + \frac{a}{2x+1}$, then which of the following would be the value of a ?

Ⓐ 6

Ⓑ 3

Ⓒ -7

Ⓓ -5

$$\begin{array}{r} 5 \\ 2x+1 \overline{) 10x+11} \\ \underline{-(10x+5)} \\ 6 \end{array}$$

$$5 + \frac{6}{2x+1}$$

3. Write the following in $q(x) + \frac{r}{x-a}$. (The polynomial $q(x)$ will now be a quadratic.)

$$\frac{2x^3 - 11x^2 + 22x - 25}{x-3}$$

$$\begin{array}{r} 2x^2 - 5x + 7 \\ x-3 \overline{) 2x^3 - 11x^2 + 22x - 25} \\ \underline{-(2x^3 - 6x^2)} \downarrow \\ -5x^2 + 22x \downarrow \\ \underline{-(-5x^2 + 15x)} \downarrow \\ 7x - 25 \downarrow \\ \underline{-(7x - 21)} \\ -4 \end{array}$$

$$2x^2 - 5x + 7 + \frac{-4}{x-3}$$

missing term!

4. Divide: $(5x^4 - 2x^3 - 7x^2 - 39) \div (x^2 + 2x - 4)$

Identify $q(x)$ and $r(x)$.

Write your answer in the form $q(x) + \frac{r(x)}{b(x)}$

$$q(x) = 5x^2 - 12x + 37$$

$$r(x) = -122x + 109$$

$$\begin{array}{r}
 \overline{5x^2-12x+37} \\
 x^2+2x-4 \overline{) 5x^4-2x^3-7x^2+0x-39} \\
 \underline{-(5x^4+10x^3-20x^2)} \\
 -12x^3+13x^2+0x \\
 \underline{-(-12x^3-24x^2+48x)} \\
 37x^2-48x-39 \\
 \underline{-(37x^2+74x-148)} \\
 -122x+109
 \end{array}$$

$$5x^2-12x+37 + \frac{-122x+109}{x^2+2x-4}$$

5. The completely factored form of $2x^4 + 6x^3 - 32x^2 - 96x$ is

- (1) $(x-4)(x+4)(x+3)$ $2x(x^3+3x^2-16x-48)$
- (2) $2x(x^2-16)(x+3)$ $2x(x^2(x+3)-16(x+3))$
- Ⓒ $2x(x-4)(x+4)(x+3)$ $2x(x+3)(x^2-16)$
- (4) $2x(x-4)(x+4)(x-3)$ $2x(x+3)(x+4)(x-4)$

6. When $\frac{3}{2}x^2 - \frac{1}{4}x - 4$ is subtracted from $\frac{5}{2}x^2 - \frac{3}{4}x + 1$, the difference is

- (1) $-x^2 + \frac{1}{2}x - 5$
- (3) $-x^2 - x - 3$
- Ⓒ $x^2 - \frac{1}{2}x + 5$
- (4) $x^2 - x - 3$

$$\begin{aligned}
 &\frac{5}{2}x^2 - \frac{3}{4}x + 1 - \left(\frac{3}{2}x^2 - \frac{1}{4}x - 4\right) \\
 &\frac{5}{2}x^2 - \frac{3}{4}x + 1 - \frac{3}{2}x^2 + \frac{1}{4}x + 4 \\
 &\frac{2}{2}x^2 - \frac{2}{4}x + 5
 \end{aligned}$$

7. The expression $5x^3 - 6x^2y - 45xy^2 + 54y^3$ is equivalent to

- (1) $x^2(5x-6y) + 9y^2(5x+6y)$
- (2) $x^2(5x-6y) + 9y^2(5x-6y)$
- (3) $x^2(5x-6y) - 9y^2(5x+6y)$
- Ⓒ $x^2(5x-6y) - 9y^2(5x-6y)$

$$\begin{aligned}
 &x^2 - \frac{1}{2}x + 5 \\
 &x^2(5x-6y) - 9y^2(5x-6y) \\
 &\underline{(5x-6y)(x^2-9y^2)} \text{ * if factored completely!} \\
 &(5x-6y)(x+3y)(x-3y)
 \end{aligned}$$