Lesson 4: Solve Polynomials by Factoring

Question #1

Reference Q.11279
Solve the following equation by factoring:
$x^2 + 7x - 30 = 0$

Question #2

Reference Q.11280
Solve the following equation by factoring:
$x^2 - 5x - 36 = 0$

Question #3

Reference Q.11281
Solve the following equation by factoring:
$3x^2 - 16x + 16 = 0$

Question #4

Reference Q.11282
Solve the following equation by factoring:
$6x^2 + 11x - 10 = 0$

Question #5

Reference Q.11283
Solve the following equation using the quadratic formula:
$6x^2 + 7x - 9 = 0$
Reminder:
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Question #6

Reference Q.11284
Solve the following equation using the quadratic formula:
$4x^2 - 7 = 3x + 9$
Reminder:
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Question #7

Reference Q.11285

a. What are the possible factors of the polynomial in the following equation?$x^3 - 10x^2 - 23x - 12 = 0$

b. What are the possible solutions that we might find by factoring?

c. Can there ever be other solutions other than these?

Question #8

Reference Q.11286

a. What are the possible factors of the polynomial in the following equation?$x^3 - 20x^2 + 127x - 252 = 0$

b. What are the possible solutions that we might find by factoring?

c. Can there ever be other solutions other than these?

Question #9

Reference Q.11288

a. What are the possible factors of the polynomial in the following equation?$3x^3 - 12x^2 - 21x + 30 = 0$

b. What are the possible solutions that we might find by factoring?

c. Can there ever be other solutions other than these?

Question #10

Reference Q.11287

a. What are the possible factors of the polynomial in the following equation?$2x^3 + 30x^2 + 136x + 192 = 0$

b. What are the possible solutions that we might find by factoring?

c. Can there ever be other solutions other than these?

Question #11

Reference Q.11289
Solve the following polynomial equation by factoring:
$x^3 - 10x^2 - 23x - 12 = 0$

Question #12

Reference Q.11290
Solve the following polynomial equation by factoring:
$x^3 - 20x^2 + 127x - 252 = 0$

Question #13

Reference Q.11302
Solve the following polynomial equation by factoring:
$3x^3 - 12x^2 - 21x + 30 = 0$

Question #14

Reference Q.11304
Solve the following polynomial equation by factoring:
$2x^3 + 30x^2 + 136x + 192 = 0$

Question #15

Reference Q.11307
Write a polynomial equation that has the following solutions:
$x = -5, -1, 7$
Give your answer in expanded form. (Not factored)

Question #16

Reference Q.11309
Write a polynomial equation that has the following solutions:
$x = -\frac{1}{5}, 2, 3$
Give your answer in expanded form. (Not factored)

Question #17

Reference Q.11311
Write a 4th degree polynomial equation that has the following solutions:
$x = 2, 5$
Leave your answer in factored form.

Question #18

Reference Q.11312
Challenge question:
Solve the following polynomial equation:
$x^4 - 2x^3 = 10x^2 + 22x + 15$

Question #19

Reference Q.11962
Consider the polynomial $P(x) = x^3 + x^2 - 4x - 4$

a. List the potential zeros of the polynomial.

b. List the potential factors of the polynomial.

c. Express the polynomial in factored form.

Question #20

Reference Q.11963
Consider the polynomial $P(x) = x^3 - 2x^2 - 5x + 6$

a. List the potential zeros of the polynomial.

b. List the potential factors of the polynomial.

c. Express the polynomial in factored form.

d. State the zeros of $P(x)$.

e. State the roots of the equation $x^3 - 2x^2 - 5x + 6 = 0$.

Question #21

Reference Q.11965
Factor the following polynomials algebraically.

a. $P(x) = x^3 + x^2 - 5x + 3$

b. $P(x) = x^3 + x^2 + 2x + 2$

Question #22

Reference Q.11966
Algerbraically determine the zeros of the function
$f(x) = x^4 + x^3 - 7x^2 - x + 6$.

Question #23

Reference Q.11967
Algebraically determine the x-intercepts of the graph of
$y = x^4 - 2x^3 - 9x^2 + 2x + 8$.

Question #24

Reference Q.12026

The Rational Root Theorem is a method of determining potential roots of a polynomial. This theorem states that the potential rational roots of a polynomial with integer coefficients can be found by listing the factors of the constant last term over the factors of the leading coefficient.

For example the possible roots of $f(x) = 3x^2 - 7x + 4$ can be found by dividing the possible factors of the constant 4 (which are $\pm 1, \pm 2, \pm 4$) by the factors of the leading coefficient 3 (which are $\pm 1, \pm 3$). This gives us the following possible roots:

$\frac{4}{3}$, $\frac{1}{3}$, $\frac{2}{3}$, 1, 2, 4, $-\frac{4}{3}$, $-\frac{1}{3}$, $-\frac{2}{3}$, -1, -2, and -4.

Emma is determining the zeros of the integral polynomial $P(x) = 4x^5 - 2x + 10$. Which of the following rational numbers are potential zeros according to the Rational Root Theorem?

a. $\frac{5}{4}$

b. $\frac{5}{2}$

c. $\frac{2}{5}$

d. -5

e. 10

f. $-\frac{1}{2}$

g. $\frac{1}{4}$

Question #25

Reference Q.12027

Consider the polynomial $g(x) = 6x^3 + 13x^2 + x - 2$

a. List the potential zeros of the polynomial.

b. List the potential binomial factors of the polynomial in the form $ax - b$, where $a \in \mathbb{N}$ and $b \in \mathbb{Z}$.

c. Express the polynomial in factored form.

d. State

v. the zeros of $g(x)$

vi. the roots of the equation $6x^3 + 13x + x - 2 = 0$

Question #26

Reference Q.12028

The volume of a bar of gold is $3x^3 + 23x^2 + 45x + 25\text{cm}^3$. The length, width, andheight of the bar can all be expressed in the binomial form $px + q$, where p and q are natural numbers.

a. Determine binomial expressions for the dimensions of the bar.

b. State the dimensions of the bar if $x = 5$.

Question #27

Reference Q.12029

Express $3x^4 - 5x^3 - 17x^2 + 13x + 6$ in factored form.

Question #28

Reference Q.12030

Consider the function $f(x) = 2x^3 - 9x^2 + 6x - 1$.

a. State the potential zeros of the polynomial

b. Given that there are no integral zeros, determine a rational zero of the polynomial.

c. The zero in b) is the only rational zero. Use the quadratic formula to determine the two irrational zeros.

d. State the roots as exact values of the equations $2x^3 - 9x^2 + 6x - 1 = 0$.

Question #29

Reference Q.12043

State the zeros of the polynomial function $g(x) = (2x - 5)(x - 7)(3x + 1)$

Question #30

Reference Q.12045

Solve the equation $8x^4 - 12x^3 + 6x^2 - x = 0$.

Question #31

Reference Q.12046

Jenny is attempting to algebraically find the factors of $P(x) = 6x^3 - 7x^2 - x + 2$. Which of the following factors should she not consider as a possible factor?

A. $x - 1$
B. $x - 6$
C. $x + 1$
D. $x + 2$

Question #32

Reference Q.12047

The zeros of the function $f(x) = 2x^3 - x^2 - 18x + 9$ are

A. $\frac{1}{2}, -3, 3$

B. $\frac{1}{2}, 3, 3$

C. $-\frac{1}{2}, 3, 3$

D. $-\frac{1}{2}, -3, 3$

Question #33

Reference Q.12048

If $P(x) = 6x^3 - 11x^2 - x + 6$ and $P\left(\frac{3}{2}\right) = 0,$ then the factorization of P(x) is

A. $(2x - 3)(3x + 2)(x - 1)$

B. $(3x - 2)(2x + 3)(x - 1)$

C. $(2x + 3)(3x - 2)(x + 1)$

D. $(3x + 2)(2x - 3)(x + 1)$

Question #34

Reference Q.12049

The trinomial $x^2 - 3x - 4$ is a factor of the polynomial $2x^3 - 12x^2 + cx + d,$ where c and d are integers. The value of $c + d$ is ____.