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...

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

a. the divisor

b. the dividend

c. the quotient

d. the remainder

Question #4

Reference Q.11182
In the following division identify...

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

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

a. What is the remainder of $x^3 - 2x^2 - kx - 11 \div (x + 4)$?

b. 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

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

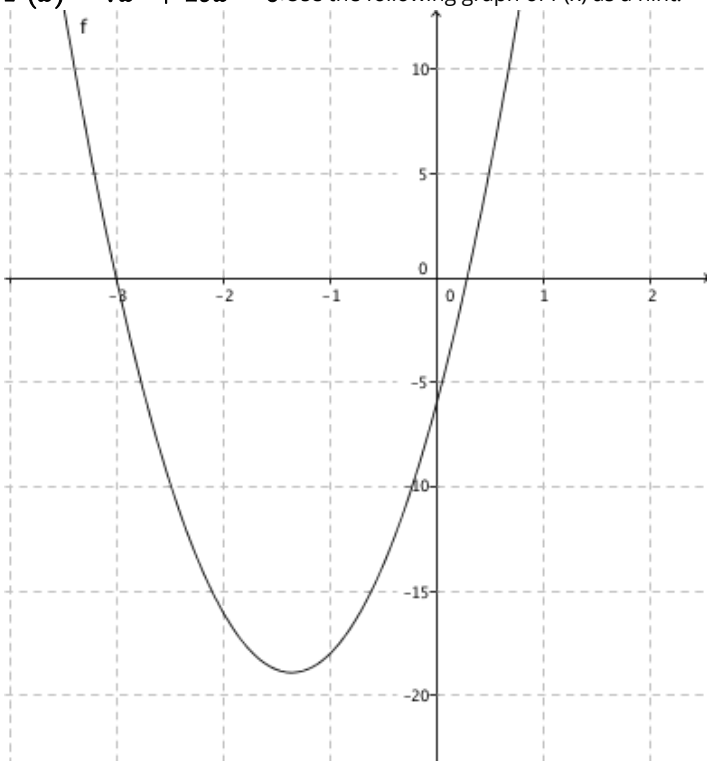
Use the following graph of $P(x)$ as a hint:

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 $(-4,0)$, $\left(\frac{5}{2},0\right)$, $(8,0)$ 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 thenth, the value of a is ___.