

You must use a separate piece of paper for your work.

$$F(x) = 2x^4 - 7x^3 + 13x^2 - 28x + 20$$

1. Find the upper and lower bound.
2. Use the Location Principle to locate the real roots.
3. List all the possible rational roots.
4. Find all the roots.
5. Use Descartes' Rule of Signs to fill a chart with columns total roots, positive real, negative real, and imaginary. List all possibilities.

Factor each polynomial and sketch its graph

6. $g(x) = 4x^3 + x^2 - 18x$

7. $h(x) = -x^4 + 10x^2 - 24$

8. Find the sum of product of the roots of $6x^3 - 9x^2 + x = 0$

Find a quadratic equation with integral coefficient with the given roots

9. $5 \pm \sqrt{2}$

10. $2 - i\sqrt{5}$

Find a cubic equation with integral coefficients that has the given roots:

11. 3 and $7 - i$

12. Find a quartic equation with integral coefficients that has roots $1 + i\sqrt{7}$ and $2 + i$

13. A rectangle has a perimeter of 80 cm. If its width is x , express its length and its area in terms of x . What is the maximum area that you can enclose?

14. The publisher of a magazine that has a circulation of 80,000 and sells for \$1.60 a copy decides to raise the price of the magazine because of increased production and distribution costs. By surveying the readers of the magazine, the publisher finds that the magazine will lose 10,000 readers for each \$0.40 increase in price. What price per copy maximizes the income? What will the projected revenue be?

Answers:

1. Lower bound: -1 Upper bound 4

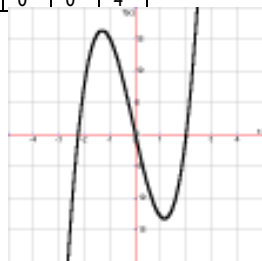
2. Between 2 and 3 and at 1

3. $\pm 1, \pm 2, \pm 4, \pm 5, \pm 10, \pm 20, \pm \frac{1}{2}, \pm \frac{5}{2}$

4. 1, 5/2, 2i, -2i

5.

total	+	-	i
4	4	0	0
	2	0	2
	0	0	4



6.



7.

8. 3/2, 0

9. $x^2 - 10x + 23 = 0$

10. $x^2 - 4x + 9 = 0$

11. $x^3 - 17x^2 + 92x - 150 = 0$

12. $x^4 - 6x^3 + 21x^2 - 42x + 40 = 0$

13. Area = $x(40 - x)$; Max = 400 unit square

14. \$2.40; Max profit \$144,000