

Lesson 2: The Remainder Theorem

Question #1

Reference Q.11207

What is the degree of the following polynomials?

- a. $P_1(x) = 2x^4 - 9x^3 + 7x^2 - x + 8$
- b. $P_2(x) = 3x^{24} - 372x^{371} + 5x^{92} - x + 8$
- c. $P_3(x) = 17x^5 - (2x^4)(72x^3)$
- d. $P_4(x) = 19$

Question #2

Reference Q.11209

Which of the following are **not** polynomials?

$$P_1(x) = 9x^y - 89x^2$$

$$P_2(x) = 2x - 1$$

$$P_3(x) = x^5 - x^4 + x^3 - x^2 + x - 1 + x^{-1}$$

$$P_4(x) = 9x^4$$

$$P_5(x) = 3x^3 - 52x^2 + 81x - 294$$

Question #3

Reference Q.11183

In the following division statement identify...

$$5x^3 + 2x^2 - x + 7 = (x - 3)(5x^2 + 17x + 50) + 157$$

- a. the divisor
- b. the dividend
- c. the quotient
- d. the remainder

Question #4

Reference Q.11182

In the following division identify...

$$\begin{array}{r} 2x^3 - 7x^2 + 7x - 13 \\ x + 2 \overline{) 2x^4 - 3x^3 - 7x^2 + x + 8} \\ \underline{- 2x^4 - 4x^3} \\ - 7x^3 - 7x^2 \\ \underline{7x^3 + 14x^2} \\ 7x^2 + x \\ \underline{- 7x^2 - 14x} \\ - 13x + 8 \\ \underline{13x + 26} \\ 34 \end{array}$$

- a. the divisor
- b. the dividend
- c. the quotient
- d. the remainder

Question #5

Reference Q.11194

Using **long division**, find the quotient and remainder of the following division, and write the division statement.

$$(x^3 - 2x^2 + 9x + 7) \div (x + 2)$$

Question #6

Reference Q.11196

Using **long division**, find the quotient and remainder of the following division, and write the division statement.

$$(x^3 - 2x + 7) \div (x - 4)$$

Question #7

Reference Q.11197

Using **synthetic division**, find the quotient and remainder of the following division, and write the division statement.

$$(x^3 - 2x^2 + 9x + 7) \div (x + 2)$$

Question #8

Reference Q.11198

Using **synthetic division**, find the quotient and remainder of the following division, and write the division statement.

$$(x^3 - 2x + 7) \div (x - 4)$$

Question #9

Reference Q.11206

Without dividing, what is the remainder when

$$P(x) = 4x^3 - 7x^2 + 5x + 11$$
 is divided by $x + 5$?

Question #10

Reference Q.11210

Without dividing, what is the remainder when

$$P(x) = -2x^3 + 4x^2 - 3x - 19$$
 is divided by $x - 3$?

Question #11

Reference Q.11218

Is $(x + 7)$ a factor of $P(x) = x^3 - 4x^2 - 59x + 126$?

Question #12

Reference Q.11216

Given that $P(3) = 0$ fully factor $P(x) = x^3 - 2x^2 - 5x + 6$

Question #13

Reference Q.11278

Given that $P(-4) = 0$ fully factor

$$P(x) = x^3 + 7x^2 - 28x - 160$$

Question #14

Reference Q.11212

- What is the remainder of $x^3 - 2x^2 - kx - 11 \div (x + 4)$?
- If the remainder of $x^3 - 2x^2 - kx - 11 \div (x + 4)$ is -139, what is k ?

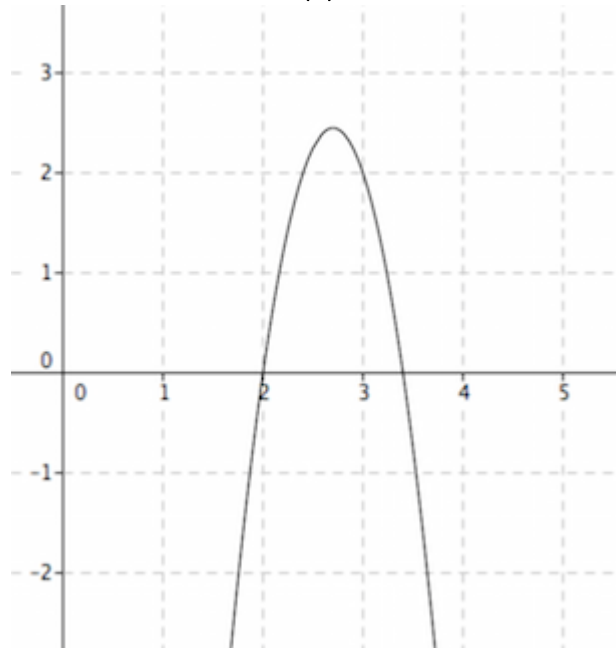
Question #15

Reference Q.11219

Use the remainder theorem to find the exact zeros of

$$P(x) = -5x^2 + 27x - 34.$$

Use the following graph of $P(x)$ as a hint:

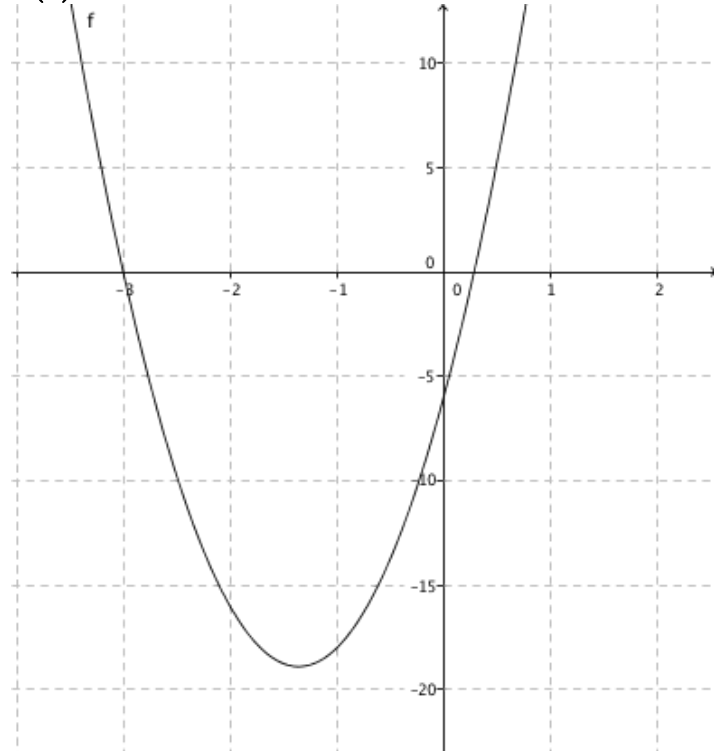


Question #16

Reference Q.11982

Use the remainder theorem to find the exact zeros of

$$P(x) = 7x^2 + 19x - 6.$$
 Use the following graph of $P(x)$ as a hint:



Question #17

Reference Q.11277

Write 3 different polynomial functions that have exactly these points: $(-8, 0)$, $(1, 0)$, $(3, 0)$

Question #18

Reference Q.11275

The third degree polynomial function has the points $(0,3)$, $(-3,0)$, $(1,0)$ and $(7,0)$. What is an equation for this function?

Question #19

Reference Q.11276

The third degree polynomial function has the points $(-4, 0)$, $(\frac{5}{2}, 0)$, $(8, 0)$ and $(0, -16)$. What is an equation for this function?

Question #20

Reference Q.11942

Use the remainder theorem to find the remainder when each of the following polynomials is divided by the binomial.

a. $P(x) = 3x^3 - x^2 + 2x + 1$ is divided by $x + 5$

b. $P(x) = x^4 + x^2 - 8x + 5$ is divided by $x - 4$

Question #21

Reference Q.11943

Find the values of p and q if $x^3 + px + q$ yields remainders of -3 and 2 when divided by $x - 2$ and $x + 1$ respectively.

Question #22

Reference Q.11944

When $P(x) = x^4 + mx^3 - nx^2 + 28x - 24$ is divided by $x - 3$, the remainder is 6. If $P(1) = -4$, find the values of m and n .

Question #23

Reference Q.11945

When $x^4 + ax^2 - 16$ is divided by $x + 1$, the remainder is -14 . What is the remainder when $x^4 + ax^2 - 16$ is divided by $x - 2$?

Question #24

Reference Q.11946

$P(x)$ is a polynomial which has a remainder of 2 when it is divided by $x + 3$. Find the remainder when the following polynomials are divided by $x + 3$.

a. $P(x) - 1$

b. $P(x) + 2x + 6$

c. $3P(x)$

Question #25

Reference Q.11954

Find the remainder when

a. $2x^4 + x^3 - 3x^2 + 3x - 4$ is divided by $2x - 1$

b. $3t^3 - 2t + 2$ is divided by $3t + 1$

Question #26

Reference Q.11955

For $P(x) = x^2 - x + 1$, find a if $P(a) = 3$.

Question #27

Reference Q.11956

When a polynomial $P(x)$ is divided by $x - 2$, the remainder is 3. If the polynomial $A(x) = 2P(x)$ is divided by $x - 2$, the remainder will be

A. 1.5

B. 2

C. 3

D. 6

Question #28

Reference Q.11957

If a polynomial $P(x)$ has $P(0) = 8$, then which of the following statements must be true?

A. The constant term in $P(x)$ is 8.

B. The constant term in $P(x)$ is -8 .

C. A factor of $P(x)$ is $x + 8$.

D. A factor of $P(x)$ is $x - 8$.

Ⓜ **Question #29**

Reference Q.11959

When a polynomial $P(x)$ is divided by $x + 5$, the remainder is -2 .

Which of the following statements is true?

- A. $P(-2) = -5$
- B. $P(-2) = 5$
- C. $P(5) = -2$
- D. $P(-5) = -2$

Ⓜ **Question #30**

Reference Q.11960

The polynomial $P(x) = 2x^3 - ax^2 - 11x + 2a$ has a remainder of **126** when divided by $x - 5$. The value of a , to the nearest tenth, is ____.

Ⓜ **Question #31**

Reference Q.11961

When $x^3 - 4x^2 + 3$ and $x^3 - 3x^2 - 8x + 19$ are each divided by $x - a$, the remainders are equal. To the nearest tenth, the value of a is ____.