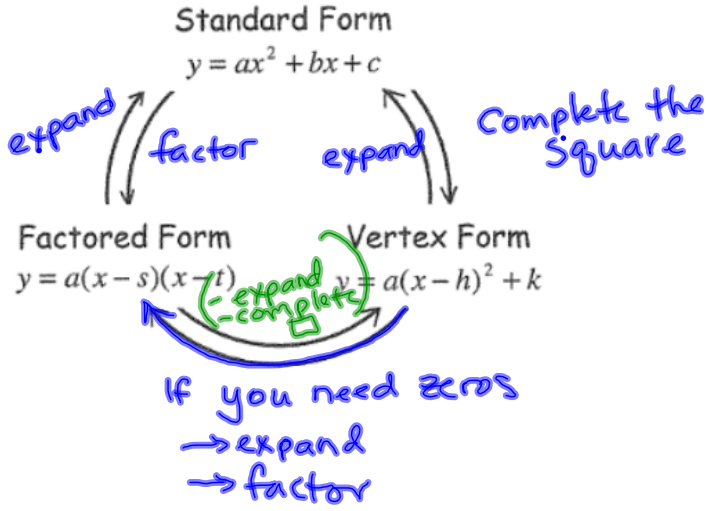


What do you know / what are you trying to find???

1. You know 'x' - find 'y'

Sub in 'x'
Solve for 'y'

2. You know 'y' - find 'x'

Sub in 'y'
→ Solve for 'x'

① Standard form → quadratic formula
→ factor

② Factored form → find zeros from factors
– what makes each factor = 0
$(x-3)(x+4)$
$x=3$ $x=-4$

③ Vertex form → solve directly
$0 = 2x^2 - 4$
$0 = 2(x-4)^2 - 16$

3. You need to find the vertex

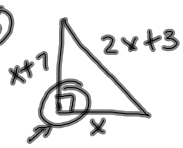
① Standard → complete the square

② Factored → use zeros to find 'x' value of vertex, $\frac{r+s}{2}$
sub in to equation to find 'y'

③ Vertex form → vertex (h,k)
$y = 2(x-4)^2 - 16$
h k

6 9 11 21 ~~12~~ 17 18

⑥



$a^2 + b^2 = c^2$

$x^2 + (x+7)^2 = (2x+3)^2$

Expand

factor ↔ q. form

$2x^2 - 2x - 40 = 0$

$2(x^2 - x - 20) = 0$

$2(x-5)(x+4) = 0$

M: -20
A: -1
N: -5, 4

$x = 5$ $x = -4$ inadmissable

$x + 7 = 12$

$2x + 3 = 13$

---

⑨ A = multiply 2 things = QUADRATIC

$A = \frac{bh}{2}$

$2x\ 20 = \frac{b(b+4)}{2}$ ~~x2~~

$40 = b^2 + 4b$

$0 = b^2 + 4b - 40$ → ~~factor~~ → q. form

$b = 4.63$ cm

$b = 46$ mm

---

⑪ $P = 23$

$P = 2l + 2w$

$23 = 2l + 2w$

$\frac{23 - 2w}{2} = \frac{2l}{2}$

$\frac{23}{2} - w = l$

$A = 33$ * Area = ~~quadratic~~ quad

$A = lw$

$33 = lw$

$33 = \left(\frac{23}{2} - w\right)w$

$33 = \frac{23}{2}w - w^2$

$w^2 - \frac{23}{2}w + 33 = 0$

Solve → quad form.

---

⑰ a) Revenue = Price x #Sold

$= (10 - 0.5x)(30 + 2x)$

b) $R = 150$ Price #sold

$150 = (10 - 0.5x)(30 + 2x)$

$150 = 300 + 20x - 15x - x^2$

$0 = -x^2 + 5x + 150$

M: 150
A: -5
-15, 10

$0 = -(x^2 - 5x - 150)$

$= -(x - 15)(x + 10)$

$x = 15$ $x = -10$

Price

$10 - 0.5x$

$= 10 - (0.5)(15)$

$= \$2.50$

OR

$10 - 0.5(-10)$

$= 10 + 5$

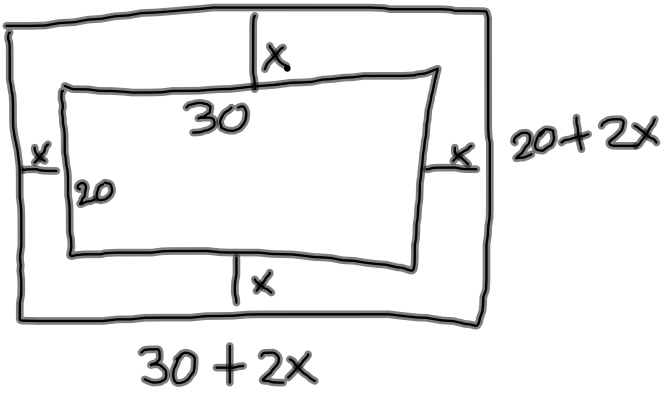
$= \$15$

c) ~~vertex complete the square~~ → $x = \frac{15 + (-10)}{2}$

d) $0 = 300 + 5x - x^2$ → factor → quad form

e)

(18)



$A = \ell \cdot w$

$1064 = (20 + 2x)(30 + 2x)$

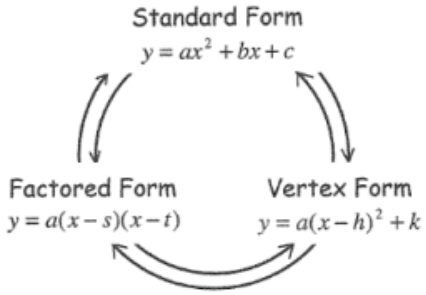
Expand

Set $= 0$

Solve → factor

→ q. form.

Everything I Need to Know about Quadratics…But Was Afraid to Ask!



If you want…	And you have…	Then do this
Vertex Form $y = a(x-h)^2 + k$	Standard Form $y = ax^2 + bx + c$	➢ complete the square or ➢ solve for zeros and use to calculate vertex ➢ "a" will be the same
	Factored Form $y = a(x-s)(x-t)$	➢ expand to standard form then convert to vertex form or ➢ solve for zeros and use to calculate vertex ➢ "a" will be the same
Standard Form $y = ax^2 + bx + c$	Vertex Form $y = a(x-h)^2 + k$	➢ expand
	Factored Form $y = a(x-s)(x-t)$	➢ expand
Factored Form $y = a(x-s)(x-t)$	Vertex Form $y = a(x-h)^2 + k$	➢ convert to standard form, then convert to factored form or ➢ solve for zeros and substitute into factored form ➢ "a" will be the same
	Standard Form $y = ax^2 + bx + c$	➢ factor, if possible or ➢ use quadratic formula to find zeros and substitute into factored form or ➢ may not have factored form if there are no real roots
to graph	Vertex Form $y = a(x-h)^2 + k$	➢ read vertex/transformations directly from equation ✓ h is horizontal ✓ k is vertical ✓ a is reflection and stretch/compression for improved accuracy, consider finding y-intercept or applying step pattern.
	Standard Form $y = ax^2 + bx + c$	➢ solve for x-intercepts and y-intercept or ➢ solve for vertex and y-intercept
	Factored Form $y = a(x-s)(x-t)$	➢ read zeros from equation, solve for y-intercept or vertex

If you want…	And you have…	Then do this
y-intercept	Vertex Form $y = a(x-h)^2 + k$	➢ set $x = 0$ and solve for y
	Standard Form $y = ax^2 + bx + c$	➢ set $x = 0$ and solve for y or ➢ c
	Factored Form $y = a(x-s)(x-t)$	➢ set $x = 0$ and solve for y
vertex, max/min, optimal value	Vertex Form $y = a(x-h)^2 + k$	➢ read the vertex right from the equation: (h,k)
	Standard Form $y = ax^2 + bx + c$	➢ convert to vertex form or ➢ determine the zeros and use $\frac{s+t}{2}$ to get x-coordinate of vertex (axis of symmetry) ➢ substitute this x to get the y-coordinate or ➢ use $x = -\frac{b}{2a}$ to get x-coordinate of vertex ➢ Substitute this x to get the y-coordinate
	Factored Form $y = a(x-s)(x-t)$	➢ use the zeros and $\frac{s+t}{2}$ to get x-coordinate of vertex (axis of symmetry) ➢ substitute this x to get the y-coordinate or ➢ convert to standard form then complete the square
x-intercepts, zeros, roots	Vertex Form $y = a(x-h)^2 + k$	➢ convert to standard form then factor or use quadratic formula or ➢ set $y = 0$ then solve for x using inverse operations
	Standard Form $y = ax^2 + bx + c$	➢ factor if possible or ➢ use quadratic formula or ➢ may not have real roots
	Factored Form $y = a(x-s)(x-t)$	➢ read the zeros right from the equation: s & t
the number of zeros	Vertex Form $y = a(x-h)^2 + k$	➢ analyze location of vertex and opening direction, draw conclusions
	Standard Form $y = ax^2 + bx + c$	➢ use discriminant: D < 0, D = 0, D > 0
	Factored Form $y = a(x-s)(x-t)$	➢ zeros are given in this form