

Unit 3: Solving Polynomials Review

Find the discriminant of each quadratic equation then state the number and type of solutions.

1) $4x^2 - 3x - 7 = 3$

169

Two rational

3) $-2a^2 - 2a - 7 = -7$

4

Two rational

5) $6a^2 + 7a + 4 = 7$

121

Two rational

Solve each equation.

7) $x^2 + 2x = 3$

 $x = 1, -3$

9) $x^2 - 20 = -x$

 $x = 4, -5$

11) $5n^2 + 6 = 11$

 $x = 1, -1$

2) $3b^2 + 12 = 4$

-96

Two imaginary

4) $2v^2 + 4v + 8 = 6$

0

One repeated

6) $-b^2 + 6b - 12 = -3$

0

One repeated

8) $p^2 - 11p = -30$

 $x = 6, 5$

10) $9p^2 + 10 = 271$

 $x = \sqrt{29}, -\sqrt{29}$

12) $3n^2 + 8 = 143$

 $x = 3\sqrt{5}, -3\sqrt{5}$

$$13) 4n^2 + 3 = 0$$

$$x = \frac{i\sqrt{3}}{2}, \frac{-i\sqrt{3}}{2}$$

$$14) 9r^2 + 12r = 23$$

$$x = \frac{-2 + 3\sqrt{3}}{3}, \frac{-2 - 3\sqrt{3}}{3}$$

$$15) 2b^2 + 8b = -10$$

$$x = -2 + i, -2 - i$$

State the possible rational zeros for each function.

$$16) f(x) = 6x^3 + 10x^2 + 29x - 11$$

$$\pm 1, \pm 11, \pm \frac{1}{2}, \pm \frac{11}{2}, \pm \frac{1}{3},$$

$$\pm \frac{11}{3}, \pm \frac{1}{6}, \pm \frac{11}{6}$$

$$17) f(x) = 4x^3 - 8x^2 + 5x - 1$$

$$\pm 1, \pm \frac{1}{2}, \pm \frac{1}{4}$$

State the least degree of a polynomial with integral coefficients that has the given zeros.

$$18) 2i, -i$$

Degree 4

$$19) -1 + 3i, -2 + \sqrt{5}, -2 - \sqrt{5}$$

Degree 4

$$20) \frac{5}{2}, 0, 3$$

Degree 3

$$21) -1, -\frac{5}{3}, i$$

Degree 4

Write a polynomial function of least degree with integral coefficients that has the given zeros.

$$22) 4, 1, -\frac{1}{4}$$

$$f(x) = 4x^3 - 19x^2 + 11x + 4$$

$$23) -2i, -2 - i$$

$$f(x) = x^4 + 4x^3 + 9x^2 + 16x + 20$$

$$24) -\frac{2}{5}, 3 + 2\sqrt{2}$$

$$f(x) = 5x^3 - 28x^2 - 7x + 2$$

$$25) 0, 1 + 2\sqrt{2}, 1 - 2\sqrt{2}$$

$$f(x) = x^3 - 2x^2 - 7x$$

$$26) -i, \sqrt{6}$$

$$f(x) = x^4 - 5x^2 - 6$$

$$27) -1, -3 - 3i, -3 + 3i$$

$$f(x) = x^3 + 7x^2 + 24x + 18$$

Find all zeros.

$$28) f(x) = 2x^3 - 5x^2 + 8x - 20$$

$$x = \frac{5}{2}, 2i, -2i$$

$$29) f(x) = 4x^3 - 9x^2 + 6x - 1$$

$$x = \frac{1}{4}, 1 \text{ mult. } 2$$

$$30) f(x) = 2x^4 - 13x^2 + 20$$

$$x = 2, -2, \frac{\sqrt{10}}{2}, -\frac{\sqrt{10}}{2}$$

$$31) f(x) = 3x^3 - 11x^2 + 11x - 2$$

$$x = 2, \frac{5 + \sqrt{13}}{6}, \frac{5 - \sqrt{13}}{6}$$

$$32) f(x) = 5x^3 + x^2 - 5x - 1$$

$$x = -\frac{1}{5}, 1, -1$$

$$33) f(x) = 2x^4 + 3x^3 - 31x^2 + 20x$$

$$x = 0, -5, \frac{7+\sqrt{17}}{4}, \frac{7-\sqrt{17}}{4}$$