



I TYPE + NUMBER of solutions

$$3x^2 + 2 = -5x$$

$$3x^2 - 5x + 2 = 0$$

$$(3)^2 - 4(3)(2) \\ 25 - 24 = 1$$

positive = REAL  
PERFECT SQUARE = RATIONAL.

2 REAL, RATIONAL ROOTS

J FIND EXACT SOLUTIONS

$$3x^2 = 3x + 2$$

$$3x^2 - 3x - 2 = 0$$

USE QUADRATIC FORMULA.

$$x = \frac{3 \pm \sqrt{9 - 4(3)(-2)}}{2(3)}$$

$$x = \frac{3 \pm \sqrt{33}}{6}$$

K SOLVE  $-2x^2 + 3x = 1$

$$0 = 2x^2 - 3x + 1$$

$$0 = (2x - 1)(x - 1)$$

$$2x - 1 = 0$$

$$x = \frac{1}{2}$$

$$x - 1 = 0$$

$$x = 1$$

L SOLVE QUADRATIC BY COMPLETING THE SQUARE.

$$4x^2 + 10x = -7$$

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$$4\left(x^2 + \frac{5}{2}x + \frac{25}{16}\right) = -7 + 4\left(\frac{25}{16}\right)$$

\* CAREFUL TO INCLUDE THE 4 THAT WAS FACTORED OUT

$$\frac{4\left(x + \frac{5}{4}\right)^2}{4} = \frac{-3}{4}$$

$$\left(x + \frac{5}{4}\right)^2 = \sqrt{\frac{-3}{16}}$$

$$x + \frac{5}{4} = \pm \sqrt{\frac{-3}{16}}$$

$$x + \frac{5}{4} = \pm \frac{\sqrt{-3}}{4}$$

$$x = \frac{-5}{4} \pm \frac{\sqrt{-3}}{4}$$

$$x = \frac{-5 \pm \sqrt{-3}}{4}$$

M FACTOR COMPLETELY

$$4x^2 + 12x - 112$$

$$\text{GCF } 4(x^2 + 3x - 28)$$

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

N GIVE THE EXACT ANSWER(S)

$$2x^2 = -6x - 3$$

$$2x^2 + 6x + 3 = 0$$

NOT FACTORABLE. → USE QUADRATIC FORMULA.

$$x = \frac{-6 \pm \sqrt{36 - 4(2)(3)}}{2(2)}$$

$$x = \frac{-6 \pm \sqrt{12}}{4}$$

$$x = \frac{-6 \pm 2\sqrt{3}}{4} = \frac{-3 \pm \sqrt{3}}{2}$$

$$x = \frac{-3 \pm \sqrt{3}}{2}$$



O  $y = -1000x^2 + 1100x - 2.5$

PROFIT

x = PRICE

WHAT PRICE TO MAXIMIZE PROFIT?

FIND VERTEX:

$$x = \frac{-b}{2a} = \frac{-1100}{2(-1000)} = \frac{1100}{2000} = \boxed{\$ .55}$$

P  $y = \frac{1}{3}(x+2)^2 - 7$  How HAS IT TRANSFORMED?

VERTICAL STRETCH BY  $\frac{1}{3}$   
or COMPRESSION BY 3  
LEFT 2 DOWN 7

Q SOLVE:  $5x^2 - 75 = 0$

$$\frac{5x^2}{5} = \frac{75}{5}$$

$$\sqrt{x^2} = \sqrt{15}$$

$$x = \pm\sqrt{15}$$

**R**  $y = \text{REVENUE}$   
 $x = \text{HOURLY FEE}$

$$y = -480x^2 + 3120x$$

Price  $\rightarrow$  Max REVENUE?

Find VERTEX:

$$x = \frac{-b}{2a} = \frac{-3120}{2(-480)} = \boxed{3.25}$$

**S** WRITE EQUATION IN STANDARD FORM.

VERTEX  $(-1, 13.5)$

ZEROS:  $(-4, 0)$   $(2, 0)$

$\hookrightarrow$  FACTORS  $(x+4)(x-2)$

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

PLUG IN VERTEX TO FIND  $a$ .

$$13.5 = a(-1+4)(-1-2)$$

$$13.5 = a(9)$$

$$a = \boxed{-\frac{3}{2}}$$

$$y = -\frac{3}{2}(x+4)(x-2)$$

WRITE IN STANDARD FORM

$$y = -\frac{3}{2}(x^2 + 2x - 8)$$

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

**T** GRAPH:  $y = -3x^2 + 6x + 9$

ZEROS:  $0 = -3(x^2 - 2x - 3)$

$x \rightarrow 0 = -3(x-3)(x+1)$

$$x-3=0$$

$$\boxed{x=3}$$

$$x+1=0$$

$$\boxed{x=-1}$$

VERTEX:  $x = \frac{-b}{2a} = \frac{-6}{2(-3)} = 1$

VERTEX:  $(1, 12)$

Axis:  $x=1$

y-INT:  $(0, 9)$

