Providence Catholic High School

Algebra 1 Honors Proficiency Exam Topics

Know and operate with the subsets of real numbers.

Know and use the properties of real numbers, order of operations, and exponential properties.

Add, Subtract, Multiply, Divide, Simplify, and Evaluate numeric and algebraic expressions including; terms with integer exponents, polynomials and radicals. (Include polynomial long division and rationalizing the denominator)

Solve and Graph Linear Equations and Inequalities.

Solve and Graph Absolute Value Equations and Inequalities.

Solve Systems of Linear Equations with graphs, substitution, and linear combination.

Identify slope and y intercept from an equation and graph.

Identify the slope of a line from 2 points.

Write linear equations from graphs, points, slope and a point, in y-intercept and standard form.

Estimate, evaluate, and simplify radical expressions.

Completely factor polynomials using; greatest common factor, difference of squares, simple and complex trinomials, 4 terms by grouping, and completing the square.

Solve rational equations.

Find real solutions for quadratic and radical equations.

Use the quadratic formula.

Use the discriminant of the quadratic formula.

Graph quadratic and radical equations.

Solve word problems.

ALGEBRA 1 HONORS

PRACTICE QUESTIONS

1. A student tries to solve the problem: How long does it take a car to travel 240 miles if the car's rate is 60 mi/h? The student uses unit analysis to check the problem. Which set of units is correct?

   [A] $\frac{\text{h}}{\text{mi/h}}$ [B] $\frac{\text{mi/h}}{\text{h}}$ [C] $\frac{\text{mi}}{\text{mi/h}}$ [D] $\frac{\text{mi/h}}{\text{mi}}$

2. Simplify: $5+2(3+4)^2$ [A] 37 [B] 103 [C] 201 [D] 343

3. Write an expression to represent the following:
   "2 times what Wade's age was 7 years ago"

   [A] $2x+7$ [B] $2(x-7)$ [C] $2x-7$ [D] $2(x+7)$

4. Find the quotient $\frac{12}{-\frac{4}{9}}$. [A] $\frac{1}{27}$ [B] $\frac{9}{4}$ [C] $\frac{3}{9}$ [D] -27

5. Find an equation of the line containing the points $(-8, -7)$ and $(-12, -16)$.

   [A] $18x-8y=-62$ [B] $-9x-4y=100$

   [C] $4x-18y=31$ [D] $9x-4y=-44$

6. The Robertsons find that they have used $\frac{1}{2}$ gallon of paint to cover 540 square feet of wall. They used $\frac{3}{4}$ gallon of paint to cover 810 square feet of wall. Which of the following equations shows the number of gallons of paint they will need, G, to cover s square feet of wall?

   [A] $G=\frac{s}{540}$ [B] $G=270s$ [C] $G=\frac{s}{1350}$ [D] $G=\frac{s}{1080}$

7. A large factory knows that if it sells its new gadgets for \$6 each, it can sell 350 per month, and if it sells the same gadgets for \$7, it will sell 300 per month. Assuming the relationship between price and sales is linear, predict the monthly sales of gadgets to the nearest whole number if the price is \$8.

   [A] 200 [B] 250 [C] 280 [D] 235

8. Solve: $|4x-2| < 3$

[A] $x \leq -\frac{1}{4}$ or $x \geq \frac{5}{4}$

[B] $-\frac{1}{4} \leq x \leq \frac{5}{4}$

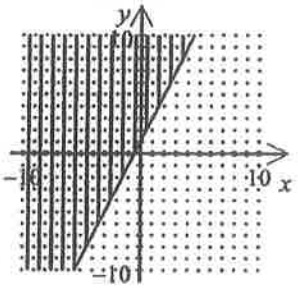
[C] $-\frac{1}{4} < x < \frac{5}{4}$

[D] $x < -\frac{1}{4}$ or $x > \frac{5}{4}$

Graph:

9. $-y \geq 2x-1$

[A]



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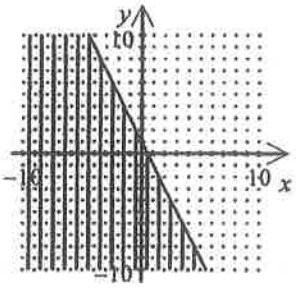

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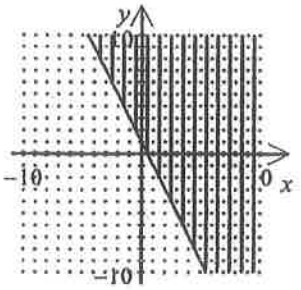

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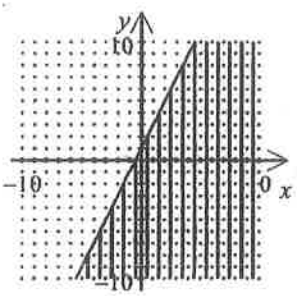
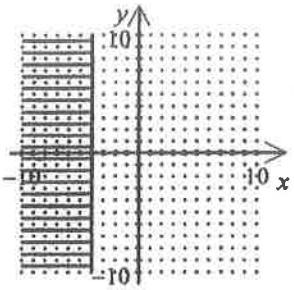


Graph:

10. $x \geq -4$

[A]



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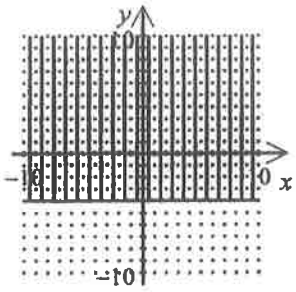

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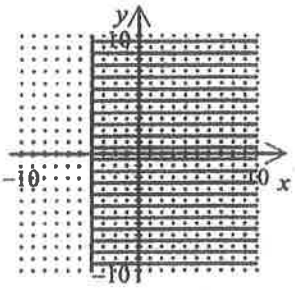

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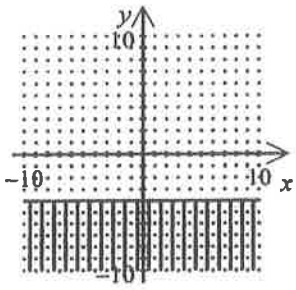
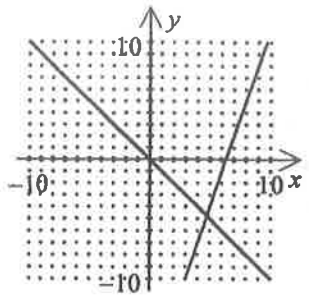


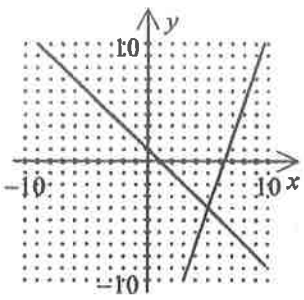
11. Solve the system by graphing: $x + y = 1$
$y = 3x - 19$

[A]



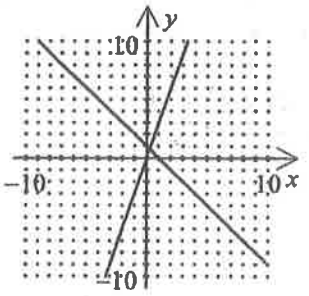
$\left(\frac{19}{4}, -\frac{19}{4}\right)$

[B]



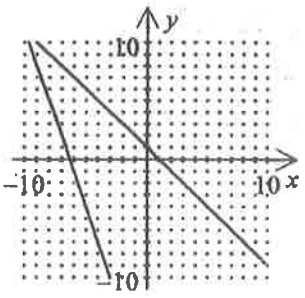
$(5, -4)$

[C]



$\left(\frac{1}{4}, \frac{3}{4}\right)$

[D]



$(-10, 11)$

12. The length of a rectangle is 2 cm more than two times the width. If the perimeter of the rectangle is 28 cm, what are the dimensions?

[A] width = 4 cm, length = 10 cm

[B] width = 8 cm, length = 18 cm

[C] width = 8 cm, length = 20 cm

[D] width = 4 cm, length = 20 cm

13. Mr. Frankel bought 7 tickets to a puppet show and spent \$32. He bought a combination of child tickets for \$2 each and adult tickets for \$8 each. Which system of equations below will determine the number of adult tickets, a, and the number of child tickets, c, he bought?

[A] $a + c = 224$
$a + c = 7$

[B] $8a + 2c = 32$
$a + c = 7$

[C] $2a + 2c = 39$
$a + c = 7$

[D] $a = c - 8$
$8a + 2c = 32$

14. Determine if the system has no solutions, one solution, or many solutions.
$3x - y = 15$
$-9x + 3y = -45$

[A] no solution

[B] (4, 3)

[C] (4, –3)

[D] many solutions

15. Simplify the product: $(4fg^3)^4(fg)^2$

[A] $256f^6g^5$ [B] $4f^5g^{14}$ [C] $4f^6g^{14}$ [D] $256f^6g^{14}$

Simplify:

16. $a^4 \times a^{-8}$ [A] a^4 [B] a^{32} [C] $\frac{1}{a^4}$ [D] $\frac{1}{a^{32}}$

17. $\frac{9x^7y^3}{-3x^5y^4}$ [A] $-\frac{2x^{12}}{y^7}$ [B] $\frac{3x^2}{y}$ [C] $-\frac{3x^2}{y}$ [D] $\frac{2x^{12}}{y^7}$

18. Multiply: $(2.1\times10^{-16})(6.6\times10^{12})$

[A] 1.386×10^{-4} [B] 8.7×10^{-4} [C] 13.86×10^{-3} [D] 13.86×10^{-4}

19. Write an exponential function to model the situation.

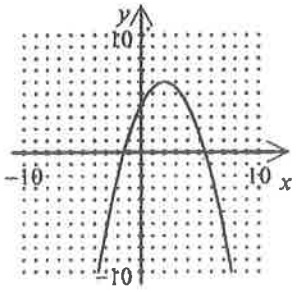
A population of 240 animals that decreases at an annual rate of 16%.

[A] $y = 240(0.16)^x$ [B] $y = 240(1.16)^x$ [C] $y = 240(0.84)^x$ [D] $y = 240(1.84)^x$

20. Simplify: $\sqrt{4} \cdot \sqrt{30}$ [A] $4\sqrt{30}$ [B] $\sqrt{120}$ [C] $2\sqrt{30}$ [D] $3\sqrt{20}$

21. Graph: $y = -x^2 - 2x - 4$

[A]



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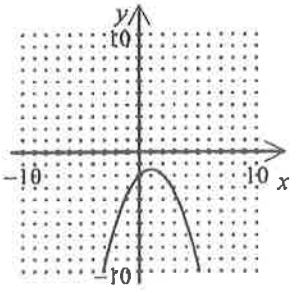

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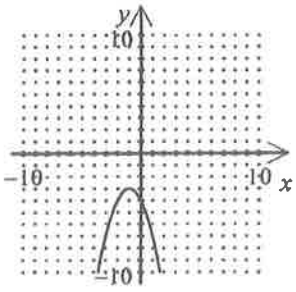

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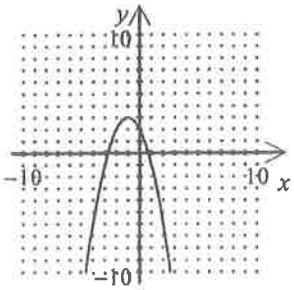


22. Solve: $x^2+6x+7 = 0$

[A] $3+\sqrt{2}, 3-\sqrt{2}$ [B] $6+2\sqrt{2}, 6-2\sqrt{2}$

[C] $-6+2\sqrt{2}, -6-2\sqrt{2}$ [D] $-3+\sqrt{2}, -3-\sqrt{2}$

23. Add: $(3x^3+5x^6-3) + (7x^6+5+3x^3)$

[A] $10x^6+10x^3+2$ [B] $12x^6+6x^3+2$ [C] $12x^6+6x^3-8$ [D] $10x^6+10x^3$

24. The sides of a rectangle have length $x+1$ and width $x-7$. Which equation below describes the area, A, of the rectangle in terms of x?

[A] $A = 4x-12$ [B] $A = 2x-6$ [C] $A = x^2+8x-7$ [D] $A = x^2-6x-7$

25. The area of a rectangular school yard is given by the equation $x^2+15x+50$ as measured in square yards. Your teacher wants you to run the length. How far will you run if $x = 21$?

[A] 57 yards [B] 26 yards [C] 31 yards [D] 5 yards

26. Solve: $9e^2+24e+16=0$

[A] $e=\frac{4}{3}$ [B] $e=-\frac{4}{3}$ [C] $e=\frac{3}{4}$ [D] $e=-\frac{3}{4}$

27. Find an equation of variation when y varies inversely with x and $y = 9$ when $x = 5$.

[A] $y=\frac{5}{9}x$ [B] $y=\frac{9}{5}x$ [C] $y=\frac{x}{45}$ [D] $y=\frac{45}{x}$

28. Simplify: $\frac{-4x+4x^2}{-32x+32}$ [A] $\frac{x-x^2}{8x-8}$ [B] $\frac{1-x}{16}$ [C] $-\frac{x}{8}$ [D] $\frac{x^2}{16}$

29. Divide: $\frac{x+1}{x-1} \div \frac{x^2-1}{1-x}$ [A] $\frac{1}{x-1}$ [B] $\frac{1}{-1-x}$ [C] $\frac{x+1}{x-1}$ [D] $\frac{1}{1-x}$

30. Add: $\frac{2}{x+9}+\frac{5}{x-9}$ [A] $\frac{7}{x^2-81}$ [B] $\frac{7x+27}{x^2-81}$ [C] $\frac{7}{x+9}$ [D] $\frac{7x+27}{7}$

31. A board of length $\frac{8}{x+4}$ cm was cut into two pieces. If one piece is $\frac{4}{x-4}$ cm, express the length of the other board as a rational expression.

[A] $\frac{12x+48}{(x+4)^2}$ [B] $\frac{4x-48}{(x+4)^2}$ [C] $\frac{12x+48}{(x+4)(x-4)}$ [D] $\frac{4x-48}{(x+4)(x-4)}$

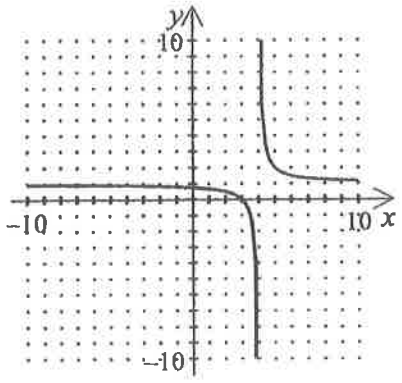
32. A rectangle has an area of $(x^3+x^2-10x+8)$ square meters, and a width of $(x+4)$ meters. Find its length.

[A] (x^2+x-10) meters [B] $(x^2-3x-10)$ meters

[C] (x^2-3x+2) meters [D] (x^2+x+2) meters

33. Solve: $\frac{x}{x^2-36}+\frac{6}{x-6}=\frac{1}{x+6}$ [A] 7 [B] −7 [C] 6 [D] no solution

34. Which function matches the graph?



[A] $f(x)=\frac{x-2}{x-5}$ [B] $f(x)=\frac{x-4}{x-3}$ [C] $f(x)=\frac{x-5}{x-2}$ [D] $f(x)=\frac{x-3}{x-4}$

35. Solve by completing the square: $2x^2-4x-4=0$

[A] $1\pm\sqrt{3}$ [B] $-1\pm\sqrt{3}$ [C] $-1\pm 2\sqrt{3}$ [D] $1\pm 2\sqrt{3}$