

**DIRECTIONS:** No calculators. *Show ALL of your work* or you may not receive credit. All work must be shown on this test; scratch paper will not be graded. Simplify all answers completely. If there is a blank, write your answer in the blank, otherwise **circle your answer**.

**EQUATION OF A LINE**

1. Give the equation of a horizontal line through point  $(2, 1)$ .
  
  
  
  
  
  
  
  
  
  
2. In slope intercept form, give the line going through points  $(0, -5)$  and  $(2, -6)$

**FACTOR each of the following polynomials completely.**

3.  $x^6 - 64$

4.  $3x^2 - 14x - 5$

5.  $x^4 - 16$

6.  $121x^2 - 110x + 25$

**SIMPLIFY** each of the following expressions completely.

7.  $\frac{7}{\sqrt{8x^3}}$

8.  $\sqrt{18x^2y^9}$

9.  $\frac{6 + \frac{3}{x}}{\frac{x}{4} + \frac{1}{8}}$

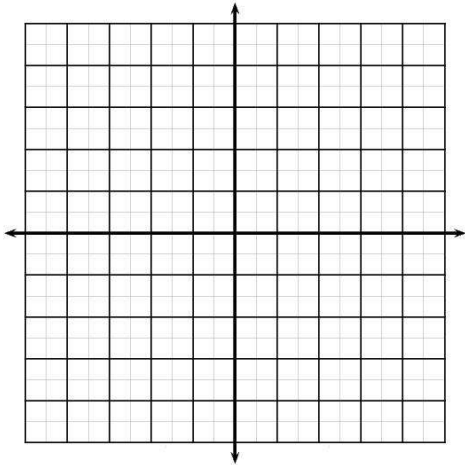
10.  $27^{-\frac{2}{3}}$

11.  $\frac{2x}{x^2 - 1} - \frac{1}{x + 1}$

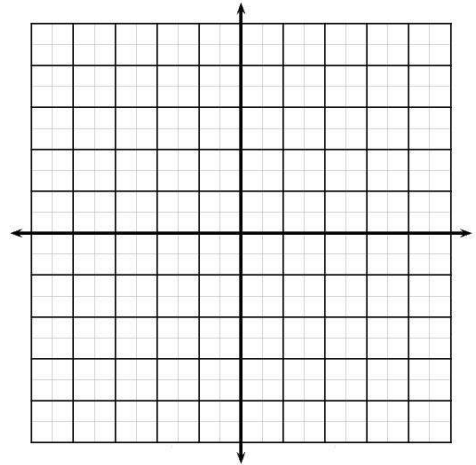
12.  $\frac{-2x^{-3}y^{-2}}{10x^2y^{-4}}$

**GRAPHING:** Graph each equation on the grid provided. PLEASE NOTE that the bold lines represent units and that the light lines are there to represent half spaces.

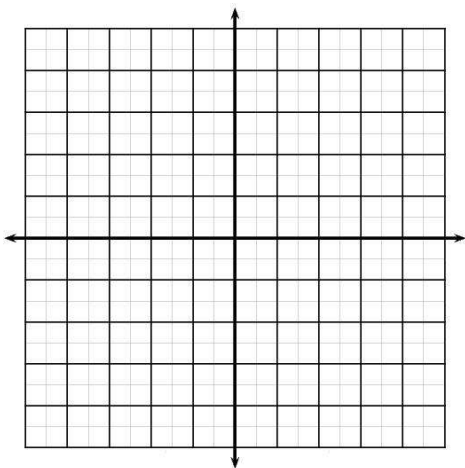
13.  $x - 2y = -8$



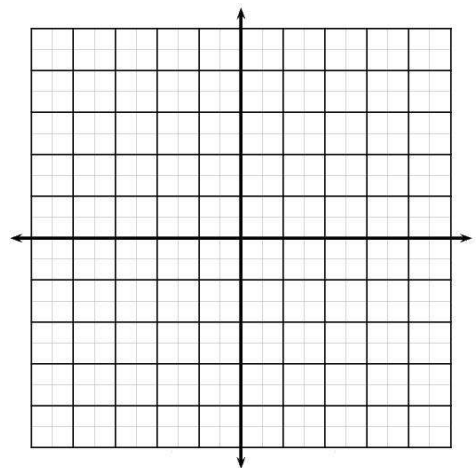
14.  $x = 3$



15.  $x < 2y + 1$



16.  $y = \frac{1}{2}(x - 1)^2 - 4$



<b>SOLVING</b>
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17.  $x^2 - 3x + 9 = 0$

18.  $4 = (3x - 1)^2$

19.  $3 + \sqrt{2x - 3} = x$

20.  $\frac{x}{2} + \frac{5}{x+3} = \frac{8}{2x+6}$

21.  $x(2x + 7) = 4$

22.  $2(x + 3) - 7 = 3x - 2 - 2x + 2$

<b>OPERATIONS ON POLYNOMIALS</b>
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23.  $(3x - 2)^3$

24.  $(6x^3 - 13x^2 + 16x - 11) \div (2x - 3)$

25.  $(2x + 3)(3x^2 - 3x + 10)$

<b>FUNCTION NOTATION</b> Given that $f(x) = x^2 - 3x$ find the following:
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26. The value of  $x$  if  $f(x) = 4$ .

27.  $f(-3)$

## SLOPES OF LINES

28. Find the slope of  $x - 3y = 6$

29. Find the slope of the line containing the points  $(-2,-4)$  and  $(-3,-5)$

## APPLICATIONS

30. One more than twice the sum of a number and three is equal to four less than three times the number. Find the number.

31. How many gallons of milk that is 2% butterfat must be mixed with milk that is 3.5% butterfat to get 10 gallons of milk that is 3% butterfat?

32. The longer leg of a right triangle is 8 cm. If the hypotenuse is 4 cm longer than the shorter leg what is the length of the hypotenuse?

33. The product of the second and third of three consecutive integers is two more than seven times the first integer. Find the integers.

**EXTRA CREDIT**

Factor completely:  $x^3 + x^2 - 8y^3 - 4y^2$