Scavenger Hunt for Chapter 8

1) Create a table listing the possibilities for the nature of the roots of the equation: $0 = 2x^4 - 9x^3 + 13x^2 - x - 5$

1 Answer:

# of positive real roots	# of negative real roots	# of imaginary roots
3	1	0
1	1	2

2) The frequency of a radio signal varies inversely as the wave length. A signal of frequency 1200 kilohertz, which might be the frequency of an AM radio station, has wave length 250 m. What frequency has a signal of wave length 400 m?

2 Answer: 750 kilohertz

3) Divide the following: $\dfrac{x^4 + x^3 - 5x^2 + 13x - 6}{x^2 + 3x - 2}$

3 Answer: $x^2 - 2x + 3$

4) Given the polynomial, $P(x) = 2x^3 - 4x^2 + x - 5$, use synthetic division to find $P(3)$.

4 Answer: $P(3) = 16$

5) Find an equation with integral coefficients that has $\frac{1}{2}, -1 \; and \; 3$ as roots.

5 Answer: $2x^3 - 5x^2 - 4x + 3 = 0$

6) Solve the equation given the roots -1 and 4; $x^4 - 3x^3 - 8x^2 + 12x + 16 = 0$.

6 Answer: $x = -1,\ 4, -2,\ 2$

7) Solve the equation given $3 + i$ as a root; $x^4 - 6x^3 + 60x - 100 = 0$.

7 Answer: $x = 3 \pm i,\ \pm\sqrt{10}$

8) Use synthetic division to divide the following: $\dfrac{5x^4 - 3x^3 + 10x + 2}{5x - 3}$.

8 Answer: $x^3 + 2 + \dfrac{8}{5x - 3}$

9) Is $a + 3$ a factor of $a^5 + 3a^4 - 2a^3 - 6a^2 + a + 3$? Explain.

9 Answer: $a + 3$ is a factor because the remainder is 0.

10) Solve the equation given that 3 is a root; $2y^3 - 5y^2 - 4y + 3 = 0$.

10 Answer: $y = 3, -1, \dfrac{1}{2}$

11) Solve the equation given that $-1+i$ is a root; $0 = x^4 - 5x^2 - 10x - 6$.

11 Answer: $x = -1 \pm i,\ -1,\ 3$

12) Find a cubic equation with integral coefficients that has -2 and $1 + 3i$ as roots.

12 Answer: $x^3 + 6x + 20 = 0$

13) The centripetal force on an object, when that object is swung in a circle, varies jointly as the mass of the object and the square of its velocity and inversely as the radius of the circle. What would be the effect on the force if the mass, the velocity, and the radius were all doubled?

13 Answer: The force would be quadrupled.

14) Solve the system: $\begin{aligned} 4x^2 - y^2 &= 5 \\ xy - 3 &= 0 \end{aligned}$

14 Answer: $\left(\frac{3}{2}, 2\right), \left(-\frac{3}{2}, -2\right)$

15) Solve the system: $\begin{aligned} 2x^2 - 3y^2 &= 30 \\ x^2 + y^2 &= 25 \end{aligned}$

15 Answer: $(\sqrt{21}, 2), (\sqrt{21}, -2), (-\sqrt{21}, 2), (-\sqrt{21}, -2)$

NAME: _____ DATE: _____ BLOCK: ___

Chapter 8 Scavenger Hunt – ANSWER SHEET

Work shown algebraically:	Final answer:
1)	1. _____
2)	2. _____
3)	3. _____
4)	4. _____
5)	5. _____
6)	6. _____
7)	7. _____
8)	8. _____

9) 9. _____

10) 10. _____

11) 11. _____

12) 12. _____

13) 13. _____

14) 14. _____

15) 15. _____