Algebra Final Exam Worksheet

Organic Chemistry Tutor

1. Which of the following answer choices is equivalent to the expression shown below?

$$(3x + 5)(4x - 7)$$

A. $12x^2 - 41x - 35$
B. $12x^2 - x - 35$
C. $12x^2 + x - 35$
D. $12x^2 + 41x - 35$

2. Which of the following expressions is equivalent to the difference of the two polynomials shown below?

$$(9x^3 - 5x^2 + 7) - (4x^3 - 8x - 9)$$

A. $5x^3 + 3x^2 + 16$
B. $5x^3 - 13x - 2$
C. $5x^3 - 5x^2 + 8x + 16$
D. $5x^3 - 5x^2 - 8x - 2$

3. What is the slope of the line that passes through the points (3, -5) and (-9, -1)?

A. -2/3
B. -3
C. 3/2
D. -1
E. -1/3

4. Which of the following answer choices is equal to the expression shown below?

$$8 + 3(2 - 9)^2$$

A. -223
B. -34
C. 60
D. 155
E. 539

5. Factor each expression completely.

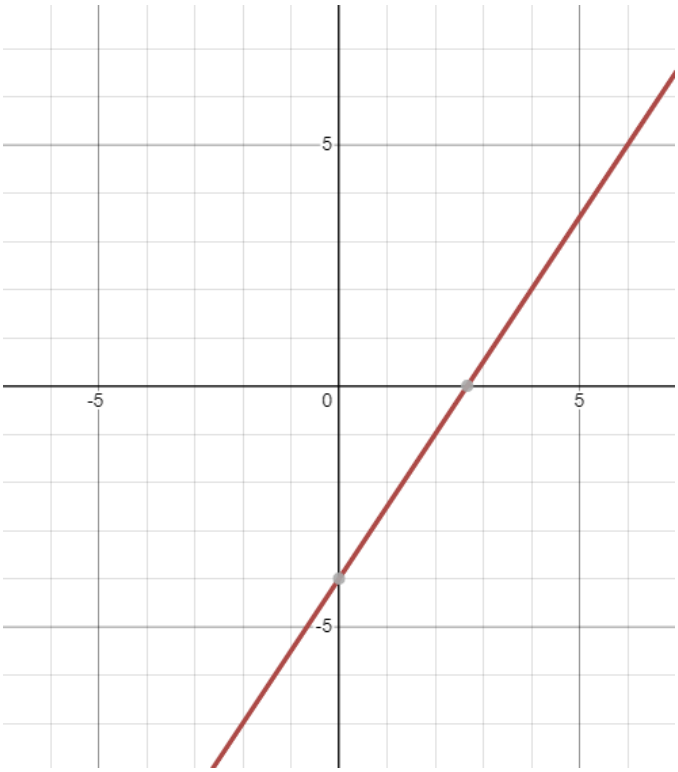
I. $9x^2 - 64$
II. $x^2 + 7x + 12$
III. $6x^2 + x - 15$
IV. $27x^3 - 64$

6. Which of the following is a solution to the equation shown below?

$$3(x - 5) + 7 = 5(x + 3) - 41$$

A. x = 2
B. x = 5
C. x = 9
D. x = 13
E. x = 17

7. Which of the following equations corresponds to the graph shown below?



A. $y = 2x - 4$
B. $y = -\frac{3}{2}x - 4$
C. $y = \frac{3}{2}x - 4$
D. $y = \frac{2}{3}x + 4$

8. Simplify the expression shown below:

$$(2x^3y^4)^3(3x^2y^5)^4$$

9. Simplify the expression shown below:

$$-3(5x^2y^7z^4)^0$$

10. Simplify the expression shown below:

$$\left(\frac{36x^4y^5z^{-4}}{63x^9y^{-3}z^{-6}}\right)^2$$

11. Which of the following is a solution to the equation shown below?

$$\frac{4}{x-1} = \frac{2}{x-3}$$

A. x = 1
B. x = 2
C. x = 3
D. x = 4
E. x = 5

12. Which of the following is a solution to the equation $6x^2 - 29x + 28 = 0$?

A. x = -4
B. x = 2/5
C. x = 4/3
D. x = 5
E. x = -1/2

13. Which of the following is a solution to the system of linear equations shown below?

$$7x + 2y = 24$$
$$5x - 3y = -5$$

A. (1, -4)
B. (3, -2)
C. (7, -3)
D. (2, 5)
E. (5, -7)

14. The length of a rectangle is four more than its width. If the area of the rectangle is 60 square feet, then what is the perimeter of the rectangle?

A. P = 16 ft
B. P = 22 ft
C. P = 26 ft
D. P = 32 ft
E. P = 64 ft

15. Graph the following linear equations:

I. x = 2
II. y = 3
III. 3x – 4y = 12
IV. y = 2x – 3

16. Determine if the two lines 4x – 5y = -10 and 5x + 4y = -12 are parallel, perpendicular, or neither.

17. Which of the following is a solution to the equation shown below?

$$|3x + 5| = 17$$

A. x = -22/3
B. x = 5
C. x = -8/17
D. x = 5/3
E. x = 17/8

18. Solve the absolute value inequality shown below. Graph the solution on a number line and represent it using interval notation.

$$4|8 - 3x| + 7 > 15$$

19. Solve the inequality shown below. Graph the solution on a number line and represent it using interval notation.

$$-18 < 7x - 4 \leq 17$$

20. Calculate the distance between the two points (-3, -7) and (2, 5).

A. 7
B. 9
C. 10
D. 13
E. 15

21. Simplify the radical expression shown below:

$$5\sqrt{48} - 2\sqrt{27} + 3\sqrt{75}$$

22. Rationalize the denominator.

$$\frac{3}{5 - \sqrt{2}}$$

23. Which of the following linear equations passes through the point (2, -7) and is parallel to the line Y = 3/2 X – 4?

A. 3x – 7y = 4
B. 3x – 2y = 20
C. 4x – 3y = 12
D. 2x – 7y = -14
E. 7x – 4y = 28

24. Which of the following is a solution to the equation shown below?

$$\frac{6}{x} + \frac{5}{x+2} = \frac{45}{x(x+2)}$$

A. x = 1
B. x = 2
C. x = 3
D. x = 4
E. x = 5

25. Simplify the complex fraction shown below.

$$\frac{4-\frac{2}{x}}{\frac{3}{y}-\frac{5}{xy}}$$

26. Simplify.

$$\frac{x^2+9x+20}{3x^2-75} \div \frac{2x+5x-12}{24x^2-54}$$

27. Which of the following could be a solution to the equation shown below?

$$\sqrt{x+9} = x-3$$

A. x = -4
B. x = -1
C. x = 2
D. x = 5
E. x = 7

28. Solve.

$$(x-4)^2 = -25$$

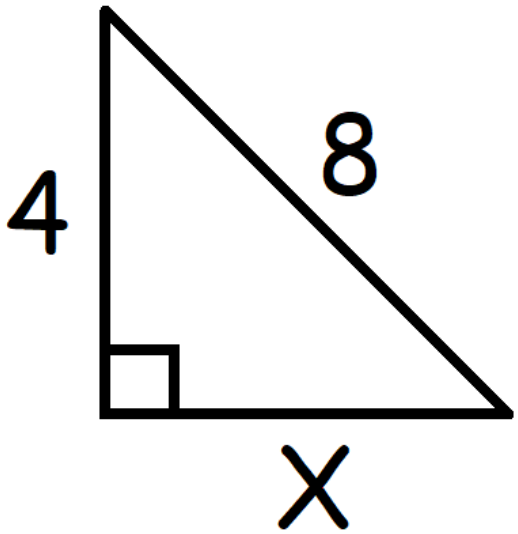
29. Write the equation of the line that passes through the points (4, -1/3) and (-2/5, 7).

A. $7x - 3y = 21$
B. $5x + 7y = 12$
C. $5x + 3y = 19$
D. $4x - 3y = 10$
E. $3x - 5y = -15$

30. Simplify the expression shown below.

$$\frac{35a^3b^7 - 63a^8b^4 + 42a^5b^3}{7ab^2}$$

31. Find the missing side length of the right triangle shown below.



32. Consider the graph of the function $Y = X^2 - 8X + 12$. (a) Identify the X and Y intercepts.
(b) Identify the coordinates of the vertex.
(c) Identify the location of the axis of symmetry.
(d) Determine the maximum or minimum value.
(e) Graph the quadratic function.

33. A ball is thrown straight up into the air at 32 ft/s from a 240 ft cliff adjacent to the sea. The height of the ball above the sea is represented by the function $h(t) = -16t^2 + 32t + 240$. (a) How long does it take the ball to reach its maximum height? (b) What is the maximum height of the ball? (c) How long does it take for the ball to fall to the sea?

34. Simplify the expression shown below.

$$\frac{5}{x-3} - \frac{4}{x+2}$$

35. Multiply.

$$(2x^2 + 5x - 3)(3x^2 + 4x - 6)$$

36. Which of the following could be a solution to the equation shown below?

$$16^{2x+3} = 8^{3x-1}$$

A. x = 3
B. x = -5
C. x = 15
D. x = 12
E. x = -9

37. Simplify the expressions shown below:

I. $16^{-3/4}$

II. $\sqrt{32x^2y^4z^7}$

III. $\sqrt[3]{16x^6y^{10}z^{14}}$

38. Using the equations shown below, what is the sum of x and y?

$$\sqrt[3]{x+5} = 2 \qquad \sqrt{y} - \sqrt{y-12} = 2$$

A. 3
B. 5
C. 10
D. 16
E. 19

39. What is the midpoint of the points (-4, 3) and (6, 8)?

40. Divide $2x^3 + 7x - 4$ by $x + 3$ using long division.

41. Graph the linear inequalities on the x-y plane.

I. $Y < -3/2\ x + 5$
II. $X \geq -2$
III. $Y > -4$

42. Evaluate.

I. $\log_2 8$

II. $\log_3 81$

III. $\log_4 \frac{1}{64}$

IV. $\log_9 3$

V. $\log_{25} \frac{1}{5}$

43. Solve each equation.

I. $\log_4 (x + 7) = 2$

II. $\log_2(x) + \log_2(x + 4) = 5$

III. $\log_3(y + 12) - \log_3(y - 12) = 2$

44. Graph the following equations. Write the domain and range of each function.

I. $y = (x - 3)^2$

II. $y = \sqrt{x} + 2$

III. $y = \frac{1}{x-2} + 3$

IV. $y = 3^{x+2} + 1$

V. $y = \log_2(x + 3)$

45. Consider the function below. (a) Identify the horizontal and vertical asymptotes. (b) Identify any holes. (c) Draw a rough sketch of the function.

$$y = \frac{3x^2 + 3x - 18}{x^2 - x - 12} + 5$$

Answers:

1. B
2. C
3. E
4. D

5. Factor each expression completely:

I. (3X + 8)(3X - 8) II. (X + 3)(X + 4) III. (3X + 5)(2X – 3) IV. (3X – 4)($9X^2$ + 12X + 16)

6. C
7. C

8. $648X^{17}Y^{32}$

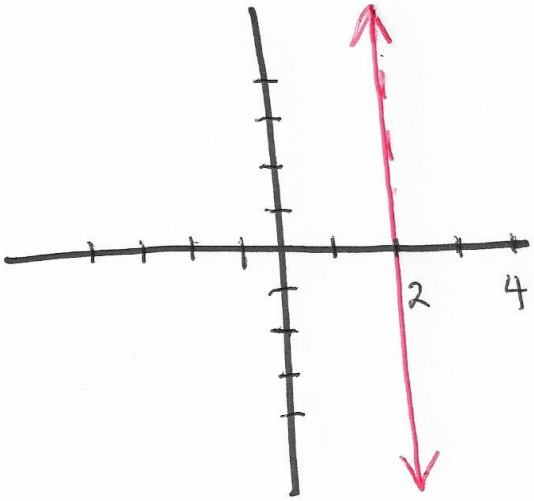
9. -3

10. $\frac{16y^{16}x^4}{49x^{10}}$

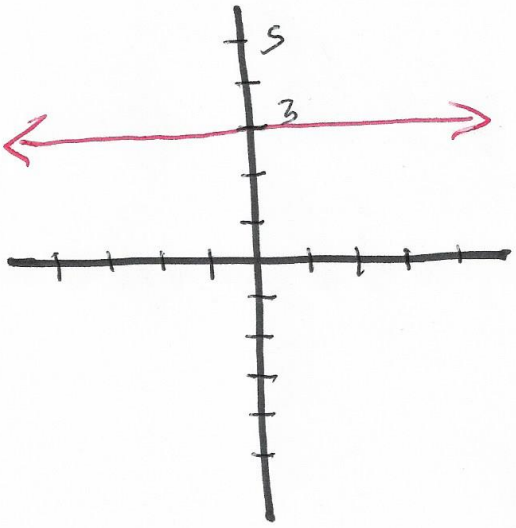
11. E
12. C
13. D
14. D

15.

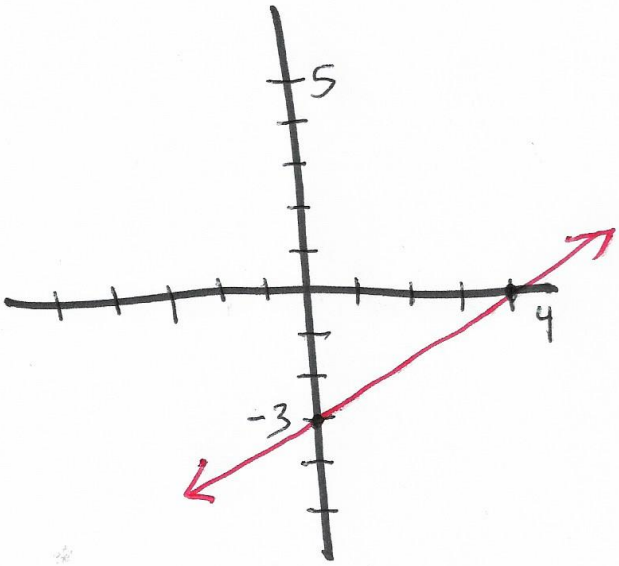
I. $x = 2$



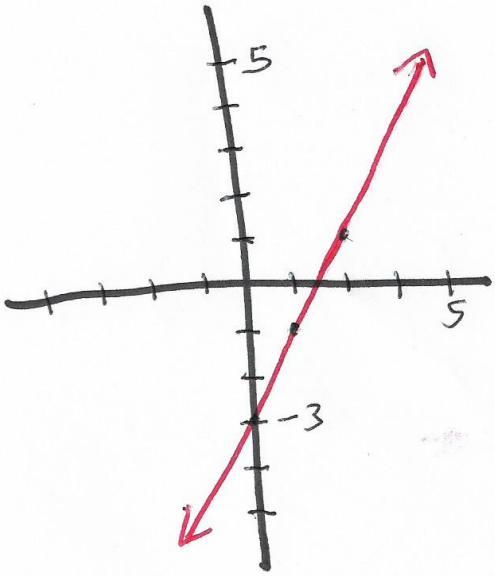
II. $y = 3$



III. $3x - 4y = 12$



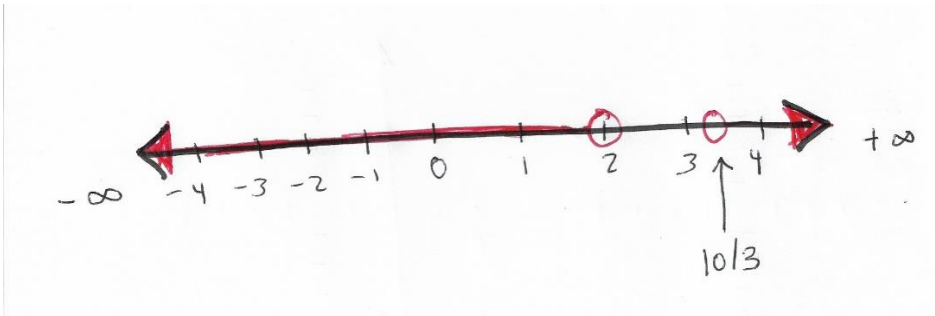
IV. $y = 2x - 3$



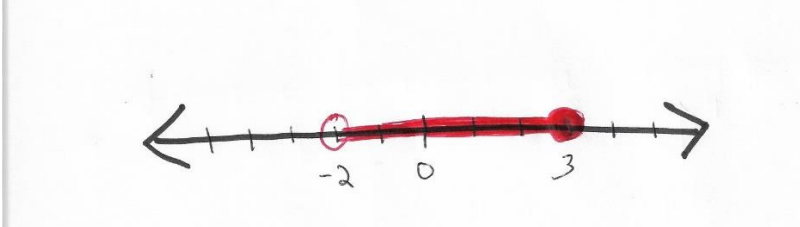
16. The two lines are perpendicular.

17. A

18. Inequality: $X < 2$ or $X > 10/3$
    Interval Notation: $(-\infty, 2) \cup (10/3, +\infty)$



19. Inequality: $-2 < X \leq 3$
    Interval Notation: $(-2, 3]$



20. D

21. $29\sqrt{3}$

22. $\frac{15+3\sqrt{2}}{23}$

23. B

24. C

25. $\frac{2y(2x-1)}{3x+5}$

26. $\frac{2(2x+3)}{x-5}$

27. E

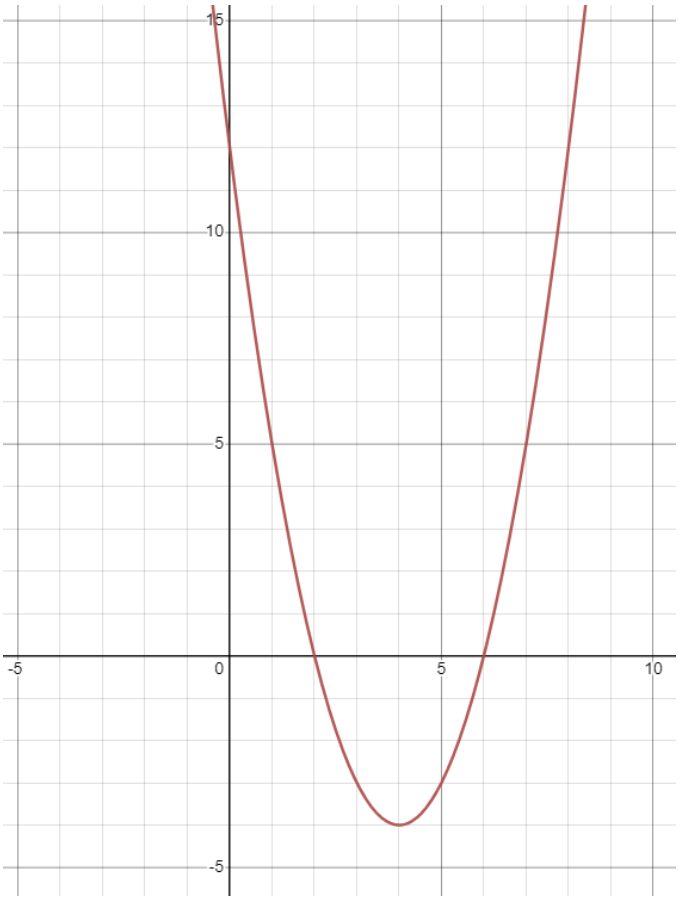
28. X = 4 + 5i and X = 4 – 5i

29. C

30. $5a^2b^5 - 9a^7b^2 + 6a^4b$

31. $4\sqrt{3}$ = 6.92820323

32a. Y-intercept: (0, 12) X-intercepts: (2, 0), (6, 0)
32b. Vertex: (4, -4)
32c. Axis of Symmetry: X = 4
32d. Minimum Value = -4

32e. 

33a. t = 1 second
33b. Maximum height = 256 ft
33c. t = 5 seconds

34. $\frac{x+22}{(x+2)(x-3)}$

35. $6x^4 + 23x^3 - x^2 - 42x + 18$

36. C

37a. 1/8

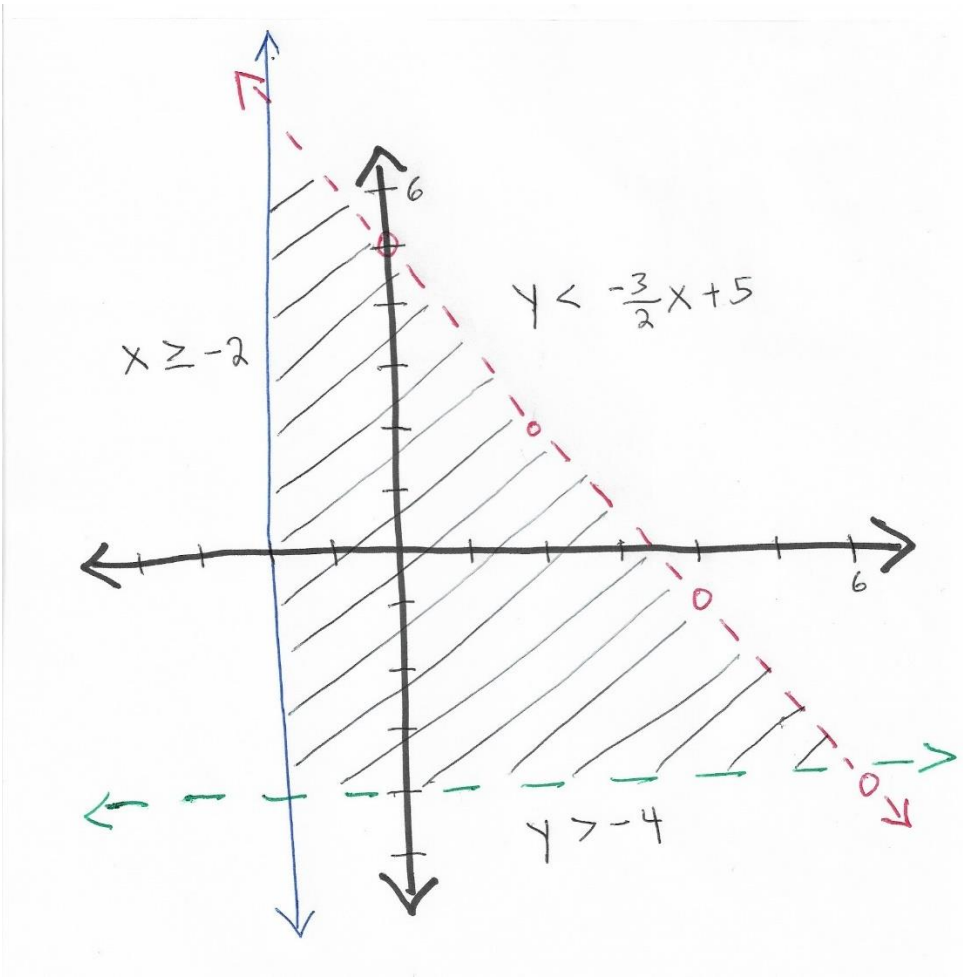
37b. $4y^2|xz^3|\sqrt{2z}$

37c. $2x^2y^3z^4\sqrt[3]{2yz^2}$

38. E

39. Midpoint (1, 11/2)

40. $2x^2 - 6x + 25 - \frac{79}{x+3}$

41. 

42a. 3

42b. 4

42c. -3

42d. +1/2

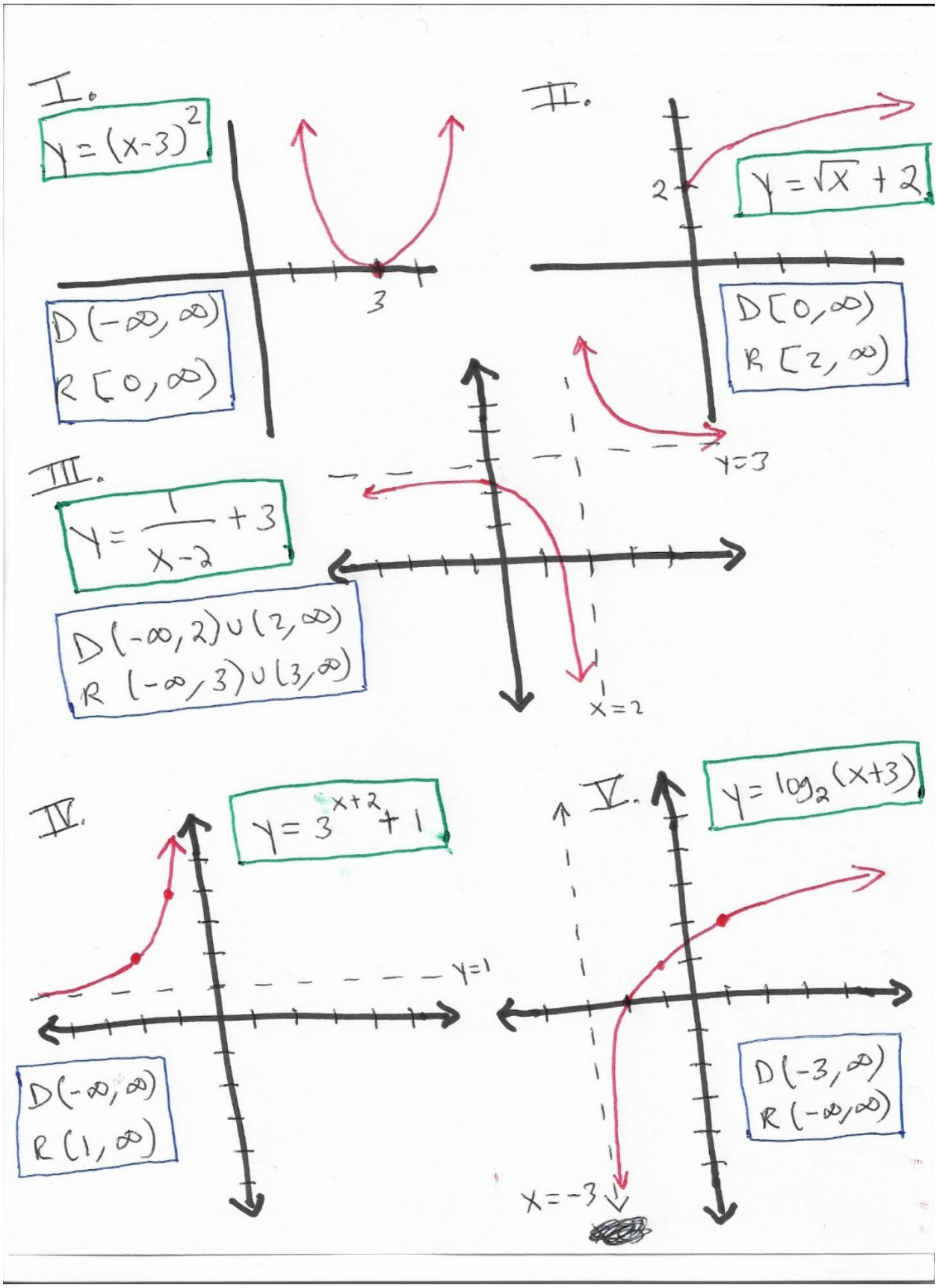
42e. -1/2

43a. X = 9

43b. X = 4

43c. y = 15

44.


I.
$y = (x-3)^2$
3
D $(-\infty, \infty)$
R $[0, \infty)$
II.
$y = \sqrt{x} + 2$
2
D $[0, \infty)$
R $[2, \infty)$
III.
$y = \frac{1}{x-2} + 3$
y=3
x=2
D $(-\infty, 2) \cup (2, \infty)$
R $(-\infty, 3) \cup (3, \infty)$
IV.
$y = 3^{x+2} + 1$
y=1
D $(-\infty, \infty)$
R $(1, \infty)$
V.
$y = \log_2(x+3)$
x=-3
D $(-3, \infty)$
R $(-\infty, \infty)$

45.