

Factoring and Finding Zeroes of Polynomials

Date _____ Period _____

CLASS EXAMPLE: Factor each completely.

1) $21x^3 + 6x^2 - 15x$

Factor each completely.

2) $2x^2 - 2x$

3) $30m^2 + 12m$

4) $9n^2 - 65n - 56$

5) $18k^3 + 54k^2 + 28k$

6) $25x^2 - 135x + 140$

7) $14b^2 + 80b - 24$

CLASS EXAMPLE: Factor each completely.

8) $336v^3 - 126v^2 + 48v - 18$

Factor each completely.

9) $4a^3 + 7a^2 + 28a + 49$

10) $24x^3 + 6x^2 + 4x + 1$

11) $8r^3 - 4r^2 - 2r + 1$

12) $4m^3 - 28m^2 + m - 7$

13) $105k^3 - 75k^2 - 126k + 90$

14) $v^3 + 8v^2 - 5v - 40$

CLASS EXAMPLE: Factor each.

15) $y = x^8 - 5x^4 + 4$

Factor each.

16) $y = x^8 - 20x^4 + 64$

17) $y = x^8 - 26x^4 + 25$

18) $y = x^8 - 34x^4 + 225$

19) $y = x^6 - 7x^4 + 10x^2$

CLASS EXAMPLE: Find all zeros.

20) $f(x) = 5x^4 + 31x^2 - 28$

Find all zeros.

21) $f(x) = 5x^3 - 12x^2 - 9x$

22) $f(x) = 5x^3 + 21x^2 - 20x$

23) $f(x) = 5x^3 + 25x^2 - 3x - 15$

24) $f(x) = 3x^3 + x^2 - 9x - 3$

25) $f(x) = 5x^4 - 23x^2 + 24$

26) $f(x) = 2x^4 - 7x^2 - 9$

27) $f(x) = 4x^6 + 16x^4 - 9x^2 - 36$

28) $f(x) = 2x^6 - x^4 - 2x^2 + 1$

Factoring and Finding Zeroes of Polynomials

Date _____ Period _____

CLASS EXAMPLE: Factor each completely.

1) $21x^3 + 6x^2 - 15x$

$3x(7x - 5)(x + 1)$

Factor each completely.

2) $2x^2 - 2x$

$2x(x - 1)$

3) $30m^2 + 12m$

$6m(5m + 2)$

4) $9n^2 - 65n - 56$

$(n - 8)(9n + 7)$

5) $18k^3 + 54k^2 + 28k$

$2k(3k + 7)(3k + 2)$

6) $25x^2 - 135x + 140$

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

7) $14b^2 + 80b - 24$

$2(7b - 2)(b + 6)$

CLASS EXAMPLE: Factor each completely.

8) $336v^3 - 126v^2 + 48v - 18$

$6(7v^2 + 1)(8v - 3)$

Factor each completely.

9) $4a^3 + 7a^2 + 28a + 49$

$(a^2 + 7)(4a + 7)$

10) $24x^3 + 6x^2 + 4x + 1$

$(6x^2 + 1)(4x + 1)$

11) $8r^3 - 4r^2 - 2r + 1$

$(2r - 1)^2(2r + 1)$

12) $4m^3 - 28m^2 + m - 7$

$(4m^2 + 1)(m - 7)$

13) $105k^3 - 75k^2 - 126k + 90$

$3(5k^2 - 6)(7k - 5)$

14) $v^3 + 8v^2 - 5v - 40$

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

CLASS EXAMPLE: Factor each.

15) $y = x^8 - 5x^4 + 4$

$$y = (x - 1)(x + 1)(x^2 + 1)(x^2 - 2)(x^2 + 2)$$

Factor each.

16) $y = x^8 - 20x^4 + 64$

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

18) $y = x^8 - 34x^4 + 225$

$$y = (x^2 - 5)(x^2 + 5)(x^2 - 3)(x^2 + 3)$$

17) $y = x^8 - 26x^4 + 25$

$$y = (x - 1)(x + 1)(x^2 + 1)(x^2 - 5)(x^2 + 5)$$

19) $y = x^6 - 7x^4 + 10x^2$

$$y = x^2(x^2 - 2)(x^2 - 5)$$

CLASS EXAMPLE: Find all zeros.

20) $f(x) = 5x^4 + 31x^2 - 28$

$$\left\{ \frac{2\sqrt{5}}{5}, -\frac{2\sqrt{5}}{5}, i\sqrt{7}, -i\sqrt{7} \right\}$$

Find all zeros.

21) $f(x) = 5x^3 - 12x^2 - 9x$

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

22) $f(x) = 5x^3 + 21x^2 - 20x$

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

23) $f(x) = 5x^3 + 25x^2 - 3x - 15$

$$\left\{ -5, \frac{\sqrt{15}}{5}, -\frac{\sqrt{15}}{5} \right\}$$

24) $f(x) = 3x^3 + x^2 - 9x - 3$

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

25) $f(x) = 5x^4 - 23x^2 + 24$

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

26) $f(x) = 2x^4 - 7x^2 - 9$

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

27) $f(x) = 4x^6 + 16x^4 - 9x^2 - 36$

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

28) $f(x) = 2x^6 - x^4 - 2x^2 + 1$

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