Algebra 2 Name_____

5.2 Special Binomials

Date_____ Period____

Factor each completely. You can show all work on this WS. Circle or Box your final answer.

1) $x^3 + 8$

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

2) $216x^3 + 1$

$(6x + 1)(36x^2 - 6x + 1)$

3) $8u^3 - 125$

$(2u - 5)(4u^2 + 10u + 25)$

4) $125 - 27u^3$

$(5 - 3u)(25 + 15u + 9u^2)$

5) $192x^3 + 375$

$3(4x + 5)(16x^2 - 20x + 25)$

6) $375a^3 + 192$

$3(5a + 4)(25a^2 - 20a + 16)$

7) $375 - 3x^3$

$3(5 - x)(25 + 5x + x^2)$

8) $54x^3 - 128$

$2(3x - 4)(9x^2 + 12x + 16)$

9) $9v^2 - 1$

$(3v + 1)(3v - 1)$

10) $n^2 - 4$

$(n + 2)(n - 2)$

11) $50x^2 - 8$

$2(5x + 2)(5x - 2)$

12) $12v^2 - 3$

$3(2v + 1)(2v - 1)$

Find all roots.

13) $x^3 - 27 = 0$

$$\left\{3, \frac{-3 + 3i\sqrt{3}}{2}, \frac{-3 - 3i\sqrt{3}}{2}\right\}$$

14) $x^3 - 8 = 0$

$$\left\{2, -1 + i\sqrt{3}, -1 - i\sqrt{3}\right\}$$

15) $27x^3 + 64 = 0$

$$\left\{-\frac{4}{3}, \frac{2 + 2i\sqrt{3}}{3}, \frac{2 - 2i\sqrt{3}}{3}\right\}$$

16) $x^3 - 1 = 0$

$$\left\{1, \frac{-1 + i\sqrt{3}}{2}, \frac{-1 - i\sqrt{3}}{2}\right\}$$

17) $27x^3 + 8 = 0$

$$\left\{-\frac{2}{3}, \frac{1 + i\sqrt{3}}{3}, \frac{1 - i\sqrt{3}}{3}\right\}$$

18) $27x^3 - 8 = 0$

$$\left\{\frac{2}{3}, \frac{-1 + i\sqrt{3}}{3}, \frac{-1 - i\sqrt{3}}{3}\right\}$$

Algebra 2

Name_____

5.2 Grouping

Date_____ Period____

Factor each completely. You can show all work on this WS. Circle or Box your final answer.

1) $20n^3 + 35n^2 + 16n + 28$

$(5n^2 + 4)(4n + 7)$

2) $32x^3 + 28x^2 + 24x + 21$

$(4x^2 + 3)(8x + 7)$

3) $240v^3 + 90v^2 - 288v - 108$

$6(5v^2 - 6)(8v + 3)$

4) $7x^3 - 35x^2 - 21x + 105$

$7(x^2 - 3)(x - 5)$

5) $24xy - 18x + 4ny - 3n$

$(6x + n)(4y - 3)$

6) $5a^2z + 7a^2c + 20bz + 28bc$

$(a^2 + 4b)(5z + 7c)$

7) $105ab + 175a + 168b^3 + 280b^2$

$7(5a + 8b^2)(3b + 5)$

8) $24ab - 18a^2 - 12b + 9a$

$3(2a - 1)(4b - 3a)$

9) $21a^2c + 35xf + 49a^2f + 15xc$

$(7a^2 + 5x)(3c + 7f)$

10) $4aw^2 + 30bf^2 + 5af^2 + 24bw^2$

$(a + 6b)(4w^2 + 5f^2)$

11) $14xy - 20y - 4x + 70y^2$

$2(x + 5y)(7y - 2)$

12) $105xy - 40x - 30x^2 + 140y$

$5(3x + 4)(7y - 2x)$

Find all roots.

13) $x^4 - 5x^3 + 5x^2 - 25x = 0$

$\{0, 5, i\sqrt{5}, -i\sqrt{5}\}$

14) $x^3 - 3x^2 + 2x - 6 = 0$

$\{3, i\sqrt{2}, -i\sqrt{2}\}$

15) $9x^6 - 36x^4 - x^2 + 4 = 0$

$\left\{2, -2, \frac{\sqrt{3}}{3}, -\frac{\sqrt{3}}{3}, \frac{i\sqrt{3}}{3}, -\frac{i\sqrt{3}}{3}\right\}$

16) $4x^4 - 5x^3 - 12x^2 + 15x = 0$

$\left\{0, \frac{5}{4}, \sqrt{3}, -\sqrt{3}\right\}$

17) $16x^3 - 4x^2 + 4x - 1 = 0$

$\left\{\frac{1}{4}, \frac{i}{2}, -\frac{i}{2}\right\}$

18) $15x^3 + 10x^2 - 6x - 4 = 0$

$\left\{-\frac{2}{3}, \frac{\sqrt{10}}{5}, -\frac{\sqrt{10}}{5}\right\}$

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5.2 Quadratic Form

Date_____ Period____

Factor each completely. You can show all work on this WS. Circle or Box your final answer.

1) $u^4 - u^2 - 6$

$(u^2 - 3)(u^2 + 2)$

2) $a^4 + 16a^2 + 60$

$(a^2 + 10)(a^2 + 6)$

3) $4a^4 - 16a^2 - 20$

$4(a^2 + 1)(a^2 - 5)$

4) $m^4 + 4m^2 - 21$

$(m^2 + 7)(m^2 - 3)$

5) $4x^4 - 22x^2 - 80$

$2(2x^2 + 5)(x^2 - 8)$

6) $5x^4 + 21x^2 + 18$

$(5x^2 + 6)(x^2 + 3)$

7) $5x^4 + 21x^2 - 54$

$(5x^2 - 9)(x^2 + 6)$

8) $5x^4 - 3x^2 - 14$

$(5x^2 + 7)(x^2 - 2)$

9) $6m^4 - 18m^2 - 420$

$6(m^2 - 10)(m^2 + 7)$

10) $3x^4 - 15x^2 - 72$

$3(x^2 - 8)(x^2 + 3)$

11) $8x^4 + 68x^2 - 120$

$4(2x^2 - 3)(x^2 + 10)$

12) $9x^4 - 6x^2 - 120$

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

Find all roots.

13) $x^8 - 32x^4 + 256 = 0$

$\{2 \text{ mult. } 2, -2 \text{ mult. } 2, 2i \text{ mult. } 2, -2i \text{ mult. } 2\}$

14) $x^8 - 25x^4 + 144 = 0$

$\{\sqrt{3}, -\sqrt{3}, i\sqrt{3}, -i\sqrt{3}, 2, -2, 2i, -2i\}$

15) $4x^8 - 73x^4 + 144 = 0$

$\left\{2, -2, 2i, -2i, \frac{\sqrt{6}}{2}, -\frac{\sqrt{6}}{2}, \frac{i\sqrt{6}}{2}, -\frac{i\sqrt{6}}{2}\right\}$

16) $16x^8 - 89x^4 + 100 = 0$

$\left\{\sqrt{2}, -\sqrt{2}, i\sqrt{2}, -i\sqrt{2}, \frac{\sqrt{5}}{2}, -\frac{\sqrt{5}}{2}, \frac{i\sqrt{5}}{2}, -\frac{i\sqrt{5}}{2}\right\}$

17) $256x^8 - 160x^4 + 9 = 0$

$\left\{\frac{\sqrt{3}}{2}, -\frac{\sqrt{3}}{2}, \frac{i\sqrt{3}}{2}, -\frac{i\sqrt{3}}{2}, \frac{1}{2}, -\frac{1}{2}, \frac{i}{2}, -\frac{i}{2}\right\}$

18) $15x^4 + 17x^2 + 4 = 0$

$\left\{\frac{2i\sqrt{5}}{5}, -\frac{2i\sqrt{5}}{5}, \frac{i\sqrt{3}}{3}, -\frac{i\sqrt{3}}{3}\right\}$