NAME: _____ BLOCK: _____ DATE: 2021

PMATH 12 - CHAPTER 1 - PRETEST

parent/guardian signature

Multiple Choice

Circle the choice that best completes the statement or answers the question.

1. Divide: $(-4x^2 + 22x + 12) \div (x - 6)$

   a. $4x - 48$
   b. $-4x - 2$
   c. $4x + 6$
   d. $-4x + 12$

2. What is the remainder when $x^3 + 4 - 11x + 3x^2$ is divided by $6 + x$?

   a. -38
   b. 46
   c. -62
   d. 70

3. Divide $-3x^3 - 2x^2 + 4x + 3$ by $x + 3$. Write the division statement.

   a. $-3x^3 - 2x^2 + 4x + 3 = (x + 3)(-3x^2 - 11x + 25)$
   b. $-3x^3 - 2x^2 + 4x + 3 = (x + 3)(-3x^2 - 11x + 25) - 48$
   c. $-3x^3 - 2x^2 + 4x + 3 = (x + 3)(-3x^2 + 7x - 17) + 54$
   d. $-3x^3 - 2x^2 + 4x + 3 = (x + 3)(-3x^2 + 7x - 17)$

4. For the polynomial $P(x) = -3x^2 - 4x - 5$, what is the value of $P(-2)$?

   a. -9
   b. -21
   c. -25
   d. 15

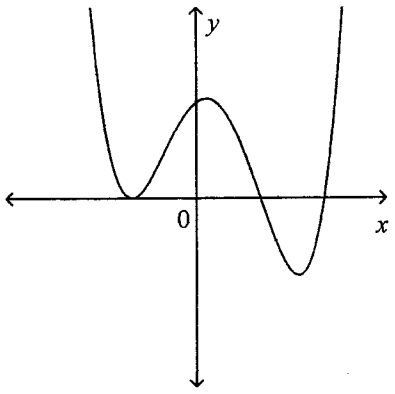
5. Which two binomials are factors of $x^4 + 8x^3 + 7x^2 - 40x - 60$?

   a. $x + 2$ and $x - 6$
   b. $x - 2$ and $x - 6$
   c. $x + 2$ and $x + 6$
   d. $x - 2$ and $x + 6$

6. Use graphing technology. Graph the polynomial function $f(x) = x^3 - 5x^2 + 7x - 3$. Which characteristics apply to the graph?

   a. Number of x-intercepts: 3
      Number of hills: 1
      Number of valleys: 1
   b. Number of x-intercepts: 1
      Number of hills: 1
      Number of valleys: 2
   c. Number of x-intercepts: 2
      Number of hills: 2
      Number of valleys: 1
   d. Number of x-intercepts: 2
      Number of hills: 1
      Number of valleys: 1

7. The graph of a polynomial function of degree 4 is shown. Which statements are true?
   i) The function has an even degree. ✓
   ii) The function has a zero of multiplicity 2. ✓ (bounce off)
   iii) The equation of the function has a negative leading coefficient. ✗
   iv) The y-intercept is positive. ✓



a. i, ii, iii (b.) i, ii, iv c. ✗ ii, iii, iv d. ✗ i, iii, iv

8. Determine the zeros of the polynomial function $f(x) = (x+2)^4(x-5)$.
   State the multiplicity of each zero. -2 5

   a. The zero 4 has multiplicity 2; the zero 1 has multiplicity –5.
   b. The zero 2 has multiplicity 4; the zero –5 has multiplicity 1.
   (c.) The zero –2 has multiplicity 4; the zero 5 has multiplicity 1.
   d. The zero 4 has multiplicity –2; the zero 1 has multiplicity 5.

9. Use graphing technology to graph the function $V(x) = x^3 - 7x^2 + 10x$. Determine the coordinates of the local maximum point to the nearest tenth.

   a. (3.8, 4.1) b. (3.8, 8.2) (c.) (0.9, 4.1) d. (0.9, 8.2)

Short Answer - SHOW YOUR WORK

10. Divide: $(-5x^5 - 20x^4 - 25x^3 - 12x^2 - 5x + 40) \div (x+2)$
    Write the quotient and the remainder.

$Q = -5x^4 - 10x^3 - 5x^2 - 2x - 1$

$R = 42$

$-2 \mid -5 \quad -20 \quad -25 \quad -12 \quad -5 \quad 40$

$\qquad\quad 10 \quad 20 \quad 10 \quad 4 \quad 2$

$-5 \quad -10 \quad -5 \quad -2 \quad -1 \quad (42)$

OR long division

11. Write an equation in standard form for a cubic function with zeros 1, –2, and 4.

$x=1 \quad x=-2 \quad x=4$

$x-1=0 \quad x+2=0 \quad x-4=0$

$= (x-1)(x+2)(x-4)$

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

$= x^3-4x^2+x^2-4x-2x+8$

$= x^3-3x^2-6x+8$

Problem - SHOW YOUR WORK

12. A polynomial is divided by $x+2$. The quotient is $5x^2+5x+9$ and the remainder is 3. What is the original polynomial? Explain your work.

$P(x) = (x-a)Q(x)+R$

$= (x+2)(5x^2+5x+9)+3$

$= 5x^3+5x^2+9x+10x^2+10x+18+3$

$= 5x^3+15x^2+19x+21$

13. Is $3x-1$ a factor of $3x^3-x^2-15x+10$? Justify your answer.

$$\begin{array}{r|l} & x^2 \quad -5 \\ \hline 3x-1 & 3x^3-x^2-15x+10 \\ & -3x^3+x^2 \\ \hline & 0 \quad -15x+10 \\ & \quad +15x-5 \\ \hline & \quad\quad 5 \leftarrow R \end{array}$$

NOT a FACTOR
Since $R \neq 0$

14. a) Use graphing technology. Complete the table below for the graphs of,

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

ii) $g(x) = -x^4 - 3x^3 - 2x^2 + 3x + 3$

iii) $h(x) = x^4 - x^3 - x^2 + 4x + 3$

iv) $j(x) = x^4 + 3x^3 - 2x^2 - 3x + 1$

Graph	Number of x-intercepts	Number of hills	Number of valleys	y-intercept
i	3	2	1	−2
ii	2	1	0	3
iii	2	0	1	3
iv	4	1	2	1

15. The volume, in cubic centimetres, of an expandable box can be represented by the polynomial function $V(x) = x^3 - 43x^2 + 432x$. The width of the box in centimetres is $16 - x$. Assume the length is greater than the width.

a) Determine binomial expressions for the height and width of the box in terms of x.

FACTOR $x(x^2 - 43x + 432)$

$= x(16 - x)(-x + 27)$

divide $-x + 16 \overline{)\, x^2 - 43x + 432}$ → $-x + 27$

$-x^2 + 16x$

$-27x + 432$

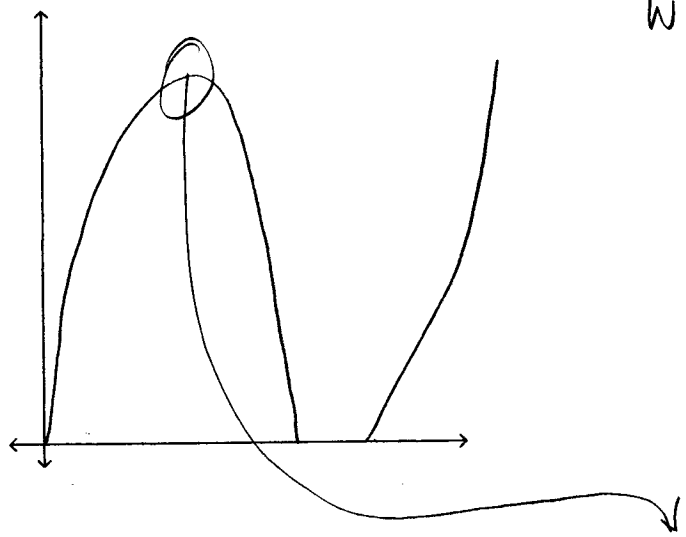
$+ 27x + 432$

0

b) Graph the function. Sketch the graph. What do the x-intercepts represent?

x = height

will assist in finding l and w



c) To the nearest cubic centimetre, what is the **approximate** maximum volume of the box?

$\approx 1266\ cm^3$