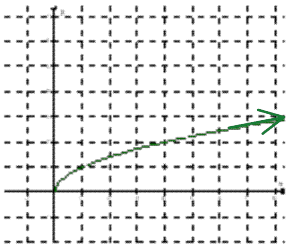
C12 - 3.0 - Polys Long/Synth/Graph Review

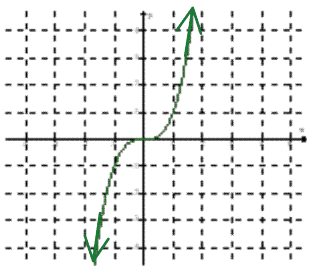
1) State date whether the following are polynomial or not.

$a)\ y = x^2 - 5$
$b)\ y = 5^x$
$c)\ y = x^3$
$d)\ y = sinx$
$e)\ y = \frac{1}{x} + 4$
$f)\ y = 2^{-3}x$
g) $y = -3x^{-2}$
$h)\ y = -x^3 + 3x^2 + 1$
$i)\ y = \sqrt{2}x+5$
$j)\ y = \sqrt{2x}+5$
$k)\ y = 8$
$l)\ y = logx$
$m)\ x^2 + y^2 = 4$

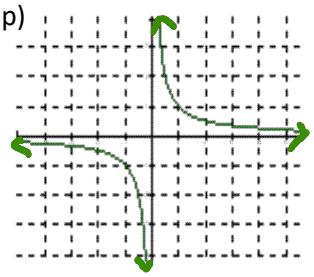
n)



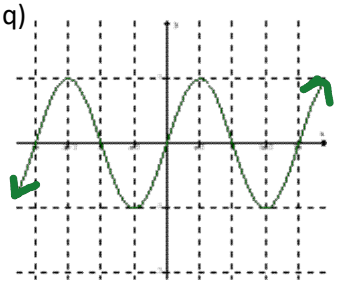
o)



p)



q)



2) Find the degree of the polynomial and name its type, leading term, leading coefficient and constant term and the constant term's meaning.

$a)\ y = -2x^4 + 5x + 1$
$b)\ y = 2x + 1$
$c)\ y = 3x^5 - 8x^2 + 2x + 5$
$d)\ y = -x^3 + 2x - 4$
$e)\ y = 5$

3) Graph with a table of values.
$a)\ y = x^2 - 2x - 3$
$b)\ y = x^3 - 2x^2 - x + 2$
(x-1)(x+1)(x-2)
(x^2-1)(x-2)

4) Find x-intercepts
$a)\ y = (x-2)^2$
$b)\ y = x^3 + 5x^2 + 6x$
$c)\ y = x^3 + x^2 - x - 1$
$d)\ y = x^3 - 7x + 5$

5) Do Synthetic and Long Division and write in division and multiplication form.

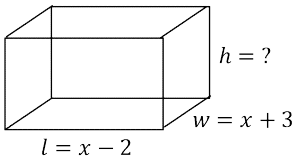
$a)\ \frac{x^3 + x^2 - 8x + 4}{x - 2}$
$b)\ \frac{x^3 - 7x - 6}{x + 2}$
$\frac{x^4 - x^3 + 2x^2 - 6x - 12}{x + 2}$
$c)\ \frac{2x^2 + 3x - 2}{2x - 1}$
$d)\ \frac{x^3 + x^2 + x + 1}{x^2 - 1}$
$e)\ \frac{x^3 - 1}{x - 1}$

6)
$a)\ \frac{x^3 + x^2 - 8x + 7}{x - 2}$

7)Find the number of x-intercepts.
$y = x(x-1)(x^2+1)$

8) Find possible expressions for height if and find Volume if x=3:

$V = x^3 + 2x^2 - 5x - 6$



9)
Is $(x-2)$ a factor of $f(x) = x^3 + x^2 - 8x + 4$?

Is $(2x+1)$ a factor of $f(x) = x^3 + 2x^2 - 7x + 5$?

If a polynomial $f(x)$ is divided by $x - a$, what is the remainder?

10) *Find k and or m:*
If $(x+3)$ *is a factor of* $f(x) = x^3 + 2x^2 + kx - 6$.

If $f(x)$ *is divided by* $(x-1)$ *and the remainder is* -8, *if :* $f(x) = x^3 + 2x^2 - 5x + k$.

If when divided by $(x+3)$ *the remainder is* 4 *and if* $(x-2)$ *is a factor if :* $f(x) = x^3 + 2x^2 + mx + k$.

If when divided by $(x+2)$ *the remainder is the same as if divided by* $(x+1)$ *if :* $f(x) = mx^3 - 7x + k$.

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11) Graph/State the Domain and Range and Asymptote(s) and find any Intercepts. State the Multiplicity of all x-intercepts. Identify End Behavior. Find Domain of f(x)>0, f(x)<0. Find the max or min if possible on your graphing calculator.

$\boldsymbol{a)\ f(x) = x^2 - 6x + 5}$
$b)\quad y = x^4 - 13x^2 - 12x$
$c)\ f(x) = x^3 + 2x^2 - 5x - 6$
$d)\quad y = 2x^3 + 9x^2 + 3x - 4$
$e)\quad y = x(x-2)^2(x+2)^3$
$f)\ f(x) = -(x+2)^3(1-x)$
$g)\quad y = x^4 - 2x^3 + 2x - 1$
$h)\ y = 6x^4 - 20x^3 - 6x^2 + 24x + 36$
-2(x-1)(3x+1)(x+2)^2

12) Find Equation.
$a)\ x - int = 1,3$
$y - int = 3$
$b)\ x - int = -4, -2, 1$
$y - int = 4$
$c)\ x - int = -2, 0, 2$
$d)\ x - int = -2, -2, 2$
$y - int = -8$

13) Find Equation.
a) Leading Term: $-2x^3$
b) Zeros at $x = -2, 1$
c) Zero at $x = -1$; multiplicity of 2
d) Zeros at $x = 2, \frac{1}{2}, 0$
e) Zero at $x = -3$; multiplicity of 2
$y - int$: 54
f) Zeros at $x = \pm\sqrt{2}, -1$

14) Find the maximum and minimum number of intercepts and find the maximum and minimum number of turns.
$a)\ -2x^4$ …
$b)\ 3x^5$ …
$c)\ -\frac{1}{2}x^2$ …

15) List the potential factors
$\boldsymbol{y = 3x^2 + 5x - 2}$

16) Find the new $x-$ intercepts of a graph of $y = (x+2)(x-1)(x+3)$
Has a horizontal compression of 1/2 and vertical stretch by a factor of 2.

17) Find the new equation of $y = x^3$ translated to have the point $(3,9)$.
Find the new equation of $y = x^3$ stretched to have the point $(4,8)$.

18) Find the new equation of $y = x^3 - x^2 + x -$ 1 with a HC=1/2, a VR and up 1.

Definition
TOV
Factor/x-int
Synthetic/Long Div
Remainder/Factor Theorem
Div & Mult Forms
Graph
Domain & Range
Asymptotes
Intercepts
End Behavior
f(x)>0,<0
Max/Min
Find Equation
x-intercepts
Turning Points
Transformations
Potential Factors
Find Equation
Word Problems

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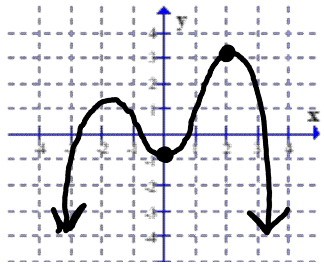
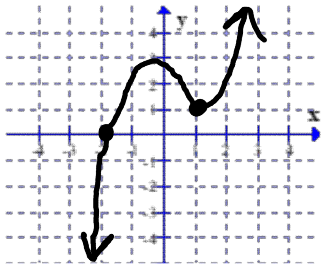
19) Name the type of polynomial. Identify the possible degree and a possible leading term.

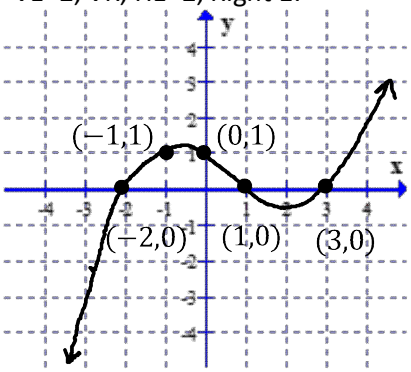
a)



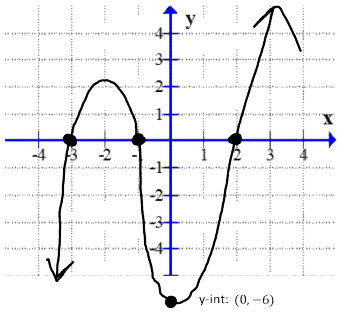
b)

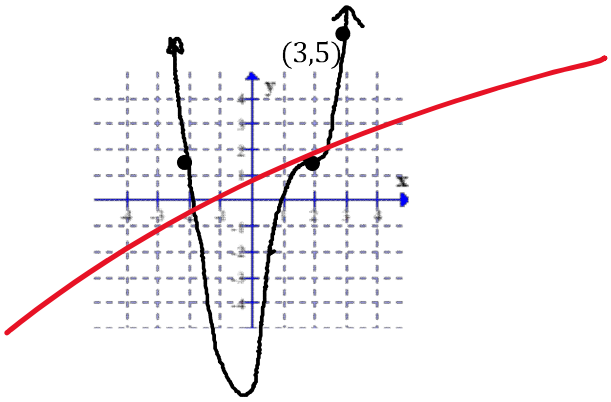


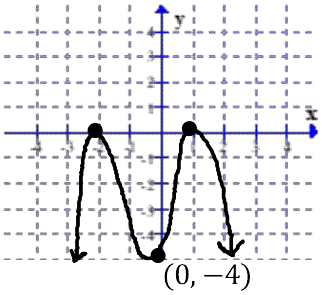
20) Transform the following graph : VE=2, VR, HE=2, Right 1.

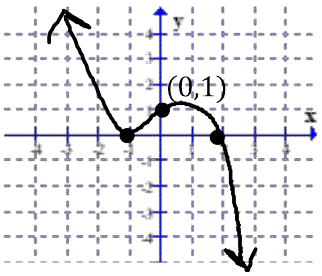


21) Find Equation.









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Geometry

22) Find the possible dimensions of a rectangular box with the volume of $V = x^3 + 2x^2 - 5x - 6$

23) An open rectangular box is made by cutting equal lengths from each corner of a 4 cm by 6 cm rectangular piece of cardboard, then folding up the sides. Find the length of the square that must be cut from each corner so the box has a volume of 8 cm^3. And find Max Volume. x=1, V=8.45

24) A box of 1 cm^3 length's are increased by the same amount. Find the increase, the new dimensions and Volume if the new volume is 8 times larger. x=1.

25) A box of 1x2x3 cm length's are increased by the same amount. Find the increase, the new dimensions and Volume if the new volume is 20 times larger. x=3. 4x5x6, V=120

26) Find the dimensions of a rectangular box with square ends has lengths 2 cm more than the length of the square ends with a volume of $175\ m^3$.

27) Find the dimensions of a Triangular prism with an equilateral base and a height of the prism equal to the length of the sides of the equilateral triangle; has a volume of $50\ m^3$.

28) A Frustrum (A Bucket) is the leftover part of a cone after a cone is cut from a cone where the smaller radius is half the radius of the larger radius. The height of the bucket is 2 centimeters greater than the radius of the base. Find the dimensions if the volume of the bucket is $50\ cm^3$.

29) Find the dimensions of a cylinder with a height 2 centimeters greater than the radius with the volume of 355 milliliters. $1ml = 1cm^3$

30) A buoy on a sailboat is in the shape of a right circular cylinder with hemispheres on each end with a total length of 14 centimeters and the volume of $108\pi\ cm^3$. Find the radius of the buoy.

31) Find the lengths of the sides right angle triangle with an area of 48 m^2 and has the hypotenuse 1 meter longer than one of the sides.

Numbers

32) Find three consecutive integers whose product is 2730.

33) Find four consecutive odd integers whose product is 3465.

Rev/Cost/Profit

34) A company has a revenue function of $R(x) = 100x - .1x^3$ and a cost function of $C(x) = 1000 + 2x$. *let* $x = \#$ of units.

a) Find the maximum revenue. (18.25,1217.16)

b) Find the maximum profit. (18.07,180.82)

c) Find the break even points. x=11.94,23.57. Find the domain and the range of the company's survival.