

# **Quadratic Equations**

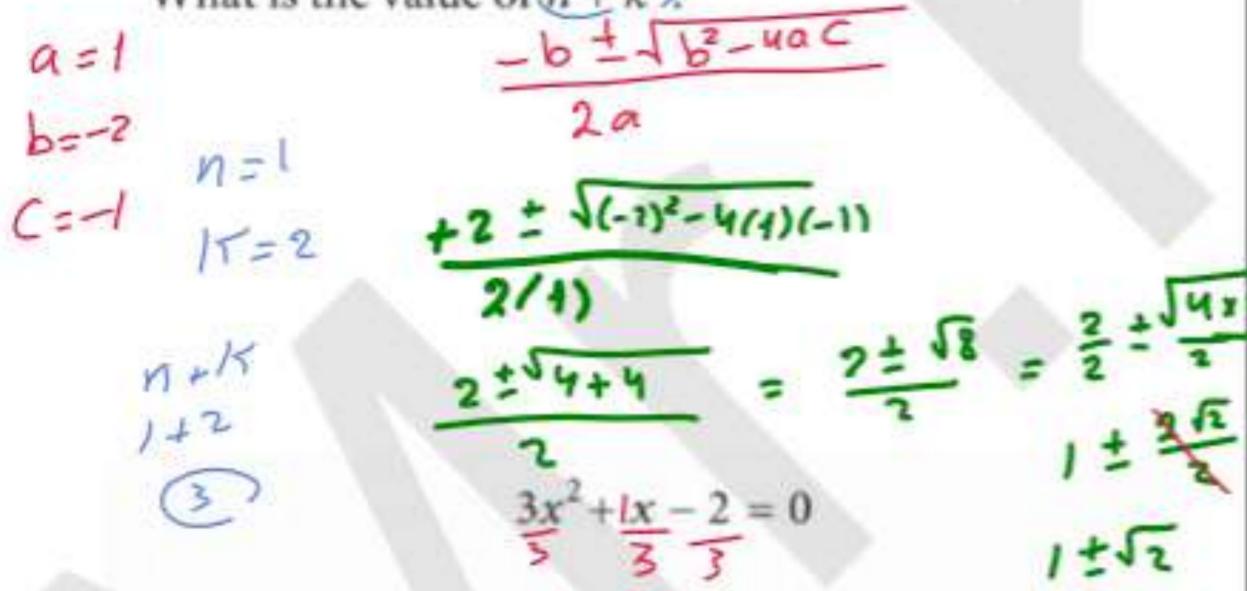
2. Which of the following is the ordinate of the vertex of the function  $f(x) = 2x^2$  -

$$8x + 3?$$
 $a = 2$ 
 $b = -8$ 
 $a = -8$ 
 $a$ 

$$\begin{array}{c}
X + 3 ? \\
X = \frac{b}{2a} \\
X =$$

$$x^2 - 2x - 1 = 0$$

The equation above has solutions  $x = n + \sqrt{k}$  and  $x = n + \sqrt{k}$ , where n and k are positive integers. What is the value of n + k?



The solutions to the quadratic equation above are a and b. What is the value of a + b?

A) 
$$-\frac{5}{3}$$
  $-\frac{5}{3}$   $-\frac{7}{3}$   $-\frac{7}{3}$   $-\frac{7}{3}$   $-\frac{7}{3}$   $-\frac{7}{3}$ 

$$x^2 - 14x + 40 = 2x + 1$$

What is the sum of the solutions to the given 2-14x-2x+40-1=c equation?

A) 
$$-16$$
  
B)  $-14$   $2 - 16 \times +39 = 0$ 

$$2m^2 - 16m + 8 = 0$$
?

$$y = x^2 - 6x + 8$$

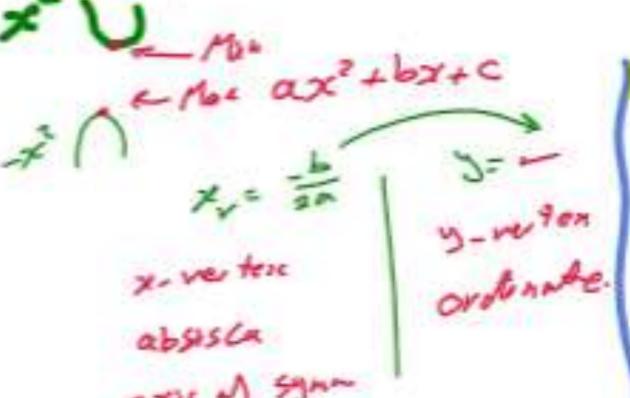
The equation above represents a parabola in the xy-plane. Which of the following equivalent forms of the equation displays the x-intercepts of the parabola as constants or coefficients?

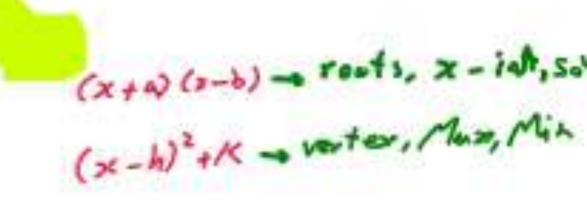
A) 
$$y - 8 = x^2 - 6x$$

B) 
$$y+1=(x-3)^2$$

C) 
$$y = x(x-6) + 8$$

D) 
$$y = (x-2)(x-4)$$





- 54m x + Road = 0



# Complex

11. If  $i = \sqrt{-1}$  which of the following is equivalent to

$$\frac{-3}{2-i} ? \times \frac{2+i}{2+i} = \frac{-3(2+i)}{4-i3(-1)}$$

A) 
$$\frac{3}{5}(2+i)$$
  $\frac{-3(2+i)}{4+1}$ 

$$\frac{B}{5} \frac{3}{5} (2+i) \qquad \frac{-3}{5} (2+i)$$

$$C)^{-2-i}$$
 $(2)^{-2+i}$ 

Which of the following complex numbers is

equivalent to

$$\frac{3}{8} - \frac{5i}{2}$$

$$\frac{3}{8} + \frac{5i}{2}$$

$$\frac{3}{8} + \frac{5i}{2}$$

$$\frac{3}{64} - \frac{4i}{2^2}$$

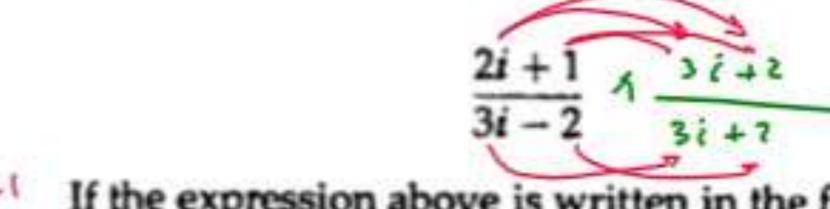
$$\frac{7}{34} - \frac{23i}{34}$$

$$\frac{7}{34} - \frac{23i}{34}$$

$$\frac{7}{34} + \frac{23i}{34}$$

$$\frac{7}{34} + \frac{23i}{34}$$

$$\frac{14 - 48i}{62}$$



If the expression above is written in the form a + bi, where a and b are constants, what is the value of b?

$$\frac{(4-1)}{(3+4i+3i+2)}$$
A)  $-\frac{4}{13}$ 
B)  $\frac{4}{13}$ 

B) 
$$\overline{13}$$
C)  $-\frac{7}{13}$ 
 $-\frac{6}{9} - \frac{4}{9}$ 

D) 
$$\frac{7}{13}$$
 $\frac{-4+7i}{-13}i$ 
 $+\frac{4}{13}i$ 

In the complex number system, which of

the following is equal to
$$3i(1+i) - l(1-i)^{2}?$$

$$(Note: i = \sqrt{-1})$$

$$A. -3+i \qquad 3i+3i^{2} - (1-2i+i)$$

$$B -3+5i \qquad 3i-3-(1-2i+i)$$

$$C. 3+i \qquad 3i-3-(1-2i+i)$$

$$D. 3+5i \qquad 3i-3+2i$$

$$(a+b)^{2} = a^{2} + 2ab + b^{2}$$

$$(a-b)^{2} = a^{2} - 2ab + b^{2}$$

$$a^{2} - b^{2} = (a-b)(a+b)$$



### Circles

In the xy-plane, the graph of

 $\frac{2x^2-6x+2y^2+2y=45}{3}$  is a circle. What is the radius of the circle?

$$x^2 - 10x + y^2 + 6y = 2$$

The graph in the xy-plane of the equation above is a circle. What are the coordinates of the center of the circle?

$$(C)$$
  $(5, -3)$ 

The graph of  $x^2 - 4x + y^2 + 6y - 24 = 0$  in the xy-plane is a circle. What is the radius of the circle?

A) 
$$2\sqrt{6}$$

A) 
$$2\sqrt{6}$$
  $\chi^2 - 4x + 4y^2 + 6y = 24$ 

B) 
$$\sqrt{11}$$
C)  $\sqrt{37}$ 
 $V = \sqrt{\left(-\frac{4}{2}\right)^2 + \left(\frac{6}{2}\right)^2 + 24}$ 

arch 1x-h)2+(y-K)2= x2

Center (h1K)

$$2c^{2} + ax + y^{2} + by = C$$

$$C\left(\frac{a}{-2}, \frac{b}{-2}\right)$$

$$C\left(\frac{a}{-2}, \frac{b}{-2}\right)$$

$$C\left(\frac{a}{-2}, \frac{b}{-2}\right)$$

Which of the following equations describes a circle with radius 10 that passes through the origin when graphed in the xy-plane?

$$(x-5)^2 + (y+5)^2 = 10$$

$$(6-5)^{2} + (6+5)^{2} = 50$$

$$(x-5)^{2} + (y+5)^{2} = 100$$

$$(0-10)^{2} + (0-10)^{2} = 200$$

$$(x-10)^{2} + (y-10)^{2} = 100$$

$$(D) (x-5\sqrt{2})^2 + (y+5\sqrt{2})^2 = 100$$

$$x^2 + y^2 + 4x - 2y = -1$$

The equation of a circle in the xy-plane is shown above. What is the radius of the circle?

$$x^2 + 20x + y^2 + 16y = -20$$

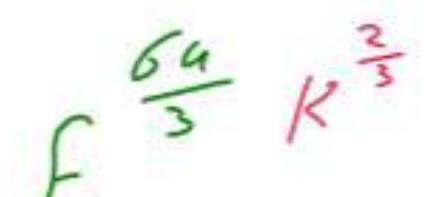
The equation above defines a circle in the xy-plane. What are the coordinates of the center of the circle?



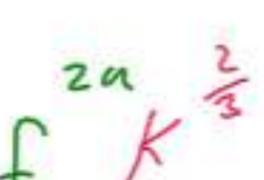
## **Powers**

Which of the following is an equivalent form of  $\sqrt[3]{f^{6a}k^2}$ , where f > 0 and k > 0?

A) 
$$f^{\frac{1}{3a}}k^{-1}$$
B)  $f^{\frac{1}{2a}}k^{\frac{3}{2}}$ 



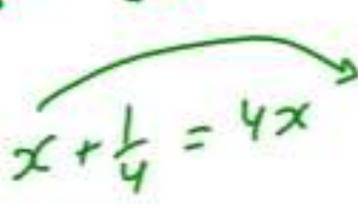
B) 
$$f^{\frac{1}{2a}}k^{\frac{3}{2}}$$

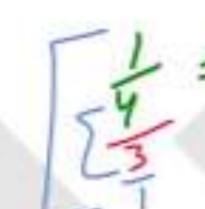


C) 
$$f^{3a}k^{-1}$$



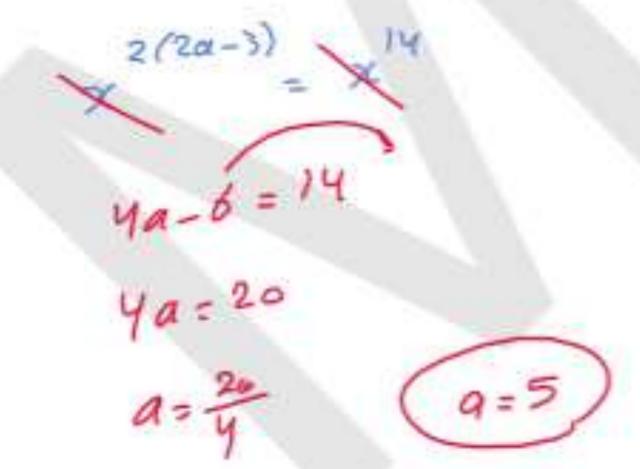
If  $3^x$ ,  $\sqrt[4]{3} = 9^{2x}$ , then x =

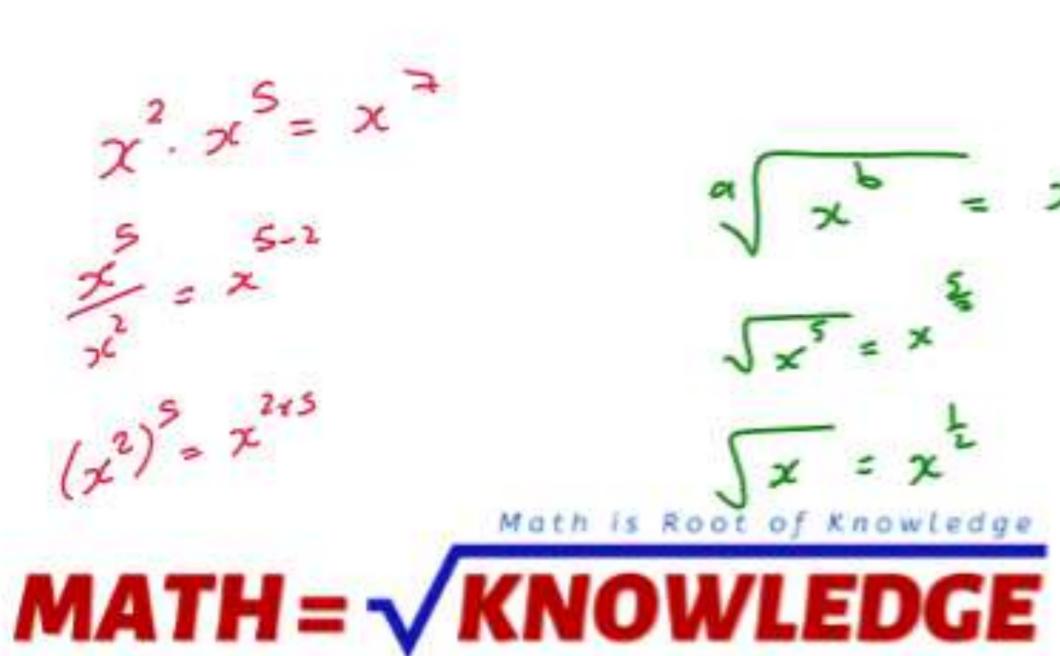




$$\frac{1\times1}{4\times3}=\frac{1}{72}$$

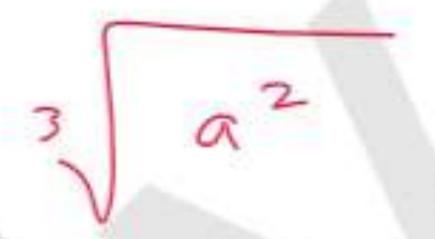
If  $(x^{2a-3})^2 = x^{14}$ , then what is the value of a?





Which of the following is equal to  $a^{\frac{3}{3}}$ , for all values

of a?



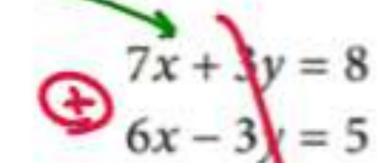
If  $27^{81} = 3^x$ , what is the value of x?

- B) 84
- C) 100 D) 243

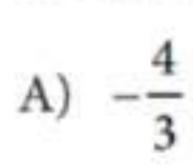
## System of equations

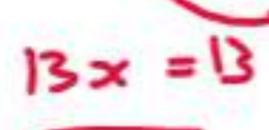


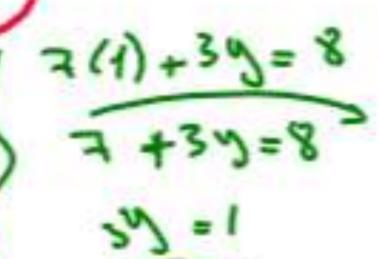
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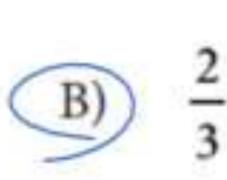


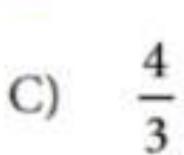
For the solution (x, y) to the system of equations above, what is the value of x - y?



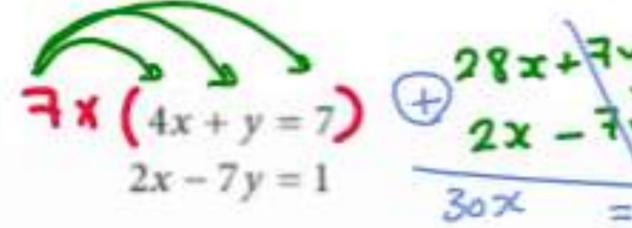






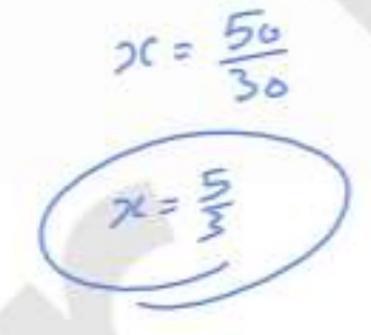


D) 
$$\frac{22}{3}$$



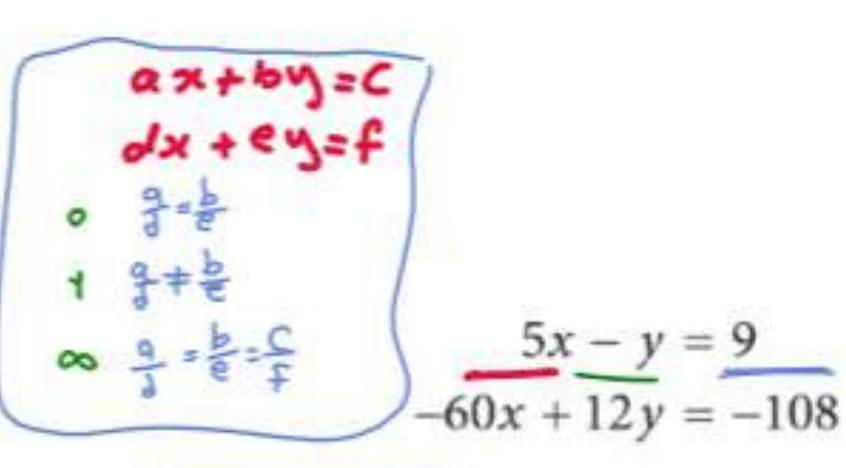
If (x, y) is the solution to the given system of equations, what is the value of x?





$$\bigoplus_{x + 2y = 10} x + 2y = 10$$

The solution to the given system of equations is (x, y). What is the value of 3x + y?



How many solutions does the given system of equations have?

- A) Zero
- Exactly one
- Exactly two Infinitely many

$$\frac{2x+3y=5}{4x+cy=8}$$

In the system of equations above, c is a constant. For what value of c will there be no solution (x, y) to the system of equations?

A farmer sold 108 pounds of produce that consisted of z pounds of zucchini and c pounds of cucumbers. The farmer sold the zucchini for \$1.69 per pound and the cucumbers for \$0.99 per pound and collected a total of \$150.32. Which of the following systems of equations can be used to find the number of pounds of zucchini that were sold?

$$z+c = 150.32$$

$$(B) \frac{z+c}{1.69z+0.99c} = 108$$

C) 
$$z+c = 108$$
  
 $0.99z + 1.69c = 150.32$ 

$$z+c = 150.32$$
  
0.99z + 1.69c = 108