

Math 12 – Workshop #10

1. (a) Divide the following

i. $23 \overline{)2789}$

ii. $2x + 3 \overline{)2x^3 + 7x^2 + 8x + 9}$

(b) What are the similarities and differences between part i and ii?

(c) Based on your answers to part (a) try and guess the result of the polynomial long division by using the standard division in part i below.

i. $23 \overline{)4479}$

ii. $2x + 3 \overline{)4x^3 + 4x^2 + 7x + 9}$

(d) Compute the polynomial long division in ii. Does it match your guess?

2. Divide the following, check your answers

(a) $\frac{6x^2 - x - 7}{x + 1}$

(b) $\frac{3x^4 + 2x^3 + x^2 + 2x + 9}{x + 3}$

(c) $\frac{4x^3 - 12x^2 + 17x + 12}{2x - 3}$

3. Let $f(x) = x - 2$ and $g(x) = 2x^2 - 1$. Multiply out, simplify and write each polynomial with the powers of x in descending order

(a) $g(x) + f(x)$

(b) $g(x) \cdot f(x)$

(c) $(f(x))^2 \cdot 3 - 2 \cdot g(x)$

4. Multiply out the following products and simplify as much as possible

(a) $(x - 2)(x + 12)$

(c) $(2x + 4)(4 - 2x)$

(b) $(x + 7)(x - 7)$

(d) $(x + a)(x + b)$

5. A student wants to find two integers which multiply together to be 36 but add together to be as big as possible. Which integers should they choose?

6. The number 12 can be factored into the product of two integers in the following 6 ways

• 1, 12

• -1, -12

• 2, 6

• -2, -6

• 3, 4

• -3, -4

(a) Which of the above pairs makes the following expression true

$$(x + \underline{\quad})(x + \underline{\quad}) = x^2 - 8x + 12$$

(b) Find all the pairs of integers whose product is 45, using these pairs fill in the blanks with integers which make the following equation true

$$(x + \underline{\quad})(x + \underline{\quad}) = x^2 + 14x + 45$$

(c) Do the same for -32 and the equation $(x + \underline{\quad})(x + \underline{\quad}) = x^2 - 14x - 32$

(d) Do the same for -20 and the equation $(2x + \underline{\quad})(x + \underline{\quad}) = 2x^2 + 6x - 20$

(e) Do the same for $3^2 \cdot b^2$ and the equation $(x + \underline{\quad})(x + \underline{\quad}) = x^2 + 6bx + 3^2b^2$

7. Multiply out the following products and simplify as much as possible

(a) $(x^2 - 2x + 1)(x + 1)$

(b) $(x - 1)(x^2 + x + 1)$

(c) $(a + b)^2 + (a - b)^2$