

This Review Sheet is only for new material: Sections 3.2-3.4, 4.3-4.4, 6.1-6.2, 6.5
The Final Exam will be over material from the entire semester.
Use the old review sheets, exams, and quizzes to study material prior to Section 3.2

1. Given $f(x) = -x^4 + x^3 + 20x^2$, (a) Describe the right- and left- hand behavior, (b) find all real zeros and state the multiplicity of each, and (c) determine the maximum possible number of turning points. [Show work.]

2. Find a polynomial of degree 4 that has the zeros $x = -1, 2, 4$. [There are many correct answers.]

3. Use long division to divide.
 - (a). $(4x^3 - 3x + 2) \div (2x - 1)$
 - (b). $(x^4 + 9x^3 - 5x^2 - 36x + 4) \div (x^2 - 4)$

4. Use synthetic division to divide $(5x^3 + 6x + 8) \div (x + 2)$.

5. Use the Remainder Theorem and synthetic division to find $f(3)$ for $f(x) = 2x^3 - 3x^2 - x + 4$

6. Use synthetic division to show that $x = \frac{2}{3}$ is a solution of $48x^3 - 80x^2 + 41x - 6 = 0$. Use the result to factor the polynomial completely and find the remaining real solutions.

7. Verify that $(x + 3)$ and $(x - 2)$ are factors of $f(x) = 3x^3 + 2x^2 - 19x + 6$. Use the result to factor the polynomial completely and find all real zeros.

8. Given $f(x) = 3x^3 + 25x^2 - 19x - 9$
 - (a). List all possible rational zeros of f .
 - (b). Determine all the real zeros of f .

9. Find the directrix and focus of the parabola $x^2 + y = 0$. Then sketch the parabola.

10. Find the standard equation of an ellipse centered at the origin with foci at $(\pm 2, 0)$ and major axis length of 10.

11. Find the vertices, foci, and asymptotes* of the hyperbola $\frac{y^2}{64} - x^2 = 1$. Then sketch the hyperbola.
*[Added to Formula Sheet.]

12. Find the standard form of the equation of a parabola that has the vertex at $(3, -1)$, passes through the point $(6, 5)$, and has a horizontal axis.

13. Find the center, vertices, and foci of the ellipse $4(x + 2)^2 + (y + 4)^2 = 1$. Then sketch the ellipse.

14. Find the standard form of the equation of the hyperbola with vertices: $(1, 2), (5, 2)$ and foci: $(0, 2), (6, 2)$.

15. Given the following equations for a conic, write the equation in standard form and then identify whether the conic is a parabola, circle, ellipse, or hyperbola.

(a). $-9x^2 + y^2 - 54x - 4y - 113 = 0$

(b). $y^2 - 8y - 4x = 0$

16. Section 6.1 #34, 24

17. Section 6.2 #14, 24, 26

18. Section 6.1 #30

19. Section 6.5 #25 [Sketch by hand.]

20. Section 6.5 #45

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