1. What is the remainder of the polynomial $x^3 + 4x^2 - 3x + 8$ when divided by $x - 5$

A. 208
B. 218
C. 283
D. 305

```
Set the calculator to computation mode: MODE>1

Input the left side of the equation

Apply the Remainder theorem

Use CALC function and set x=5

And you will get the answer.
```

*Bakit x=5?

Answer: Iequate mo yung x-5 = 0, kaya naging x = 5

ANS: B

2. Factor $8x^3 - 36x^2 + 54x - 27$

A. $(2x - 3)^3$

B. $-(3x - 2)^3$

C. $(2x + 3)^3$

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

First, type the equation and assign an arbitrary constant (mas madali kung 1) to substitute to x and use the CALC function..
for example X=1

The calculator will display "-1"..

Second, substitute 1 to the choices and find which one will be equal to "-1"..

Start with the first choice until you get the value of "-1"..
What we do as well in the previous examples like this is called "REVERSE ENGINEERING".

Kung saan mag equal sa nakuha mong sagot nung una, yun na yun

ANS: B

3. Find the 15th term in the arithmetic sequence: 1,3,5,7 . . .
A. 25
B. 27
C. 29
D. 31

1. Set the calculator to STAT mode..MODE 3>2
2: A+BX is for Arithmetic Progression(A.P.)..
May makikita kayo X and Y column..And X column natin ay ang nth term while sa Y column natin ay ang A.P..

2. Input sa X column ang 1,2,3(1st term,2nd term, 3rd term, constant na yung 1,2,3 sa X column)..Sa Y column naman, iinput ang 1,3,5 (kahit 3 number lang, kahit wag na yung 7)..
Which mean the 1st term of the A.P. is 1, 2nd term is 3 and 3rd term is 7..

3. After niyo mainput, press AC(don't worry hindi mabubura ang data niyo)
Sa problem ang hinahanap ay ang pang 15th term..anu ba ang value ng ika-15th term?..meaning ang hinahanap ang value sa Y column..gets?..

4. Therefore, type 15Y-hat..
Ang Y-hat ay makikita when you press SHIFT>1(STAT)>7(Reg)>5(Y-hat)..while ang X-hat ay makikita when you press SHIFT>1(STAT)>7(Reg)>4(X-hat)..take note of this dahil gagamitin natin ito in the next problems..

5. Then press =..
And you will get the answer..
Kung may tanong kayo dito at di niyo makuha pakipost na lang..

* Tandaan kapag Arithmetic Progression = Linear kaya ang pipiliin mo sa STAT ay yung 2: A+Bx

*Paano malalaman kung Arithmetic Progression? Kapag Constant yung difference ng mga terms,like sa example natin.

A1 = 1

A2 = 3

A3 = 5

A4 = 7

Constant na nagaadd ng 2 kada terms

ANS: C

4. Find the 12th term in the geometric series: 3, 9, 27 . . .
A. 59,049
B. 177,147
C. 531,141
D. 1,594,323

1. Set the calculator to STAT mode..MODE 3>5 or MODE3>6 (it's the same for Geometric Progression, G.P.)

May makikita kayo X and Y column..And X column natin ay ang nth term while sa Y column natin ay ang G.P..

2. Input sa X column ang 1,2,3(1st term,2nd term, 3rd term parang sa previous problem lang)..Sa Y column naman, iinput ang 3,9,27..
Which mean the 1st term of the G.P. is 3, 2nd term is 9 and 3rd term is 27..

3. After niyo mainput, press AC(don't worry hindi mabubura ang data niyo)
Sa problem ang hinahanap ay ang pang 12th term..anu ba ang value ng ika-12th term?..meaning ang hinahanap ang value sa Y column..gets?..

4. Therefore, type 12Y-hat..

5. Then press =..
And you will get the answer..
Kung may tanong kayo dito at di niyo makuha pakipost na lang..

* Tandaan kapag Geometric Progression = Exponential kaya ang pipiliin mo sa STAT ay yung

May exponent, yung 6 : A * B^X (parang declining balance sa econ para maalala niyo)

* Paano malalaman kung Geometric Progression , Kapag may common Ratio sila,

R = A2/ A1 = A3/A2 = A4/A3…so on

For example sa given, A1 = 3, A2 = 9 A3 = 27

A2/A1 = 3

A3/A2 = 3

So ang R = 3, it means Geometric

ANS: C

5. What is the sum of the first 21 terms of the sequence: 1, 3, 5, 7...
A. 361
B. 391
C. 400
D. 441

1. Set the calculator to STAT mode: MODE 3>2 (since it is A.P.)

2. In the X column, input 1,2,3..In the Y column, input 1,3,5..

3. After you input the data, press AC..Don't worry your data will not be deleted (unless you change your mode)

4. Press SHIFT>LOG(found below the ON KEY)..we will use the SUMMATION function..(SUMMATION symbol is like E)

5. Press ALPHA>)(for X)>SHIFT>1>5>5(for Y-hat)>SHIFT>)(for comma)>1>SHIFT>)(for comma)>21>)

6. You will noticed that our summation is from 1 to 21..Why 21 and not 20?..Because we start our progression in 1..If we start the progression from 0, then that's the time we use 0 to 20..

And it will be like this..walang Y-hat na symbol e..

$$\sum(X(Y-Hat),1,21)$$

* Note Walang Parenthesis si Y - hat, so ang true display lang dapat sa CALCU ay

$$\sum(X\check{y},1,21)$$

Mag eerror kasi kapag merong parethesis si Y-Hat

ANS: D

6. What is the sum of the infinite series: 1, -1/5, 1/25, . . .
A. 5/6
B. 4/5
C. 5/7
D. 6/7

1. Set the calculator to Computation Mode..MODE>1
Since this is an infinite series, with a common ratio of less than 1, then the sum is a finite number..(NOTE: For an infinite series with a common ratio of greater than 1, the sum is infinite)..

2. Input the equation under SUMMATION function and get the sum from 0 to a large value, say, 50.So it will be like this..Then press =

$$\sum_{x=0}^{50}((-\frac{1}{5})^x)$$

*Saan Galing yung - 1/5 ?

Ratio lang yun, Considered pa din to as Geometric Series so applicable pa din yung previous formula of getting R (Ratio)

R = A2/ A1 = A3/A2 = A4/A3…so on

Given:

A1 = 1

A2 = - 1/5

A3 = 1/25

Solving For R:

A2/A1 = - 1/5 --------yan yung R

ANS: A

6. What is the sum of 6+9+12+. . .+171?
A. 4956
B. 4389
C. 5198
D. 5462

1. Set the Calculator to STAT mode..MODE3>2 (I hope you already know why MODE 3 2)

2. In the X column, input 1,2,3....In the Y column, input 6,9,12 then press AC..

3. We should get the sum but we don't know how many term does it have..So let's determine how many terms it has..Earlier in this tutorial I said X is for nth term and Y is for progression..Therefore, our code is 171 X-hat..Since 171 is our last term..And the calculator will display "56"

4. now use the SUMMATION function like in number 26 but this time, its 1,56..

$\sum(x(Y - Hat)1, 56)$ Nag Error Diba? Kasi nga Nakalimutan mong walang parenthesis ang $\check{y}$, Ulyanin ka. LOL

so ang true display lang dapat sa CALCU ay

$\sum$ (X$\check{y}$,1,56)

Mag eerror kasi kapag merong parethesis si Y-Hat

ANS: A

7. What is the 6th term of the infinite series: 1, -1/5, 1/25, ...
A. 1/3125
B. 1/15625
C. -1/3125
D. -1/15625

1. Set the calculator to Computation mode..

2. Input the general equation of the infinite series and substitute 5 to x using the CALC function to display the 6th term..And press =

$$\left(-\frac{1}{5}\right)^x$$

*Bakit 5 ang sinubstitute? Kasi using our General equation $\left(-\frac{1}{5}\right)^x$ Hindi pwedeng x = 0, so pag tinry mo yung x = 1 ang makukuha mo na agad ay yung 2nd Term, which is – 1/5, so on, kapag x = 5 ang makukuha ay 6th term, kapag x = 7 ang makukuha ay 8th term, laging ganun.

ANS: C

8. Rationalize the given equation: $\frac{4+3i}{2-i}$

A. 2-5i
B. (5+10i)/6
C. 1+2i
D. (2+i)/3

1. Set the calculator to COMPLEX mode..MODE>2

2. Input the equation as it is in the calculator..(NOTE: The imaginary i is found by pressing the ENG key..

3. Then press =

And you will get the answer..

ANS: C

9. The function $f(x) = \frac{(x^2 - 4)}{(x^3 - 2x^2 - 3x + 10)}$ is discontinous at x=?

A. 2

B. -2

C. either a or b

D. neither a nor b

Pag sinabing discontinous, mageerror siya sa value na isusubstitute mo or yung tinatawag na MATH ERROR..Pag may lumalabas parin na value positive or negative or even zero, continous parin yun..dapat mageerror siya..gets?..

Set the calculator to COMP MODE..
type na equation as it is..press the CALC function and substitute the numbers in the choices and find which one will get an error..The one error is the answer..

Kung saan may error yun na yun..

ANS: B

10. Find the possible factors of $4x^5 - 4x^4 + 25x^3 - 30x^2 - 99x + 54$.

A. (x-2)

B. (2x-1)

C. (2x+3)

D. all of the above

Para masabing factor siya, kailangan ang y=0 pag isusubstitute natin yung root of x..

We use CALC function..Set the calculator to MODE 1..

Type the equation as it is and press CALC..Get the root of the choices and substitute..

X? enter 2 if y=0, then possible root siya..Try the next one..

X? enter 1/2, if y=0, then possible root siya..Try the last one..

X? enter -3/2 if y=0, then possible root siya..

Therefore you know the answer..

* Saan nakuha si 2 , ½, -3/2 ? iequate mo yung bawat choices sa 0

For example

A. (x-2)

X =2

ANS: D

11. Determine the area of the triangle bounded by the straight lines x+2y-7=0, 3x-4y-1=0, and 2x-y+6=0..

A. 10 sq.units
B. 15 sq.units
C. 20 sq.units
D. 25 sq.units

First get the point of intersection..use the EQN function..MODE 5>1

For the first two equation, type:
1 2 7
3 -4 1

then press = =..Therefore the point of intersection of this is x=3, and y=2..

Then try the next equation..
3 -4 1
2 -1 -6

Then press = =.....x=-5, and y=-4
try the last combination of equation..
1 2 7
2 -1 -6

Then press = =.....x=-1, and y=4

Then we use the determinant function to get the area of the triangle..

Set the calculator to MATRIX..MODE 6 and press AC..

What important in this is kailangan natin madaan yung DIM or dimension ng matrix..So press SHIFT>4>1>1>1 and enter
3 2 1
-5 -4 1
-1 4 1
then press AC..

To get the determinant press SHIFT>7(det)>SHIFT>4>3(since we enter our data in MatA..Then press =..

Hindi pa yan ang sagot, wag kang ATAT. Haha

Remember the area of a triangle given the vertices is $1/2$ times the determinant..

IMPORTANT: Therefore multiply it to $1/2$ and get its Abs value..

*Kapag negative ang lumabas just get the ABSOLUTE VALUE, gawin mo lang positive

Then you will get the final answer..

ANS: C

12. Find the center of the circle that is circumscribed about the triangle whose vertices are (-3,-1), (3,1) and (5,3)

A. (-3,9)
B. (3,-9)
C. (-3,-9)
D. (3,9)

Substitute x and y in the general equation of circle..

$$x^2 + y^2 + Dx + Ey + F = 0$$

In the first point you will get the equation -3D-E+F=-10
The second point will give you 3D+E+F=-10
The third point will give you 5D+3E+F=-34..

Therefore we have 3 equations, 3 unknown..
Use the EQN 2 and enter
-3 -1 1 -10
3 1 1 -10
5 3 1 -34

And you will get D=6, E=-18, and F=-10
And write it in the general form..

$$x^2 + y^2 + 6x - 18y - 10 = 0$$

Ito ang shortcut para makuha ang center..
CENTER OF CIRCLE, ELLIPSE or PARABOLA:
(h)

- D/2A
* A = Coefficient ni X^2 which is = 1

(k)

- E/2B
* B = Coefficient ni Y^2 which is = 1

Therefore our center (h,k) is at (-3,9)..

ANS: A

13. Find the value of y of the parabola whose axis is vertical and passes through (-1,0), (5,0), (1,8) and (4,y)

A. -5
B. 5
C. -6
D. 6

We use STAT 3 kasi quadratic ang parabola, in this case..

In the x column enter -1,5 and 1..

In the y column enter 0,0, and 8 then press AC

Find the value of y when x = 4..
therefore 4(y-hat) or $4\hat{y}$

And you will get the answer.

ANS: B

14. Find dy/dx if $y = t^3 - 2t + 1$ and $t = cos(x - \frac{\Pi}{6})$ when $x = \frac{\Pi}{2}$

A. 0.433
B. 0.866
C. 1.083
D. 1.732

Pag Trigonometric/Inverse, i-set ang calcu sa RADIAN MODE..
I-type sa calcu like this..

$$\frac{d}{dx}((cos(x - \frac{\Pi}{6}))^3 - 2(cos(x - \frac{\Pi}{6})) + 1)_{x=\frac{\Pi}{2}}$$

Yung Π po natin diyan, pi po yun..

ANS: C

15. Find the value of $(1+i)^7$

A. 8 - 8i

B. 8 + 8i

C. 4 - 4i

D. 4 + 4i

Code:

Ang pwede lang po sa ating calcu ay cube at square ng complex.
Pwede pong ganito:
$(1+i)^3(1+i)^3(1+i)$

Or pwede din ito:
$(1+i)^3(1+i)^2(1+i)^2$

ANS: A

16. Find the $\int e^x sinxdx$

A. $-e^x(sinx - cosx) + C$
B. $e^x(sinx - cosx) + C$
C. $-\frac{1}{2}e^x(sinx - cosx) + C$
D. $\frac{1}{2}e^x(sinx - cosx) + C$

Remember, in solving Trigonometric or inverse trigonometric, use RADIAN MODE..

Lagyan ng limits from 0 to 1 then press =

Makakakuha ka ng sagot..I-note ito..

i-substitute ang limits sa choices..Wag intindihin ang constant "C"..remember, upper limit minus lower limit..lets say for example sa choice A..
$[-e^1(sin(1) - cos(1))] - [-e^0(sin(0) - cos(0))]$

Pag pumarehas ang sagot mo kanina(yung ni-note mo) yun ang sagot..

ANS: D

17. Solve for the general solution of the differential equation: $(D^3 + 8)y = 0$

A. $y = c_1e^{-2x} + e^x(c_2 + c_3x)$
B. $y = c_1e^{2x} + e^{-x}(c_2 + c_3x)$
C. $y = c_1e^{-2x} + e^x(c_2 sin 1.732x + c_3 cos 1.732x)$
D. $y = c_1e^{2x} + e^{-x}(c_2 sin 1.732x + c_3 cos 1.732x)$

Get the roots..Use EQN 4..1 0 0 8
You will get one real root and two complex roots..

KEY:
Pag real root = e^x
Pag complex root = sin and cos

Tandaan mo lahat ng makukuha mong roots, then

*Compare mo lang yung mga roots na nakuha mo sa mga Exponent Sa choices kung san nagtugma yun na yun.

*Saan galling yung 1, 0, 0, 8,?

Coefficient Siya sa equation, Remember Cubic Equation Yan, Yung 1 coefficient ng D^3, Since walang variable na may ^2 at ^1 (Linear) kaya = 0 , then last 8 is the given constant.

ANS: C

18. Solve for the general solution of the differential equation y'-y = 2..

A. $y = ce^{x} + 2$

B. $y = ce^{x} - 2$

C. $y = ce^{-x} + 2$

D. $y = ce^{-x} - 2$

Choose one in the choices..

Choose your favorite number for C and x and substitute it to your choice..

And solved for y..i-note..

i-differentiate ang iyong napiling equation with x=(kung ano ni-substitute mo sa una, be consistent)
You will get the y'

Then susbtitute in the given equation
y'-y=2.....if
2=2

Therefore, napili mo ang tamang answer..

ANS: B

19. Solved for the particular solution of the differential equation: x + y dy/dx = 2 when x=1 and y=1

A. $y^2 = 4x + x^2 - 4$

B. $y^2 = 4x - x^2 - 2$

C. $y = 4x + x^2 - 4$

D. $y = 4x - x^2 - 2$

```
Choice one from the choices and Convert the equation to y=f(x)..

Differentiate using your calculator with x=1(as given) and you will
get the value of dy/dx

Substitute x, y and dy/dx to the equation in the problem and see if it
is equal to 2...
2=2

If yes, then your choice is the right answer..
```

ANS: B

20. Find the slope of the tangent line to the graph of the function $y = 4x^3 - 7x^2$ at the point where x=3.

A. 60
B. 66
C. 72
D. 78

Radian mode. Use d/dx function with x=3
Slope tangent is equal to the first derivative(y')

ANS: B