

Name: _____

This assignment is worth 100 points. You will be awarded 40 points for attempting the entire assignment (that is answer all problems). I will then select 20 problems at random to grade, each worth 3 points each. The space left between each question is indicative of how much work you should show. If there are any problems you find particularly difficult, circle them in **red**. If there are any particular questions you would like feedback on, circle them in **green**. These are examples of questions that might appear on an exam/quiz. If you use a calculator to help, make sure you can also do them without it.

1. Perform the operation and combine like terms for the following polynomials.

(a) $(10x^5 + 2x^3 - 1) + (8x^4 - x^3 + 16x^2)$

Answer: _____

(b) $(7t^2 - 13t + 4) + (-6t^2 + 13t - 4)$

Answer: _____

(c) $(z^3 + 2z^2 - 15z + 7) - (-12z^2 + 9z - 3)$

Answer: _____

(d) $(150x^3 + 8x - 14) - (100x^4 - 19x^2 - 7x)$

Answer: _____

(e) $w^5 - (w^4 + w^3 + w^2 + w + 1)$

Answer: _____

(f) $6y^2(3 - y^2 + 2y^3)$

Answer: _____

(g) $x^9(x^2 + 7x - 4)$

Answer: _____

(h) $(7x - 5)(4 - 10x)$

Answer: _____

(i) $(4 + 9t^2)(t^3 - 3t)$

Answer: _____

(j) $(1 + 8y)(y^3 - 4y^2 + 7)$

Answer: _____

(k) $7(x - 9)(2x + 3)$

Answer: _____

(l) $z^2(1 - z^2)(1 + z^2)$

Answer: _____

(m) $(2 - x + 4x^2)(6x + 7)$

Answer: _____

(n) $(10w^2 - 4w + 9)(w^3 + 5w^2 + 2)$

Answer: _____

(o) $10(x + 3x^2)^2$

Answer: _____

(p) $(1 - 5y)(4 + y)^2$

Answer: _____

(q) $(x^2 - 7x + 10) - (3 - x)(3 + x)$

Answer: _____

(r) $(x + 9x^3)^2 - (4x^2 - 1)^2$

Answer: _____

2. Think about the following statements and carefully explain your answer.

- (a) If we multiply a polynomial with degree m and a polynomial of degree n , what is the degree of the resulting polynomial?

(b) If we add a polynomial of degree m to a polynomial of degree $n < m$, what is the degree of the resulting polynomial?

(c) If we add 2 polynomials of the same degree, say n , can the resulting polynomial have a degree different to n ? Give an example if this is possible.

3. Factor out the greatest common factor from each polynomial.

(a) $x^3 - 6x^8 + 10x^{10}$

Answer: _____

(b) $25u^6 - 15u^5 + 30u^8$

Answer: _____

(c) $2y^6z - y^4z^{10} + 3y^2z^2$

Answer: _____

(d) $7a^{10}b^7 + 14a^8b^9 - 35a^6b^{12}$

Answer: _____

(e) $3(9 + 7x) - (2 - x)(9 + 7x)$

Answer: _____

(f) $z^2(4z - z^3) + 7(z^3 - 4z)$

Answer: _____

(g) $8y(2y + 7)^4 - 2y^3(2y + 7)^9$

Answer: _____

(h) $w^2(1 + w^2)(8w - 1)^{10} + 9w(1 + w^2)^4(8w - 1)^7$

Answer: _____

4. Factor each of the following by grouping.

(a) $18x - 2x^3 + 9 - x^2$

Answer: _____

(b) $6w^4 + 3w^3 - 14w^2 - 7w$

Answer: _____

(c) $y^4 + y^3 + 9y^3 + 9y^2$

Answer: _____

(d) $21x - 56x^4 - 12x^3 + 32x^6$

Answer: _____

(e) $6t^3 + 3t^4 - 2t^5 - t^6$

Answer: _____

5. Factor each of the following.

(a) $x^2 - 10x + 9$

Answer: _____

(b) $t^2 + 11t + 24$

Answer: _____

(c) $z^2 - 9z - 10$

Answer: _____

(d) $x^2 - 3x - 28$

Answer: _____

(e) $x^2 + 10x - 24$

Answer: _____

(f) $w^2 - 8w + 16$

Answer: _____

(g) $z^2 + 6z + 9$

Answer: _____

(h) $x^2 - 144$

Answer: _____

(i) $36 - x^2$

Answer: _____

(j) $4z^2 - 23z - 6$

Answer: _____

(k) $2y^2 - 9y + 10$

Answer: _____

(l) $12x^2 + 31x + 7$

Answer: _____

(m) $6z^2 - 35z + 36$

Answer: _____

(n) $8t^2 + 29t - 12$

Answer: _____

(o) $21 - w - 2w^2$

Answer: _____

(p) $36v^2 - 49$

Answer: _____

(q) $100x^2 + 20x + 1$

Answer: _____

(r) $25z^2 - 40z + 16$

Answer: _____

(s) $9y^2 - 121$

Answer: _____

6. Factor each of the following

(a) $4x^3 - 20x^2 - 144x$

Answer: _____

(b) $t^4 + 15t^3 + 14t^2$

Answer: _____

(c) $6u^8 - 3u^6 - 3u^4$

Answer: _____

(d) $t^8 + 5t^4 - 24$

Answer: _____

(e) $2z^4 - 5z^2 - 12$

Answer: _____

(f) $4x^6 + x^3 - 5$

Answer: _____