

Monday Quiz 2 No Calc: Solve by factoring, compl. the square & quadratic formula (Days 1-3)
 Tuesday Quiz 3 No Calc: Function Properties (Day 4)

HW Key: Group Work Factoring key is in previous day's slide.

Oct 4-9:15 AM

Transformation Reference Sheet

State the transformation from the original graph.

Translations:

Original: $y = x^2$

$$y = x^2 + 3$$

vertical
shift up 3.

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

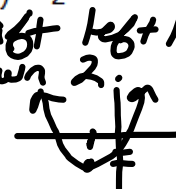
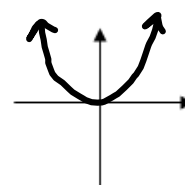
horizontal
shift right 4

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

hviz. shift left 1
and down 2

Rule: $f(x) \pm c$, vertical shift c (up +, down -)

$f(x \pm c)$, horizontal shift c (left +, right -)



Oct 8-7:36 PM

↓

Vertical Stretch & Compression:

Original: $y = x^2$

$y = 2x^2$ vertical stretch factor 2

$y = \frac{x^2}{2} = \frac{1}{2}x^2$ vertical compression factor $\frac{1}{2}$

Rule: $af(x)$, vertical stretch if $a > 1$
(factor = a)
vert. compression if $0 < a < 1$

Oct 6-10:24 AM

Reflections:

Original: $y = (x-4)^2$

$y = -(x-4)^2$ Γ x-axis

$y = (-x-4)^2$ Γ y-axis

Rule: $-f(x)$ Γ x-axis
 $f(-x)$ Γ y-axis

Describe a sequence of transformations that will transform the graph of the function f into the function g .

1. $f(x) = x^2 + 4$ to $g(x) = (x + 3)^2 + 1$

2. $f(x) = x^2$ to $g(x) = 2(x - 1)^2 + 3$

+3: horiz shift left 3
+1: vertical shift down 3

2: vertical stretch, factor of 2
-1: horiz. shift right 1
+3: vert. trans up 3

Oct 6-10:25 AM

As Transformations:Parent graph: $y = x^2$ Vertex Form

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

 $a > 1$ $0 < a < 1$ $a \rightarrow$ vertical stretch or compression $h \rightarrow$ horizontal translation (left or right) $k \rightarrow$ vertical translation (up or down) $(h, k) \rightarrow$ vertex (or turning pt) $aos \rightarrow$ axis of symmetry $x = h$ minimum or maximum occurs at the vertex (t.p.)if $a > 0$ graph contains a minimum (opens  up)if $a < 0$ graph contains a maximum (opens  down)

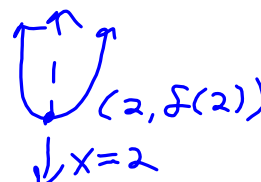
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General Form:

$$y = ax^2 + bx + c, a \neq 0$$

$$aos \rightarrow x = \frac{-b}{2a}$$

$$\text{vertex} \rightarrow (2, f(2))$$



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For each of the equations below, find the following:

a. axis $= -\frac{b}{2a}$ d. sketch - no calc

b. vertex $(-\frac{b}{2a}, f(\frac{-b}{2a}))$ e. range

c. state maximum or minimum f. intervals where increasing & decreasing

General Form

3. $g(x) = x^2 + 2x + 6$

a) $x = \frac{-2}{2} = -1 \rightarrow x = -1$

b) $(-1, g(-1))$
 $g(-1) = (-1)^2 + 2(-1) + 6$
 $= 1 - 2 + 6 = 5$

$(-1, 5)$

c) $a > 0 \rightarrow \cup$ minimum: 5 at $x = -1$



d) $\{y \mid y \geq 5\}$
 or $[5, \infty)$ range

e) increasing
 $(-1, \infty)$
decreasing
 $(-\infty, -1)$

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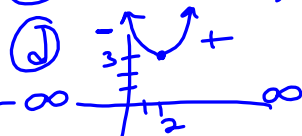
vertex form

5. $g(x) = (x - 2)^2 + 3$
 $g(x) = a(x - h) + k$

a) $x = 2$

b) $(h, k) = (2, 3)$

c) $a > 0 \rightarrow \cup$, minimum: 3 at $x = 2$



f) increasing
 $(2, \infty)$

decreasing
 $(-\infty, 2)$

g) $\{y \mid y \geq 3\}$ or $[3, \infty)$

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For each of the equations below, find the following:

a. axis

d. sketch

b. vertex

e. range

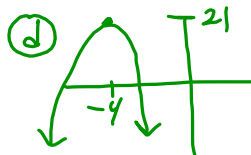
c. state maximum or minimum f. intervals where increasing & decreasing

4. $f(x) = -x^2 - 8x + 5$

(a) $x = \frac{-b}{2a} = \frac{8}{2(-1)}; x = -4$

(b) $(-4, f(-4))$
 $f(-4) = -(-4)^2 - 8(-4) + 5$
 $f(-4) = -16 + 32 + 5 = 21$
vertex: $(-4, 21)$

(c) $a < 0 \rightarrow \cap$ maximum:
 21 at $x = -4$



(e) $\{y | y \leq 21\}$ or $(-\infty, 21]$

(f) Inc: $(-\infty, -4)$
 Dec: $(-4, \infty)$

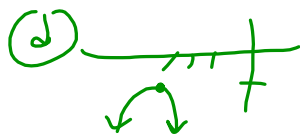
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6. $f(x) = -2(x + 3)^2 - 1$

(a) $x = -3$

(b) $(h, k) = (-3, -1)$

(c) $a < 0 \rightarrow \cap$
 maximum: -1 at $x = -3$



(e) $\{y | y \leq -1\}$ or $(-\infty, -1]$

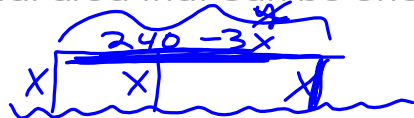
(f) Inc $(-\infty, -3)$
 Dec $(-3, \infty)$

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From Text pg 233: 51



A rancher needs to enclose two adjacent rectangular corrals, one for cattle and one for sheep. If a river forms one side of the corral and 240 yards of fencing is available, what is the largest total area that can be enclosed?



$$x + x + x + y = 240$$

$$y = 240 - 3x$$



$$A = lw$$

$$240 \div 3$$

$$f(x) = x(240 - 3x)$$

$$f(x) = 240x - 3x^2$$

$$f(x) = -3x^2 + 240x$$

$$x = \frac{-240}{-6} = 40$$

$$f(40) = 40(240 - 3(40))$$

$$= 40(240 - 120)$$

$$= 40(120) = 4800$$



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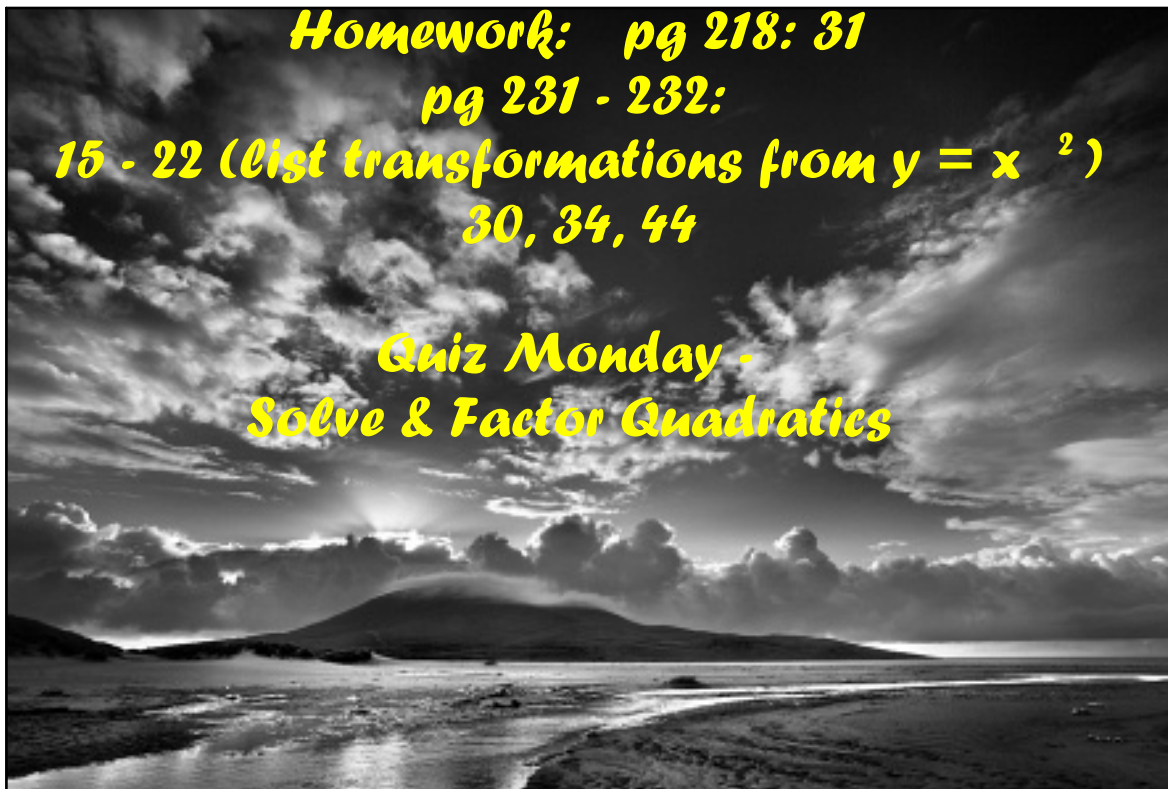
Homework: pg 218: 31

pg 231 - 232:

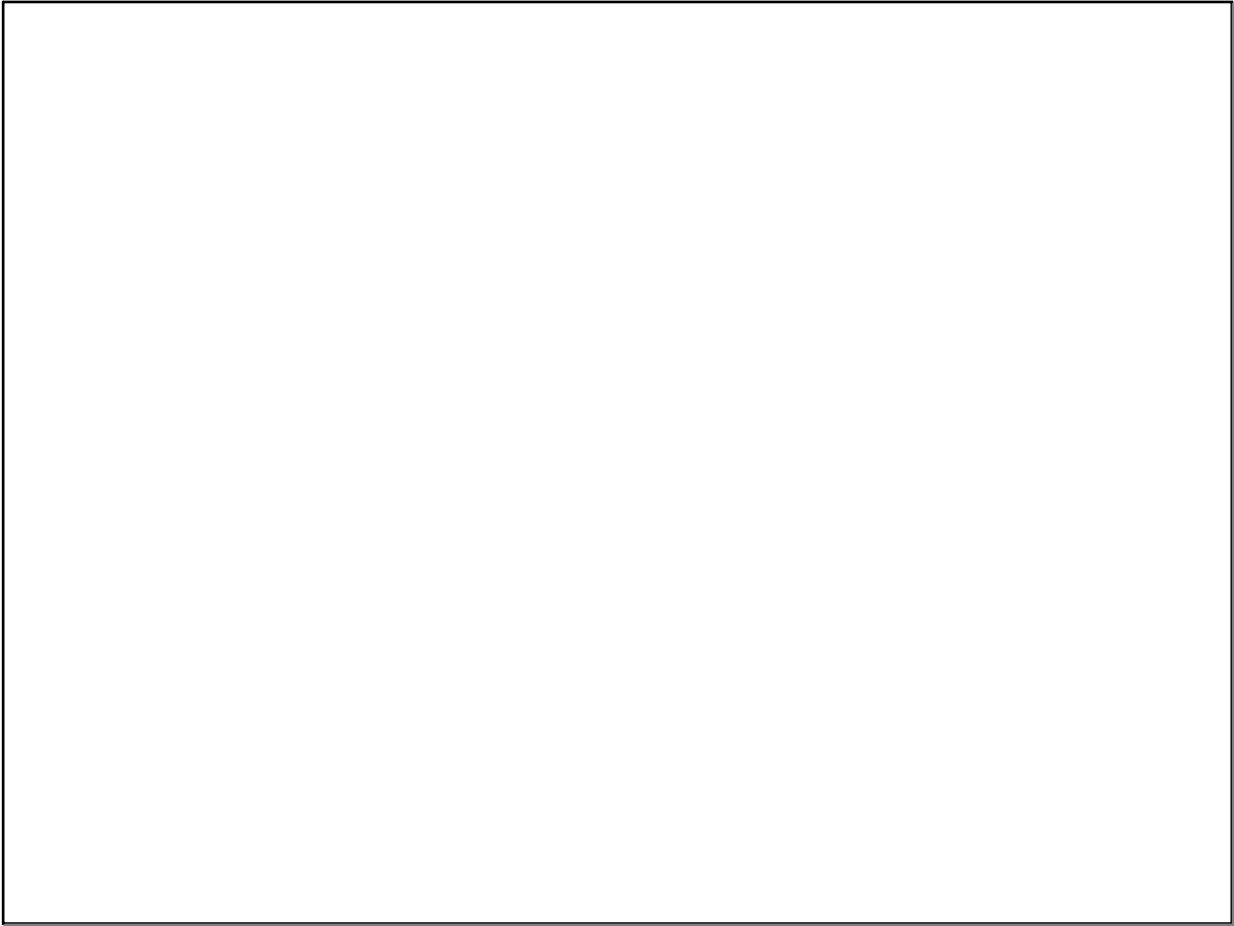
15 - 22 (list transformations from $y = x^2$)

30, 34, 44

**Quiz Monday -
Solve & Factor Quadratics**



Oct 8-7:51 PM



Sep 30-9:57 PM