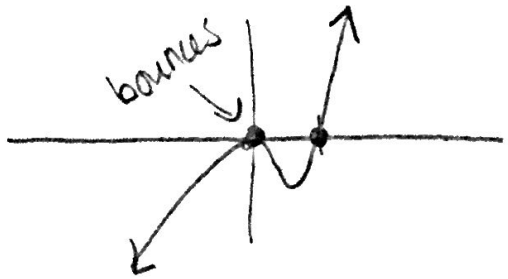
Name: _____ Date: _____ Block: _____ # _____

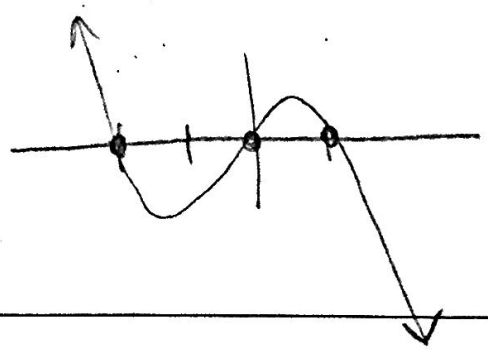
Quarter 2 Benchmark Review

1. Sketch each function. Complete the chart with the required information.

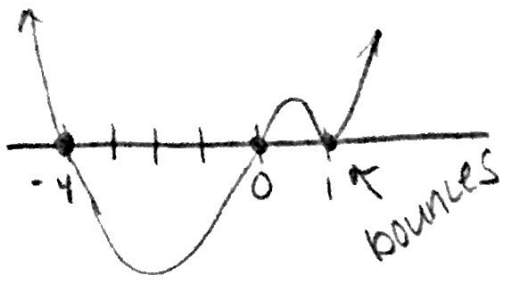
a) $f(x)=x^2(x-1)$

Leading Coefficient: 1	Degree: x^3 Cubic
End Behavior: ↙ ↗	
Zeros (list multiplicity in parentheses)	Rough sketch of graph:
$x=0$ (mult of 2)	
$x=1$	

b) $f(x)=-x(x-1)(x+2)$

Leading Coefficient: -1	Degree: x^3 Cubic
End Behavior: ↖ ↘	
Zeros (list multiplicity in parentheses)	Rough sketch of graph:
$x=0$	
$x=1$	
$x=-2$	

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

Leading Coefficient: 1	Degree: x^4 Quartic
End Behavior: ↑ ↑	
Zeros (list multiplicity in parentheses)	Rough sketch of graph:
$x = 0$	
$x = -4$	
$x = 1$ (mult of 2)	

3) Given one zero find all the zeros:

a) $f(x) = 9x^3 + 10x^2 - 17x - 2$; -2

$$\begin{array}{c|cccc} -2 & 9 & 10 & -17 & -2 \\ & \downarrow & -18 & +16 & 2 \\ \hline & 9 & -8 & -1 & 0 \end{array}$$

$9x^2 - 8x - 1 = 0$

$(9x + 1)(x - 1) = 0$

$x = -\frac{1}{9}$	$x = 1$	$x = -2$

b) $f(x) = x^3 - 14x^2 + 47x - 18$; 9

$$\begin{array}{c|cccc} 9 & 1 & -14 & 47 & -18 \\ & \downarrow & 9 & -45 & 18 \\ \hline & 1 & -5 & 2 & 0 \end{array}$$

$x^2 - 5x + 2 = 0$

$a = 1$
$b = -5$
$c = 2$

$$x = \frac{5 \pm \sqrt{(-5)^2 - 4(1)(2)}}{2(1)}$$

$x = \frac{5 \pm \sqrt{17}}{2}$	$x = 9$

Given one zero find all the zeros:

c) $f(x)=x^3+x^2+2x+24;\ -3$

$a=1$
$b=-2$
$c=8$

$$x=\frac{2\pm\sqrt{(-2)^2-4(1)(8)}}{2(1)}$$

$$x=\frac{2\pm\sqrt{-28}}{2}$$

$$x=\frac{2\pm\sqrt{-1}\sqrt{4}\sqrt{7}}{2}$$

$$x=\frac{2\pm 2i\sqrt{7}}{2}$$

$$x=1\pm i\sqrt{7} \quad | \quad x=-3$$

-3	1	1	2	24
	↓	-3	6	-24
	1	-2	8	0

$x^2-2x+8=0$

4) In a test kitchen, researchers have measured the radius of a ball of dough made with a new quick-acting yeast. Based on their data, the radius r of the dough ball, in centimeters, is given by $r=5(1.05)^{\frac{t}{3}}$ after t minutes. Round the answers to the following questions to the nearest tenth of a cm.

a. What is the radius after 5 minutes?

$r=5(1.05)^{5/3}$

$r=5.4\text{ cm}$

b. What is the radius after 20 minutes?

$r=5(1.05)^{20/3}$

$r=6.9\text{ cm}$

c. What is the radius after 43 minutes?

$r=5(1.05)^{43/3}$

$r=10.1\text{ cm}$

5) Simplify: $6\sqrt[3]{3}+4\sqrt[3]{9}$

a) $4\sqrt[3]{81}+2\sqrt[3]{72}-3\sqrt[3]{24}$

$4\sqrt[3]{27}\sqrt[3]{3}+2\sqrt[3]{8}\sqrt[3]{9}-3\sqrt[3]{8}\sqrt[3]{3}$

$4\cdot 3\sqrt[3]{3}+2\cdot 2\sqrt[3]{9}-3\cdot 2\sqrt[3]{3}$

$12\sqrt[3]{3}+4\sqrt[3]{9}-6\sqrt[3]{3}$

b) $\sqrt{28}+4\sqrt{63}-2\sqrt{7}$

$\sqrt{4}\sqrt{7}+4\sqrt{9}\sqrt{7}-2\sqrt{7}$

$2\sqrt{7}+4\cdot 3\sqrt{7}-2\sqrt{7}$

$12\sqrt{7}$