

Key

1. Write the equation given the roots $x = 7 - 8i$, $x = 0$ which passes through $(2, 178)$.

~~$$y = \frac{1}{2}(x^3 - 14x^2 + 113x)$$~~

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2. Write the equation of a parabola with roots of $x = 3$ and $x = -2$ which passes through $(2, -8)$.

$$y = 2(x^2 - x - 6)$$

- a. Does this parabola open up or down? How do you know?

up (minimum)

$$a > 0$$

3. My dog and I are at the park and I throw the ball for my dog to fetch. The equation that models this situation is $h(t) = -t^2 + 2t + 5.5$, where "h(t)" represents the height in feet and "t" represents time in seconds.

- a. What is the maximum height of the ball? 6.5 ft

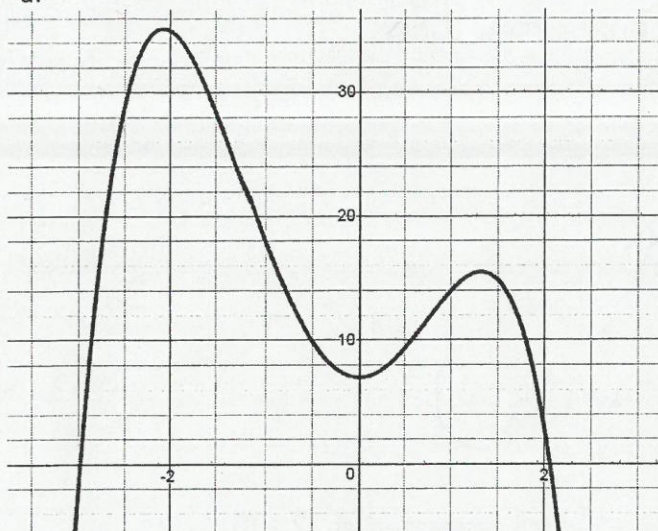
- b. How long will it take the ball to hit the ground? 3.55 sec

- c. If my dog is 2 feet tall, at what time would my dog be able to catch the ball if it was in the correct location?

3.12 sec

4. Use each diagram to answer the set of questions.

a.



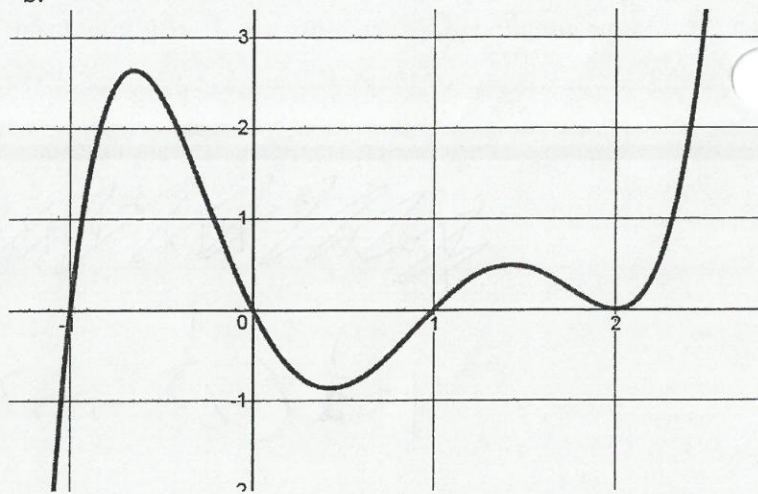
Number of real roots: 2

Number of imaginary roots: 2

Degree: 4

End Behaviors: L: $-\infty$ R: $+\infty$

b.



Number of real roots: 5

Number of imaginary roots: 0

Degree: 5

End Behaviors: L: $-\infty$ R: $+\infty$

5. Simplify:

a. $\sqrt{-84}$

$2i\sqrt{21}$

b. $\sqrt{172}$

$2\sqrt{43}$

c. $\sqrt{-216}$

$6i\sqrt{6}$

d. i^{43}

$-i$

e. i^{22}

-1

f. i^{33}

i

g. $(3 + 2i) - (-3 - 2i)$

$6 + 4i$

h. $(2i - 3) + (6 + 3i)$

$3 + 5i$

i. $(5 - 2i)(7 + 3i)$

$41 + i$

6. Find the zeroes.

a. By hand. Leave in simplified radical form.

$$y = -x^2 + 4x - 1$$

$$\frac{-4 \pm 2\sqrt{3}}{-2} \text{ or } \frac{2 \pm \sqrt{3}}{-1}$$

b. Use your calculator

$$y = -2x^3 + 5x^2 + 6x - 7$$

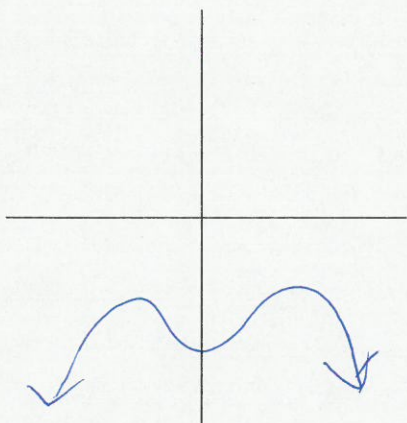
$$x = -1.41$$

$$x = 0.8$$

$$x = 3.1$$

7. Sketch a polynomial with the following features:

a. Negative L.C., Degree of 4, and 0 real roots



b. Positive L.C., Degree of 6, 1 real double root



c. Negative L.C., Degree of 9, and 4 real roots

