2.5 Families of Polynomial Functions Worksheet

This document was composed and formatted by Annie Bernatchez.

The course material originated from www.jensenmath.ca

1) The zeros of a quadratic function are -7 and -3.

a) Determine an equation for the family of quadratic functions with these zeros.

b) Write equations for two functions that belong to this family.

c) Determine an equation for the member of the family that passes through the point $(2, 18)$.

2) Examine the following functions. Which function does not belong to the same family?

a) $y = 1.5(x + 4)(x - 5)(x - 2)$

b) $y = -1.5(x - 2)(x - 5)(x + 4)$

c) $y = 1.5(x - 2)(x + 4)(x - 2)$

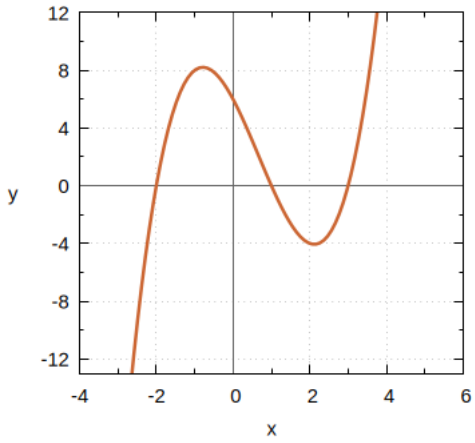
d) $y = 3(x - 5)(x - 2)(x + 4)$

3) The graphs of four polynomial functions are given. Which graphs represent functions that belong to the same family?

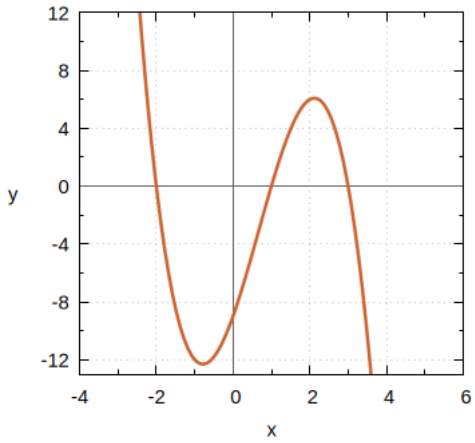
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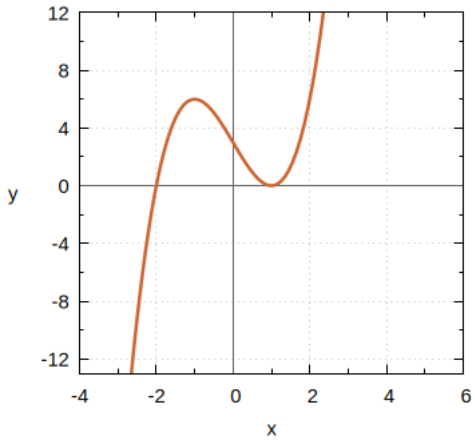
A)



B)

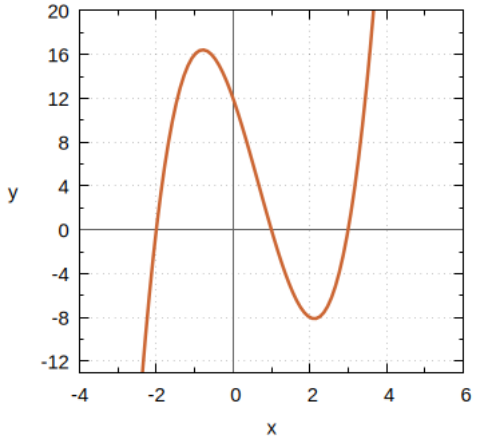


C)



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D)



4)

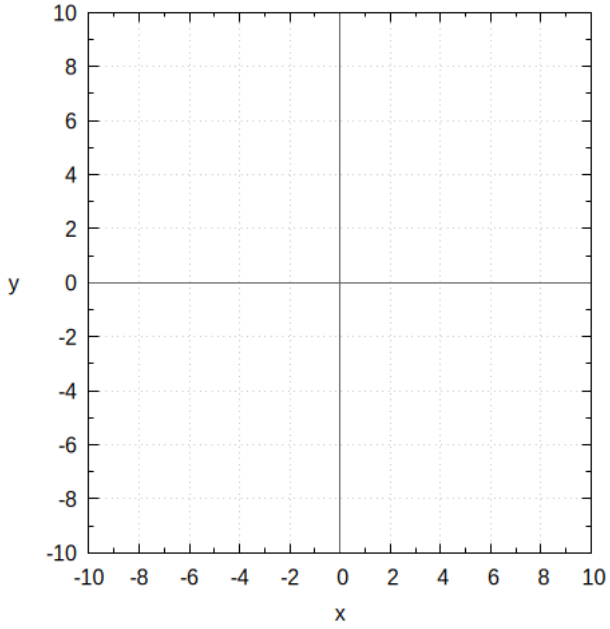
a) Determine an equation for the family of cubic functions with zeros -2, -1, and 1/2

b) Write equations for two functions that belong to this family.

c) Determine an equation for the member of the family whose graph has a y-intercept of 6.

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d) Sketch a graph of the function from part c).



5)

a) Determine an equation for the family of cubic functions with zeros $1 \pm \sqrt{2}$ and $-\frac{1}{2}$

b) Determine an equation for the member of the family whose graph passes through the point $(3,\ 35)$.

6)

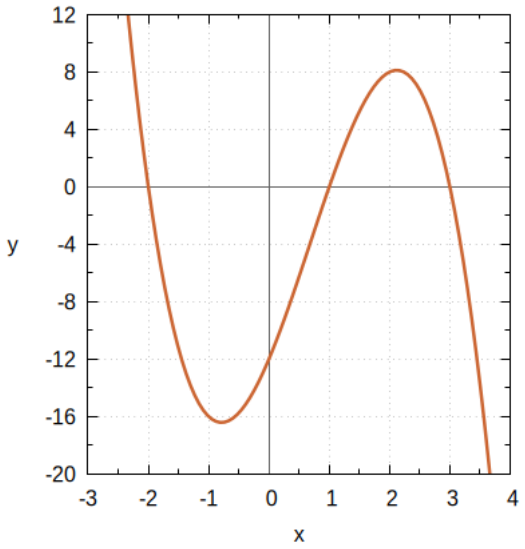
a) Determine an equation for the family of quartic functions with zeros 3 (order 2) and $-4 \pm \sqrt{3}$.

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b) Determine an equation for the member of the family whose graph passes through the point $(1, -22)$.

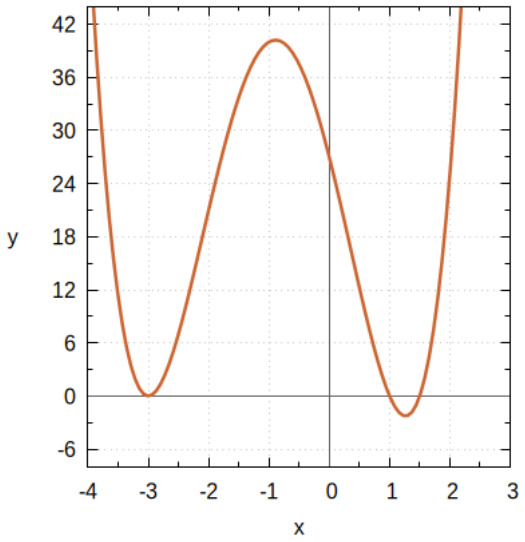
7) Determine an equation for each of the following functions

a)



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b)



Answer Key

1) a) $y = k(x + 7)(x + 3)$ b) e.g. $y = 87(x + 7)(x + 3)$, $y = 71(x + 7)(x + 3)$ c) $k = \frac{2}{5}$, $y = \frac{2}{5}(x + 7)(x + 3)$

2) c) — it has a repeated root at $x = 2$ instead of the shared zeros -4, 2, and 5.

3) A, B, and D belong to the same family (zeros -2, 1, 3); C does not (repeated zero at $x = 1$, no zero at $x = 3$).

4) a) $y = k(x + 2)(x + 1)(2x - 1)$ b) e.g. $y = 66(x + 2)(x + 1)(2x - 1)$, $y = 68(x + 2)(x + 1)(2x - 1)$ c) $k = -3$, $y = -3(x + 2)(x + 1)(2x - 1)$

5) a) $y = k(x^2 - 2x - 1)(2x + 1)$ b) $k = \frac{5}{2}$, $y = \frac{5}{2}(x^2 - 2x - 1)(2x + 1)$

6) a) $y = k(x - 3)^2(x^2 + 8x + 13)$ b) $k = -\frac{1}{4}$, $y = -\frac{1}{4}(x - 3)^2(x^2 + 8x + 13)$

7) a) $y = -2(x + 2)(x - 1)(x - 3)$ b) $y = (x + 3)^2(x - 1)(2x - 3)$

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