

Precalc Agenda 10/7

- 1) Gather Ch 2 Assignments. Staple them in order.
Be sure your name is on first sheet.
- 2) Hand in take-home part of test
- 3) If you missed the test Friday, please arrange a time to make it up with me.
- 4) Section 3.1 notes
- 5) p189-190 1-8, 25, 31, 32, 43, 45

Section 3.1 Quadratic Functions

Two Forms

General

$$f(x) = ax^2 + bx + c$$

If $a > 0$, opens up - vertex is a minimum

If $a < 0$, opens down - vertex is a maximum

$$D = (-\infty, \infty)$$

$$R = [u, \infty) \text{ if } a > 0 \\ = (-\infty, u] \text{ if } a < 0$$

u = y-coordinate of vertex

$$\text{vertex: } x = \frac{-b}{2a}$$

$$y = f\left(\frac{-b}{2a}\right)$$

x-ints: Solve $ax^2 + bx + c = 0$

y-int: $(0, c)$

$$\text{axis of symmetry: } x = \frac{-b}{2a}$$

$$D = (-\infty, \infty)$$

$$R = [k, \infty) \text{ if } a > 0 \\ (-\infty, k] \text{ if } a < 0$$

$$\text{vertex} = (h, k)$$


axis of symmetry: $x = h$


x-ints: set $a(x-h)^2 + k = 0$

y-int: set $x = 0$

Vertex Form

$$f(x) = a(x-h)^2 + k$$

If $a > 0$, opens up 

If $a < 0$, opens down 

ex: Find the vertex and axis of symmetry for

$$f(x) = 2x^2 + 8x - 7.$$

$$a = 2 \quad b = 8 \quad c = -7$$

$$x = \frac{-b}{2a} = \frac{-8}{2 \cdot 2} = \frac{-8}{4} = -2$$

$$\begin{aligned} y &= 2(-2)^2 + 8(-2) - 7 = 2 \cdot 4 - 16 - 7 \\ &= 8 - 16 - 7 \\ &= -15 \end{aligned}$$

$$\text{Vertex} = (-2, -15)$$

$$\text{axis of symmetry: } x = -2$$

- ex: Find
- ① vertex
 - ② axis of symmetry
 - ③ intercepts
 - ④ Domain
 - ⑤ Range
 - ⑥ Graph

$$\text{④ } D = (-\infty, \infty)$$

$$\text{⑤ } a < 0, \text{ down}$$

$$R = (-\infty, 16]$$

$$f(x) = -x^2 - 10x - 9$$

$$\text{① vertex: } x = \frac{-(-10)}{2(-1)} = \frac{10}{-2} = -5$$

$$y = -(-5)^2 - 10(-5) - 9$$

$$y = -25 + 50 - 9 = 16$$

$$\text{② Axis: } x = -5 \quad (-5, 16)$$

$$\text{③ ints: } x\text{-ints}$$

$$(-1)(-x^2 - 10x - 9) = 0 \quad (-1)$$

$$x^2 + 10x + 9 = 0$$

$$(x+1)(x+9) = 0$$

$$x\text{-int: } (-1, 0), (-9, 0)$$

$$y\text{-int: } (0, -9)$$

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