

Algebra II Summer Review Packet

The following exercises represent topics from Algebra II that you should be familiar with in order to be successful in Precalculus, Precalculus* or FST. You may need to refresh your memory by visiting Kahn Academy or using another online resource, but all of these topics are prerequisites for Precalculus and FST, and you will be held accountable for this knowledge in the first week of classes. You may use your graphing calculator or www.desmos.com as a graphing aid.

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. Determine which binomial is *not* a factor of $4x^4 - 21x^3 - 46x^2 + 219x + 180$.
- | | |
|------------|-------------|
| a. $x + 4$ | c. $x - 5$ |
| b. $x + 3$ | d. $4x + 3$ |
- _____ 2. Which is the equation of the parabola that has a vertex at the origin and a focus at (3, 0)?
- | | |
|---------------------------|---------------------------|
| a. $y = \frac{1}{12}x^2$ | c. $x = -\frac{1}{12}y^2$ |
| b. $y = -\frac{1}{12}x^2$ | d. $x = \frac{1}{12}y^2$ |

Short Answer

Solve the equation.

3. $6(x - 0.8) - 0.2(5x - 4) = -1$

4. $3|x - 3| - 8 = 4$

5. $\sqrt{x + 7} + 3 = 10$

6. $4(3 - x)^{\frac{4}{3}} - 5 = 59$

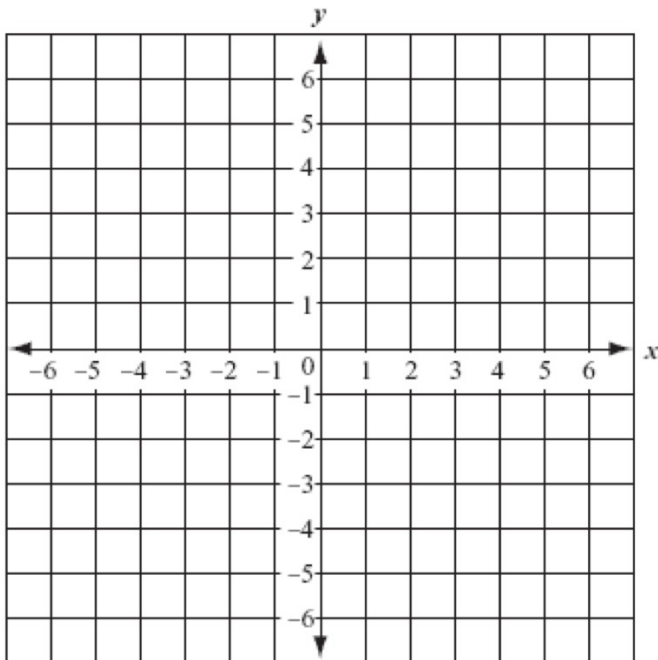
Solve the inequality. Graph the solution set.

7. $3(3b + 1) < -6 + 9b$

Solve the inequality. Graph the solution.

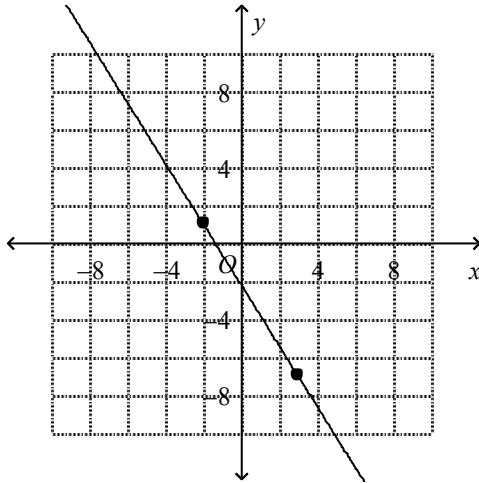
8. $|2x + 7| \geq 23$

9. Graph the equation $x + 3y = 12$.



Find the slope of the line through the pair of points.

10.

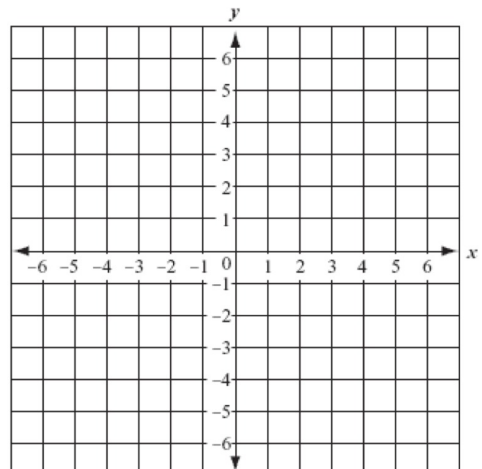


Find an equation for the line:

11. through (8, 4) and perpendicular to $y = -\frac{3}{4}x + 3$.

Graph the absolute value equation.

12. $y = -|3x + 4|$



13. A rental car agency charges a flat fee of \$32.00 plus \$2.25 per day to rent a certain car. Another agency charges a fee of \$24.50 plus \$3.75 per day to rent the same car.
- Write a system of equations to represent the cost c for renting a car at each agency for d days.
 - Using a graphing calculator, find the number of days for which the costs are the same. Round your answer to the nearest whole day.

Solve the system by the method of substitution.

14.
$$\begin{cases} 2x + 3y - 2z = 5 \\ -2x - 2y + 2z = -2 \\ -2x + z = -1 \end{cases}$$

15. Find a quadratic function to model the values in the table. Predict the value of y for $x = 5$.

x	y
-1	3
0	-2
3	19

16. A manufacturer determines that the number of drills it can sell is given by the formula $D = -4p^2 + 152p - 270$, where p is the price of the drills in dollars.
- At what price will the manufacturer sell the maximum number of drills?
 - What is the maximum number of drills that can be sold?

17. Write $y = -3x^2 + 24x - 50$ in vertex form.

Factor the expression.

18. $2x^2 - 15x - 50$

19. $x^3 + 216$

20. $x^4 - 34x^2 + 225$

Simplify the expression.

21. $(-6 + 2i)(-4 + 3i)$

Solve the quadratic equation by completing the square.

22. $x^2 + 2x - 4 = 0$

23. Write a polynomial function in standard form with zeros at -5 , -3 , and -4 .

Solve the equation by graphing. (Find the x-intercepts)

24. $-12x^3 - 18x^2 - 3x = 0$

25. Use the Rational Root Theorem to list all possible rational roots of the polynomial equation $x^3 - 2x^2 + 4x + 3 = 0$. Do not find the actual roots.

Find the roots of the polynomial equation. (roots = x intercepts)

26. $x^4 - 5x^3 + 11x^2 - 25x + 30 = 0$

Simplify the radical expression. Use absolute value symbols if needed.

27. $\sqrt[4]{625x^{20}y^{24}}$

28. Multiply and simplify $\sqrt[3]{7x^7} \cdot \sqrt[3]{5x^2}$. Assume that all variables are positive.

Rationalize the denominator of the expression. Assume that all variables are positive.

29. $\frac{\sqrt{3} - \sqrt{6}}{\sqrt{3} + \sqrt{6}}$

30. Write the exponential expression $5x^{\frac{5}{2}}$ in radical form.

31. Write $(8a^{-9})^{-\frac{2}{3}}$ in simplest form.

32. $(-7x + 9)^{\frac{1}{4}} = (8 + 3x)^{\frac{1}{4}}$

33. Let $f(x) = x^2 + 6$ and $g(x) = \frac{x+8}{x}$. Find $(g \circ f)(-7)$.

34. Find the inverse of $y = 2x^2 + 4$.

35. Write an exponential function $y = ab^x$ for a graph that includes (2, 24) and (1, 12).

36. Solve $15^{3x} = 22$. Round to the nearest ten-thousandth.

37. Solve $\log(8x + 7) = 0$.

38. Solve $\ln 2 + \ln x = 5$.

39. The amount of oil used by a ship traveling at a uniform speed varies jointly with the distance and the square of the speed. The ship uses 46 barrels of oil in traveling 85 miles at 26 mi/h. How many barrels of oil are used when the ship travels 36 miles at 40 mi/h? Round your answer to the nearest barrel, if necessary.

Find any points of discontinuity for the rational function.

40. $y = \frac{(x - 8)(x + 6)(x - 5)}{(x + 9)(x + 7)}$

41. Describe the vertical asymptote(s) and hole(s) for the graph of $y = \frac{(x + 1)(x - 4)}{(x - 4)(x + 5)}$.

42. Find the horizontal asymptote of the graph of $y = \frac{6x^3 - x + 2}{3x^6 - 9x + 2}$.

Multiply or divide. State any restrictions on the variables.

43. $\frac{b-3}{b+6} \div \frac{b-4}{b^2+b-30}$

Simplify the complex fraction.

44. $\frac{\frac{1}{4g} - \frac{4}{g}}{\frac{2}{2g} + \frac{4}{g}}$

45. $\frac{\frac{a+4}{a^2+6a-16}}{\frac{a+3}{a+8}}$

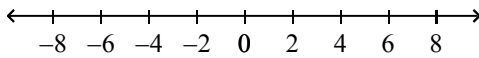
Solve the equation. Check the solution.

46. $\frac{a}{a^2-36} + \frac{2}{a-6} = \frac{1}{a+6}$

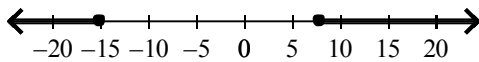
47. Orlando is making a design for a logo. He begins with a square measuring 24 inches on a side. The second square has a side length of 19.2 inches, and the third square has a side length of 15.36 inches. Which square will be the first square with a side length of less than 12 inches?

Algebra II - Review Answer Section

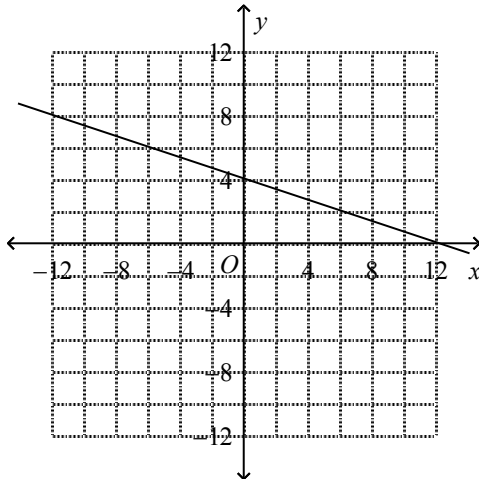
1. ANS: A
2. ANS: D
3. ANS: 0.6
4. ANS: $x = 7$ or $x = -1$
5. ANS: 42
6. ANS: -5, 11
7. ANS:
no solutions



8. ANS:
 $x \leq -15$ or $x \geq 8$

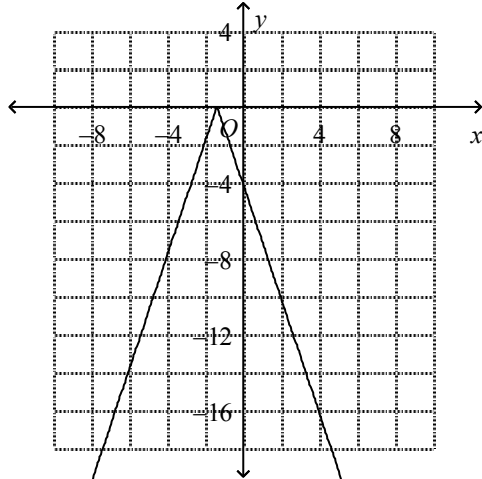


9. ANS:



10. ANS: $-\frac{8}{5}$
11. ANS: $y = \frac{4}{3}x - \frac{20}{3}$

12. ANS:



13. ANS:

a.
$$\begin{cases} c = 2.25d + 32.00 \\ c = 3.75d + 24.50 \end{cases}$$

b. 5

14. ANS: (3, 3, 5)

15. ANS: $y = 3x^2 - 2x - 2$; 63

16. ANS: \$19; 1,174 drills

17. ANS: $y = -3(x - 4)^2 - 2$

18. ANS: $(2x + 5)(x - 10)$

19. ANS: $(x + 6)(x^2 - 6x + 36)$

20. ANS: $(x - 3)(x + 3)(x - 5)(x + 5)$

21. ANS: $18 - 26i$

22. ANS: $-1 \pm \sqrt{5}$

23. ANS: $f(x) = x^3 + 12x^2 + 47x + 60$

24. ANS: 0, -1.31, -0.19

25. ANS: -3, -1, 1, 3

26. ANS: $2, 3, \pm i\sqrt{5}$

27. ANS: $5|x^5|y^6$

28. ANS: $x^3 \cdot \sqrt[3]{35}$

29. ANS: $-3 + 2\sqrt{2}$

30. ANS: $5\sqrt{x^5}$

31. ANS: $\frac{a^6}{4}$

32. ANS: $\frac{1}{10}$

33. ANS: $\frac{63}{55}$

34. ANS: $y = \pm \sqrt{\frac{x-4}{2}}$

35. ANS: $y = 6(2)^x$

36. ANS: 0.3805

37. ANS: $-\frac{3}{4}$

38. ANS: 74.2

39. ANS: 46 barrels

40. ANS: $x = -9, x = -7$

41. ANS: asymptote: $x = -5$ and hole: $x = 4$

42. ANS: $y = 0$

43. ANS: $\frac{(b-3)(b-5)}{b-4}, b \neq -6, 4$

44. ANS: $-\frac{3}{4}$

45. ANS: $\frac{a+4}{(a+3)(a-2)}$

46. ANS: -9

47. ANS: fifth square