IB AA SL yr 1

A. Factoring

Fully factor the following polynomials

a.) $a^3 + 16a^2 + 63a$

b) $-b^2 + 6b + 27$

c) $c^2 - 4c - 3$

d) $d^3 - 3d^2 + 3d - 1$

e) $e^4 - 1$

f) $f^3 + f$

g) $g^7 - g$

h) $h^{2n} + 1, \quad n \in \mathbb{Z}$

i) $6i^2 - 5i - 4$

j) $3j^2 - 19j - 14$

k) $2\pi k^2 - 8\pi$

l) $5l^2 + 62l - 39$

m) $70m^2 - 39m - 18$

n) $n^2 + a, \quad a > 0$

p) $p^3 + 4p^2 - p - 4$

q) $p^4 + 3p^2 - 4$

B. Find the roots of the following polynomials

i) $f(x) = x^2 - 5x - 14$

ii) $g(x) = 2x^3 + 3x^2 - 11x - 6$

iii) $h(x) = 2(x-1)^2 - 3$

iv) $p(x) = 5x^4 + 62x^3 - 39x^2$

v) $q(x) = (x-1)(x^2+x+1)$

vi) $s(t) = t^4 - t^3 + t^2 - t$

Describe the transformation from the parent function $f(x)$

i.e) $g(x) = -2(x-5)^2 + 3$, $f(x) = x^2$ $f \to g$

Right 5, Up 3

Vertical stretch 2

Vertical flip

i) $f(x) = x^3$, $g(x) = -(x+2)^3 - 10$

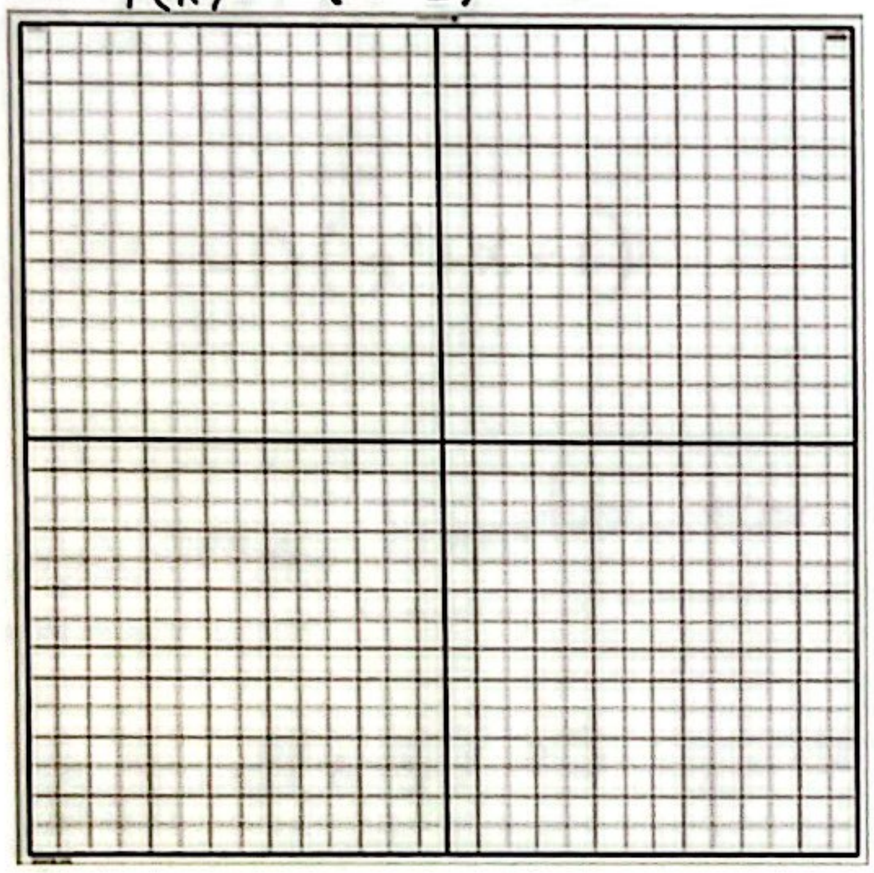
ii) $f(x) = x$, $g(x) = -x$

iii) $f(x) = x^2$, $g(x) = x^2 + 2x - 3$

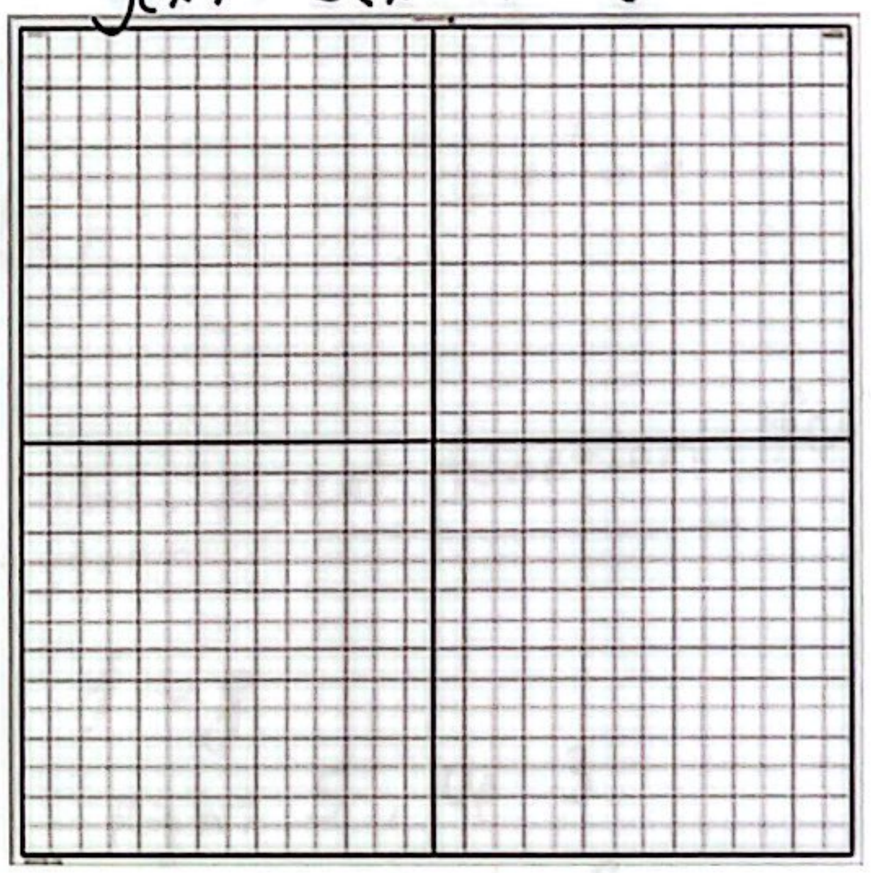
iv) $f(x) = x^2$, $g(x) = x^2 - 4x - 3$

C. Graph the following. Please label critical points and key characteristics, such as: x and y-intercepts, vertex, axis of symmetry asymptotes, center and radius

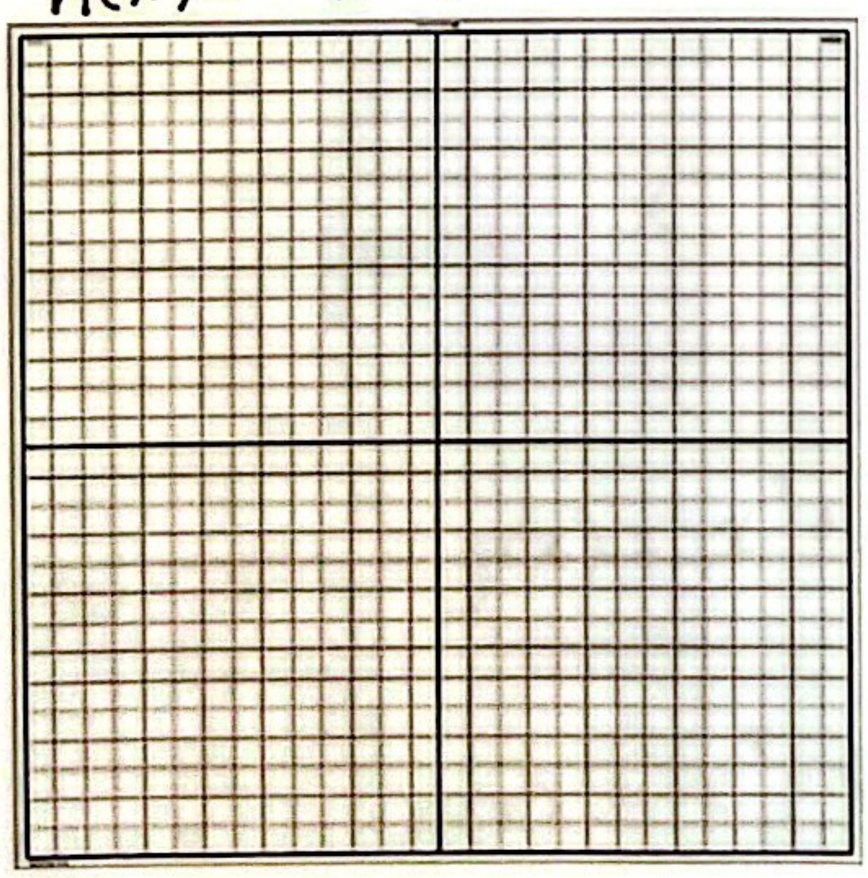
$f(x) = -(x-2)^2 + 5$



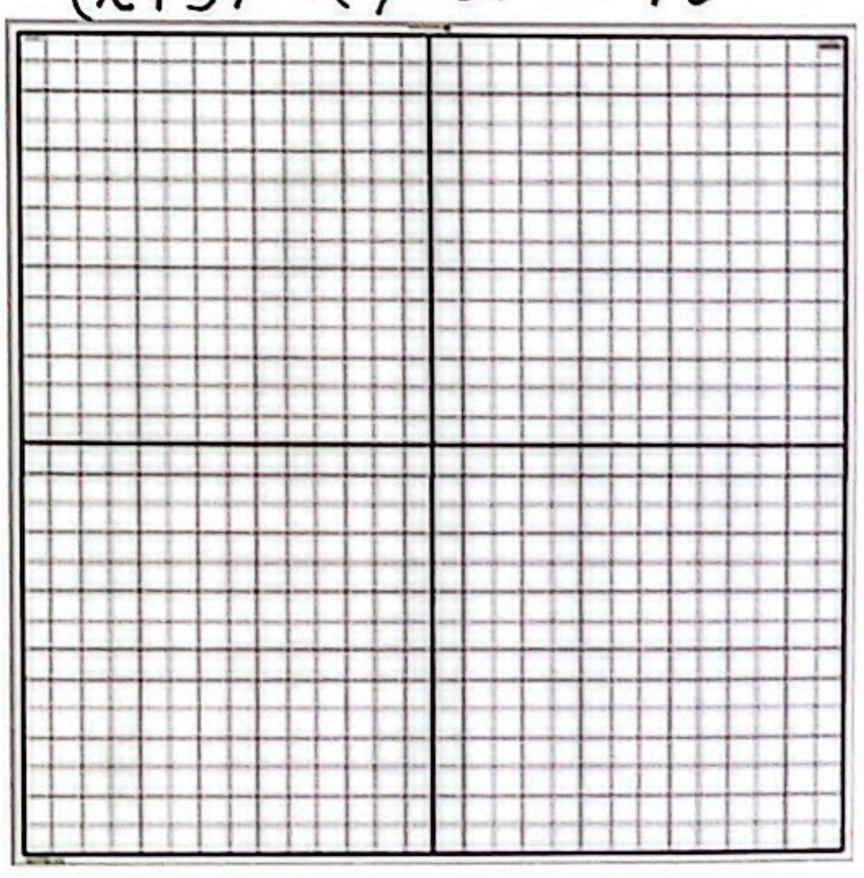
$g(x) = 3(x+1)^2 - 8$



$h(x) = \frac{4x}{x^2-4}$

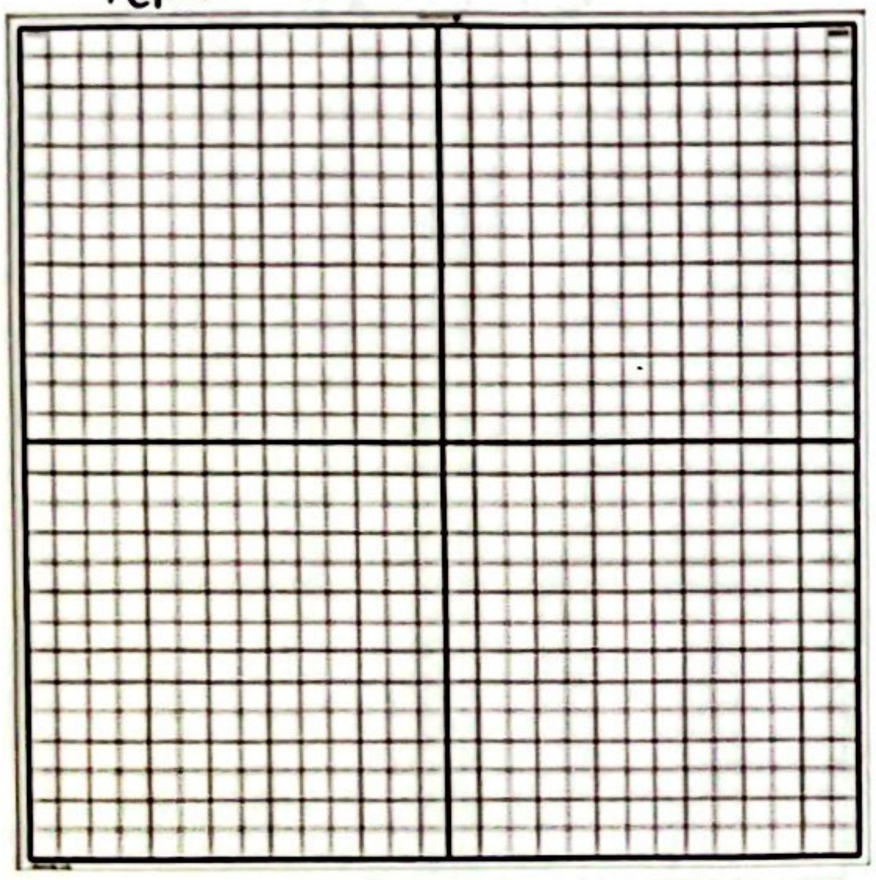


$(x+3)^2 + (y-3)^2 = 18$

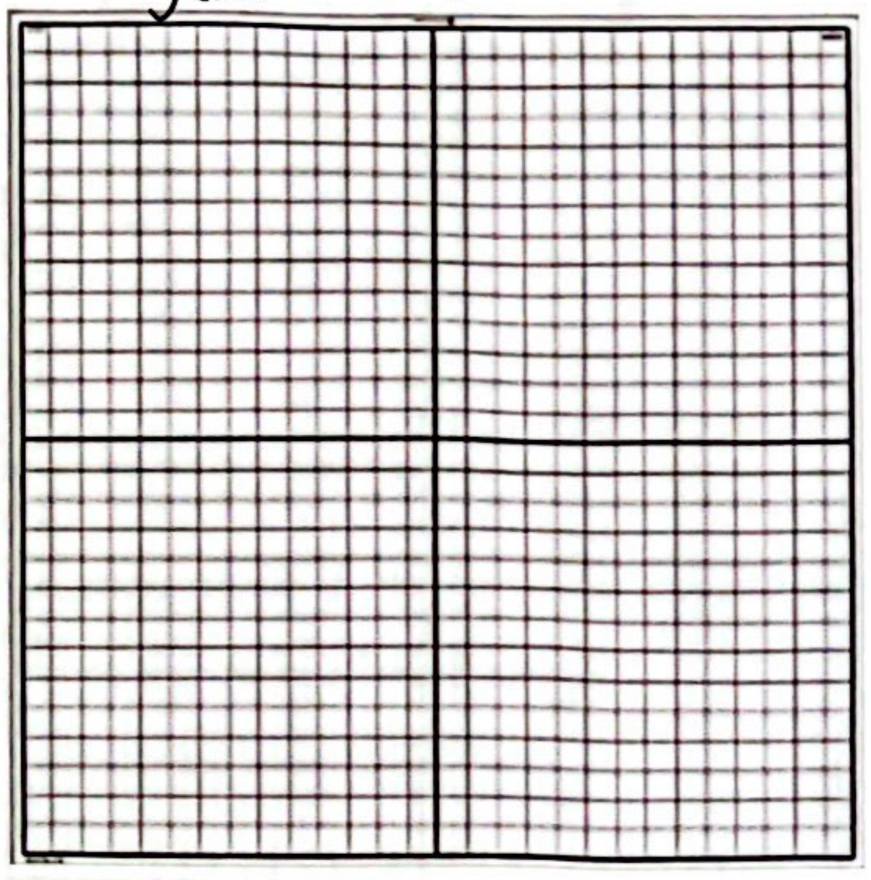


C. Graph the following (continued)

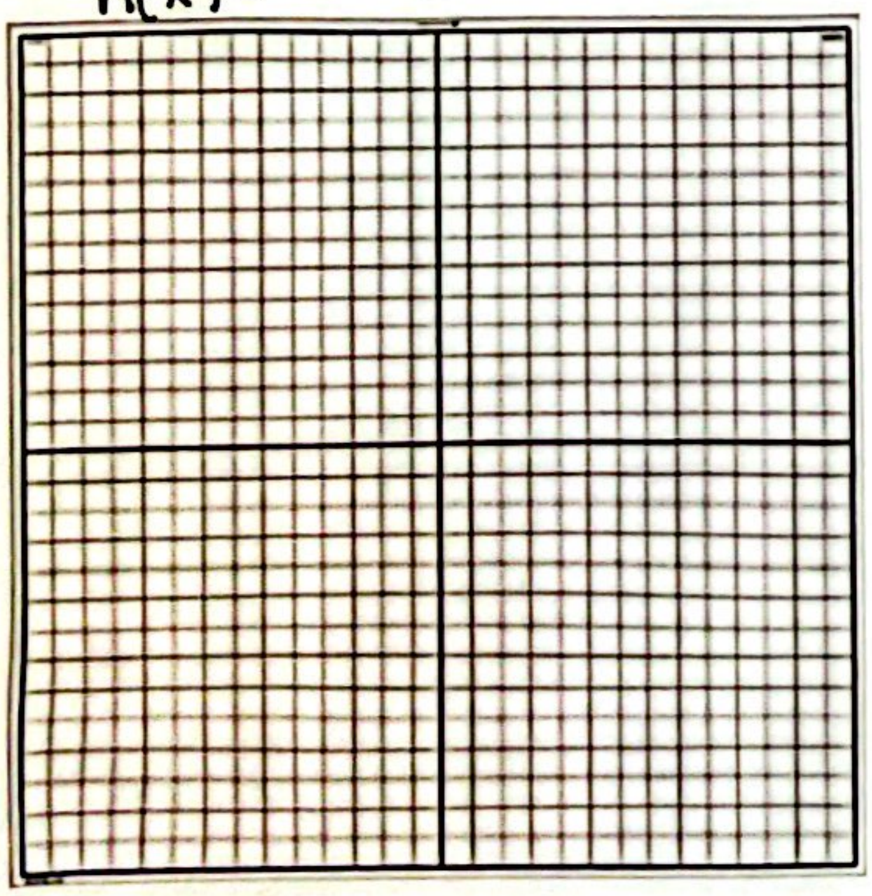
$f(x) = x^3 - x$



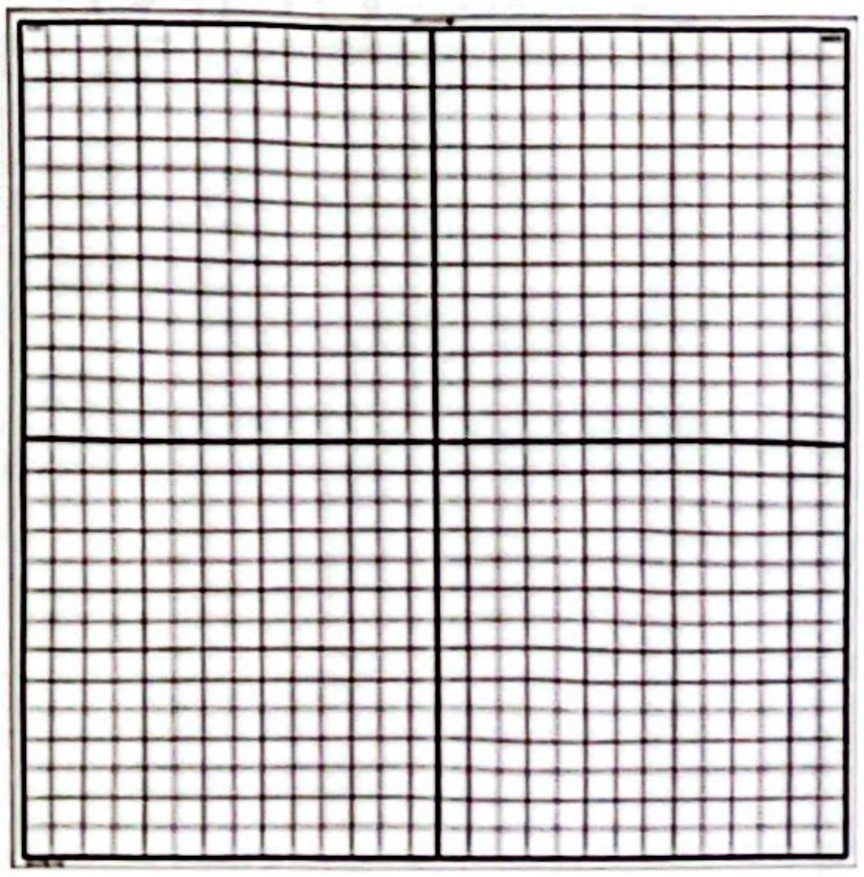
$g(x) = \frac{3}{x-1}$



$h(x) = \frac{x^2+4x+3}{x+1}$



$x^2 - 4x + y^2 + 6y - 3 = 0$



D. Perform the indicated operation

$f(x) = 2x^2 - 5x - 12$, $g(x) = 2x + 3$, $h(x) = \frac{x-3}{2}$

i) $2gh$

ii) $\frac{f}{g}$

iii) $g(h(x))$

iv) $h(g(x))$

v) $f(g(h(x)))$

vi) $h(g(f(x)))$

vii) $f + 4g$

viii) $g^2 - f$

ix) $\frac{fh}{g}$

x) $\frac{1}{x-4} \cdot f(h(g(x)))$

E. Use synthetic or polynomial division to evaluate the following

i) $(x^3 - 7x - 6) \div (x+1)$

ii) $\frac{x^3 - 7x - 6}{x-3}$

iii) $\frac{x^3 + 7x^2 - 4x - 28}{x+7}$

iv) $(x^3 + 7x^2 - 4x - 28) \div (x-2)$

v) The volume of a rectangular prism is $2x^3 + 4x^2 - 18x - 36$
If the area of the base is $x^2 - 9$, find the height.

Recall: $V = lwh$

F. Miscellaneous Topics.

Simplify

i) $\sqrt{98}$

ii) $\sqrt{288}$

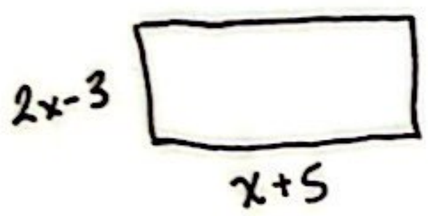
iii) $\sqrt{4800}$

iv) $\sqrt{\frac{343}{8}}$

v) $\sqrt{196}$

vi) $\sqrt{\frac{18}{169}}$

Find the perimeter and area of the rectangle



Solve

i) $\begin{cases} x+2y=5; \\ -3x+2y=1. \end{cases}$

ii) $\begin{cases} x=1-2y; \\ 5x-2y=41. \end{cases}$

iii) $\begin{cases} x+2y+3z=-2; \\ 4x-3y+7z=-3; \\ 2y+2z=-2. \end{cases}$

iv) $\begin{pmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \\ z \end{pmatrix}=\begin{pmatrix} 15 \\ 10 \\ 14 \end{pmatrix}$

$\begin{pmatrix} x \\ y \\ z \end{pmatrix}=\begin{pmatrix} \quad \end{pmatrix}$

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