

Part I – Algebra (adapted from previous years' exams)

Solve the following:

1. $(x^2x^1)^5$

2. $1 / (x^2 - 25) + 6 / (5 + x)$

3. $27^{-2/3}$

4. $-21/x^2 + 4/x + 1$

5. $3x^2 - 4x + 1 = 0$

6. Given the parabola:

$$y = x^2 + 6x + 13$$

- a. Find the vertex (x and y coordinates)
 - b. Does this open upwards or downwards?
 - c. Graph this parabola.
7. Find the interval consisting of all real numbers x such that $|3x - 5| \geq 6$
8. Consider two points: A is located on (3, 1) and B is located on (-4, -3).
- a. What is the distance between points A and B?
 - b. What is the slope of the line that connects these two points?
 - c. What is the equation of the line that passes through these two points?
 - d. What are the x and y intercepts of this line?
9. Consider the equation:
- $$3y - 5x = 7$$
- a. Write this equation in slope-intercept form.
 - b. What is the domain of this function?
 - c. What is the image of this function?
 - d. Is the ordered pair (2,3) a solution to this equation?
 - e. Find f(4).
10. Consider the following two equations:
- $$x + 3y = 12$$
- $$x - 4y = -9$$
- a. Illustrate both lines on a well-labeled diagram.
 - b. Solve for the intersection of the two lines.

11. Find the equation of the line that passes through the points (3, -2) and (1,6).

12. Solve for the unknowns in the following systems of equations:

a. $3x - y = 2$

b. $x + y = 6$

a. $2y^2 - x^2 = 1$

b. $x - 2y = 3$