

1.3 Factored Form Polynomial Functions Worksheet

This document was composed and formatted by Annie Bernatchez.

The course material originated from www.jensenmath.ca

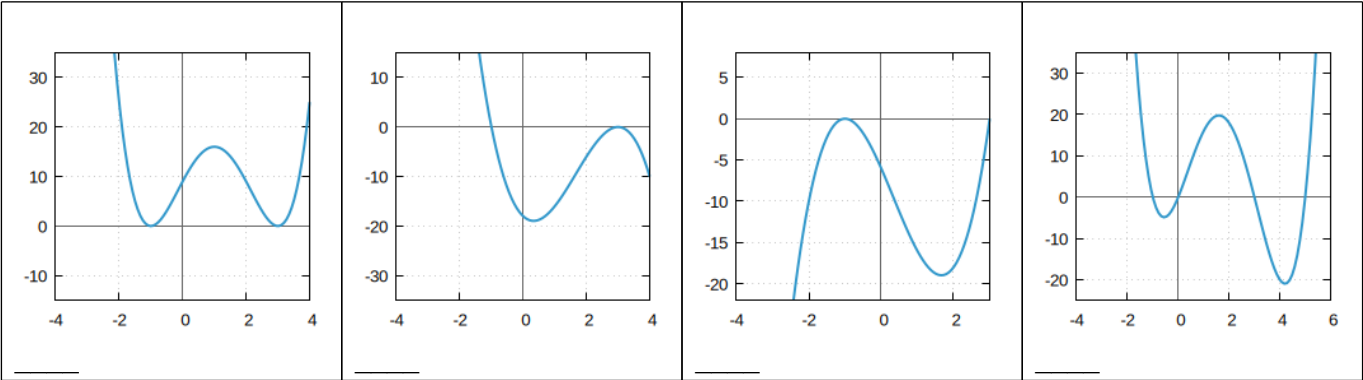
1) Match each equation with the most suitable graph. Write the letter of the equation beneath the matching graph.

A) $f(x) = 2(x + 1)^2(x - 3)$

B) $f(x) = (x + 1)^2(x - 3)^2$

C) $f(x) = -2(x + 1)(x - 3)^2$

D) $f(x) = x(x + 1)(x - 3)(x - 5)$

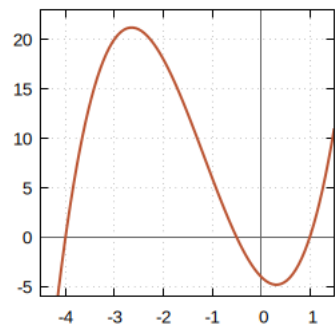


2) Complete the table

Equation	Degree	Leading Coefficient	End Behaviour	x-intercepts
$f(x) = (x - 4)(x + 3)(2x - 1)$				
$g(x) = -2(x + 2)(x - 2)(1 + x)(x - 1)$				
$h(x) = (3x + 2)^2(x - 4)(x + 1)(2x - 3)$				
$p(x) = -(x + 5)^3(x - 5)^3$				

3) For each graph, state...

- i) the least possible degree and the sign of the leading coefficient
 - ii) the x-intercepts (specify order of zero) and the factors of the function
 - iii) the intervals where the function is positive/negative
- a)

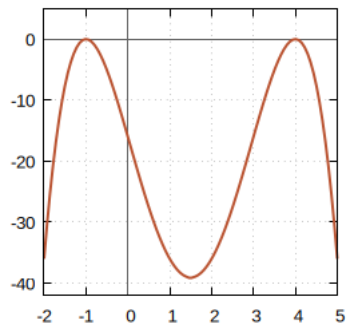


- i) degree:
leading coefficient:
- ii) x -intercepts:
factors:

iii)

Interval				
Sign				

b)

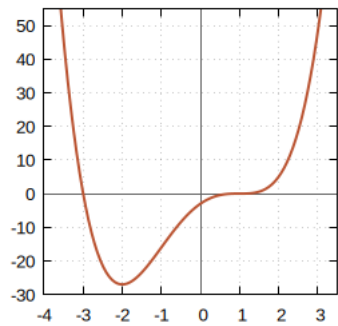


- i) degree:
leading coefficient:
- ii) x -intercepts:
factors:

iii)

Interval		
Sign		

c)



1.3 Factored Form Polynomial Functions Worksheet

i) degree:

leading coefficient:

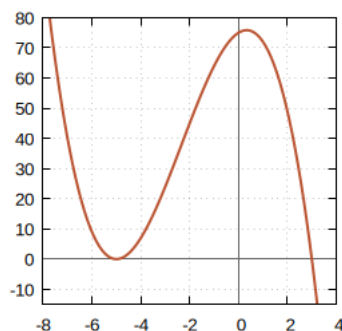
ii) x -intercepts:

factors:

iii)

Interval		
Sign		

d)



i) degree:

leading coefficient:

ii) x -intercepts:

factors:

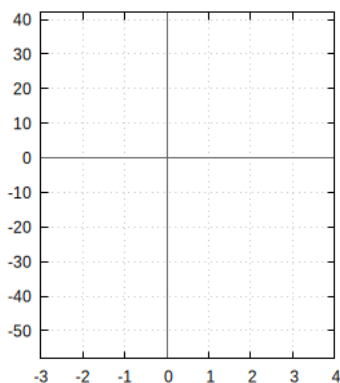
iii)

Interval		
Sign		

4) For each function, complete the chart and sketch a possible graph of the function, labelling key points.

a) $f(x) = -2(x - 3)(x + 2)(4x - 3)$

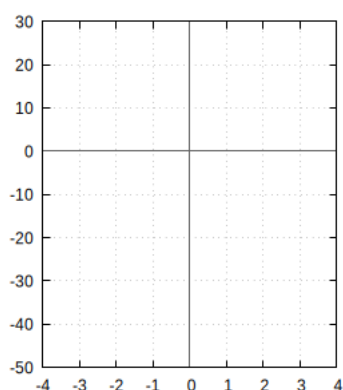
Degree	Leading Coefficient	End Behaviour	x -intercepts	y -intercept



b) $g(x) = (x - 1)(x + 3)(1 + x)(3x - 9)$

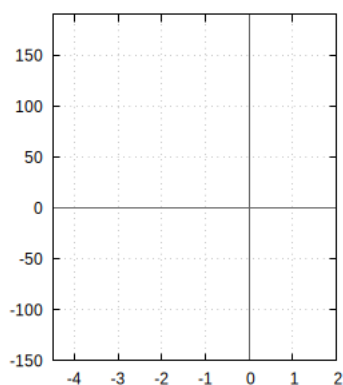
1.3 Factored Form Polynomial Functions Worksheet

Degree	Leading Coefficient	End Behaviour	x -intercepts	y -intercept



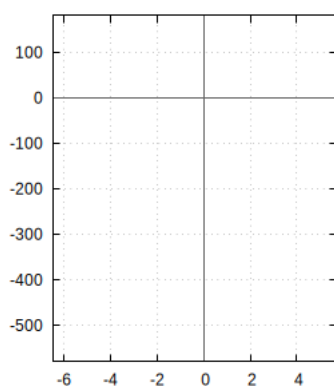
c) $h(x) = -(x+4)^2(x-1)^2(x+2)(2x-3)$

Degree	Leading Coefficient	End Behaviour	x -intercepts	y -intercept



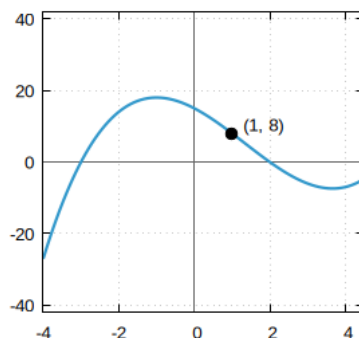
d) $p(x) = 3(x+6)(x-5)^2(3x-2)^3$

Degree	Leading Coefficient	End Behaviour	x -intercepts	y -intercept

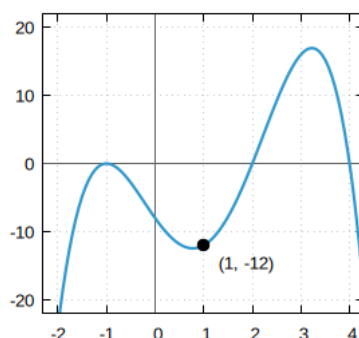


5) Write the equation of each function

a)



b)



6) Determine an equation for a quintic function with zeros -1 (order 3) and 3 (order 2) that passes through the point $(-2, 50)$.

7) Determine the zeros of $f(x) = (2x^2 - x - 1)(x^2 - 3x - 4)$.

Answer Key

1) B, C, A, D (in order of the graphs shown)

2)

Equation	Degree	Leading Coefficient	End Behaviour	x-intercepts
$f(x) = (x - 4)(x + 3)(2x - 1)$	3	2	Q3 to Q1	$(4, 0), (-3, 0), (\frac{1}{2}, 0)$
$g(x) = -2(x + 2)(x - 2)(1 + x)(x - 1)$	4	-2	Q3 to Q4	$(-2, 0), (-1, 0), (1, 0), (2, 0)$
$h(x) = (3x + 2)^2(x - 4)(x + 1)(2x - 3)$	5	18	Q3 to Q1	$(4, 0), (-1, 0), (-\frac{2}{3}, 0), (\frac{3}{2}, 0)$
$p(x) = -(x + 5)^3(x - 5)^3$	6	-1	Q3 to Q4	$(-5, 0), (5, 0)$

3) a) degree 3, positive; x-int $-4, -0.5, 1$, factors $(x+4)(2x+1)(x-1)$; signs $-, +, -, +$

b) degree 4, negative; x-int -1 (order 2), 4 (order 2), factors $(x + 1)^2(x - 4)^2$; signs $-, -, -, -$

c) degree 4, positive; x-int $-3, 1$ (order 3), factors $(x + 3)(x - 1)^3$; signs $+, -, -, +$

d) degree 3, negative; x-int -5 (order 2), 3 , factors $(x + 5)^2(x - 3)$; signs $+, +, -$

4) a) degree 3, leading coeff -8 , Q2 to Q4, x-int $(3, 0), (-2, 0), (0.75, 0)$, y-int $(0, -36)$

b) degree 4, leading coeff 3 , Q2 to Q1, x-int $(1, 0), (-3, 0), (-1, 0), (3, 0)$, y-int $(0, 27)$

c) degree 6, leading coeff -2 , Q3 to Q4, x-int $(-4, 0)$ order 2, $(1, 0)$ order 2, $(-2, 0), (1.5, 0)$, y-int $(0, 96)$

d) degree 6, leading coeff 81 , Q2 to Q1, x-int $(-6, 0), (5, 0)$ order 2, $(\frac{2}{3}, 0)$ order 3, y-int $(0, -3600)$

1.3 Factored Form Polynomial Functions Worksheet

5) a) $f(x) = 0.5(x + 3)(x - 2)(x - 5)$ b) $f(x) = -(x + 1)^2(x - 2)(x - 4)$

6) $f(x) = -2(x + 1)^3(x - 3)^2$

7) zeros: 4, 1, -1, -0.5