Unit 3 - No Calc. Review

High School HS Algebra
ALG_PS_EOC_NO_CALC_Unit 3

Name:_____   Block:_____

1. Factor completely: $2x^2 - 8x - 10$
   - (2x+2)(x-5)   ✗ $2(x^2-4x-5)$
   - B) 2(x-5)(x+1)
   - (2x-10)(x+1)   ✗
   - D) 2(x+5)(x-1)

   $\begin{array}{c} -5 \\ 1 \quad -5 \\ \hline -4 \end{array}$

   (MGSE9-12.A.SSE.2) Understand Functions

   $2(x+1)(x-5)$

2. Identify the y-intercept of the equation:

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

   - A) y=2
   - B) y=-2
   - C) y=11
   - D) y=7

   (MGSE9-12.F.IF.4) Linear Equations

   $y = (x-3)(x-3)+2$

	x	-3
x	x^2	$-3x$
-3	$-3x$	9

   $y = x^2 - 6x + 9 + 2$
   $y = x^2 - 6x + 11$ — y-int

3. Which of the following is the graph of $y \geq \frac{1}{3}x + 2$?   Solid line   Shade above

   A) ✗   C) ✗

   B)   D) ✗

   MGSE9-12.A.REI.12) Graph Solutions

3 Forms of Quadratic Functions

① Standard: $y = ax^2 + bx + c$ — y-intercept

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

③ Intercept: $y = a(x-p)(x-q)$
   X-intercepts: $x = p \; ; \; x = q$
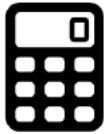
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THIS IS HARD
but
YOU CAN DO IT!

WRITTEN BY **BRITTNY ROGERS**
ILLUSTRATED BY **ADAM RECORD**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Unit 3 - Calc. Review

High School HS Algebra
ALG_PS_EOC_Unit 3b

Name:_____   Block:_____

4. What are the zeros of this function? $=0$
   $$f(x) = (x + 4)^2 - 9$$
   A) {7}
   B) {-4, 9}
   C) {-4, 4}
   D) {-7, -1}
   (MGSE9-12.F.IF.8a) Show Zeros, Extrema, Symmetry

   Handwritten: $(x+4)^2 - 9 = 0$
   $+9 \ +9$
   $(x+4)^2 = \sqrt{9}$
   $x+4 = \pm 3$ $x = -4 \pm 3$
   $x = -4 + 3; \ + -3$
   $x = -1 \ and \ -7$

5. Factor $x^2 + 9x + 18$.
   A) (x - 3)(x - 6)
   B) (x + 2)(x + 9)
   C) (x + 3)(x + 6)
   D) (x - 2)(x - 9)
   (MGSE9-12.A.REI.4b) Solve By Inspection

   Handwritten: 18   3 × 6 / 9 $(x+3)(x+6)$

6. Factor $3x^2 - 10x - 8$.
   A) (x - 4)(3x + 2)
   B) (3x + 4)(x - 2)
   C) (3x - 4)(x + 2)
   D) (3x - 2)(x - 4)
   (MGSE9-12.A.REI.4b) Solve By Inspection

   Handwritten: $a=3 \ b=-10 \ c=-8$
   $3x$ | $3x^2$ | $-12x$
   $+2$ | $2x$ | -8
   $-24 \ ac$ $2+2$ $-b$ -10
   $(x-4)(3x+2)$

7. Which binomial is a factor of the polynomial?
   $$x^2 + x - 6$$
   A) (x + 6)
   B) (x - 2)
   C) (x + 2)
   D) (x - 6)
   (MGSE9-12.A.SSE.2) Rewrite Expressions

   Handwritten: -6 $-2 × 3$ 1 $(x-2)(x+3)$

8. Which graph matches the equation
   $$y = -x^2 + 2 ?$$
   A)
   B)
   C) *(circled in red)* k |
   D)
   (MGSE9-12.A.CED.2) Graph Equations

   Handwritten: $ax^2 + bx + c$

9. For what values of x does $-x^2 + 7x + 5 = 0$?
   A) $-7 \pm \sqrt{69}$
   B) $\dfrac{7 \pm \sqrt{59}}{-2}$
   C) $\dfrac{-7 \pm \sqrt{59}}{-2}$
   D) $\dfrac{-7 \pm \sqrt{69}}{-2}$
   (MGSE9-12.A.REI.4b) Solve By Inspection

   Handwritten: $a = -1 \quad b = 7 \quad c = 5$

10. Complete the square to transform the quadratic
    equation into the form $(x - p)^2 = q$.
    $$x^2 + 4x - 19 = 5$$
    A) $(x - 4)^2 = 16$
    B) $(x + 4)^2 = 16$
    C) $(x - 2)^2 = 28$
    D) $(x + 2)^2 = 28$
    (MGSE9-12.A.REI.4a) Complete Square To Solve

    Handwritten: $x^2 + 4x = 24$
    $\dfrac{4}{2} = 2^2 = 4$
    $x^2 + 4x + 4 = 24 + 4$
    $(x+2)^2 = 28$

11. Solve. $x^2 + 10x = -24$
    A) x = 4, x = 3
    B) x = -3, x = 4
    C) x = 4, x = -6
    D) x = -6, x = -4
    (MGSE9-12.A.REI.4b) Solve By Inspection

    Handwritten: 280 $x^2 + 10x + 24 = 0$
    $6 × 4$ 24 10
    $(x+6)(x+4) = 0$
    $x+6 = 0 \quad x+4 = 0$
    $x = -6 \quad x = -4$

Handwritten (bottom left): Plug/check
$(4)^2 + 10(4) = 56$
$(-3)^2 + 10(-3) = -21$
$(4)^2 + 10(4) = 56$
$(-6)^2 + 10(-6) = -24$ ✓

⑨ $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$a = -1 \quad b = 7 \quad c = 5$

$x = \dfrac{-7 \pm \sqrt{7^2 - (4 \cdot -1 \cdot 5)}}{2(-1)}$

Calc

$x = \dfrac{-7 \pm \sqrt{64}}{-2} \longrightarrow$

12. Which describes the difference between the graph of $f(x) = x^2$ and $g(x) = -(x-2)^2$? ~~h=2~~

~~X~~ The graph of f(x) is obtained by flipping g(x) over the x-axis and shifting up 2 units.

~~X~~ The graph of g(x) is obtained by flipping f(x) over the x-axis and shifting up 2 units.

~~X~~ The graph of f(x) is obtained by flipping g(x) over the x-axis and shifting left 2 units.

(D) The graph of g(x) is obtained by flipping f(x) over the x-axis and shifting ~~left~~ *right* 2 units.

(MGSE9-12.F.BF.3) Transform Graphs

$y = a(x-h)^2 + k$ $V = (h, k)$
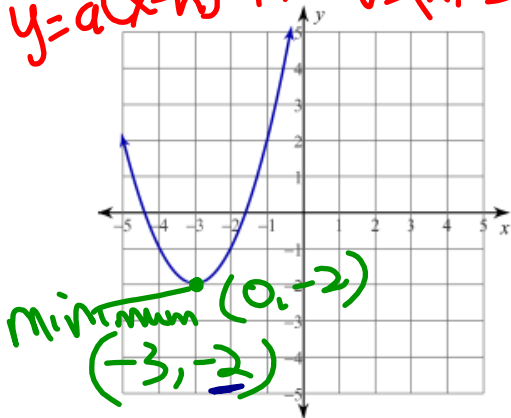
Minimum (0, -2)
(-3, -2)

13. Compare the algebraically expressed function
$f(x) = 2(x-3)^2$ $V = (3, 0)$
to the function shown in the graph to determine which statement is true.

~~A~~ The algebraic function has a greater maximum value.

B) The algebraic function has a lower minimum value.

~~X~~ The graphed function has a greater maximum value.

(D) The graphed function has a lower minimum value.

(MGSE9-12.F.IF.9) Compare Properties

End of Test

$x^2 + 8x + 6$
$(x^2 + 8x + 16) + 6 - 16$

$\frac{8}{2} = 4^2 = 16$

14. Erin was completing the square of the quadratic function in order to find the extreme value. What is the next step in the process, and what is the extreme value?

A) $(x+8)^2 - 58$; the extreme minimum is -8

B) $(x+4)^2 - 10$; the extreme minimum is -4

(C) $(x^2 + 8x + 16) + 6 - 16$; the extreme minimum is -10

D) $(x^2 + 8x + 64) + 6 - 64$; the extreme minimum is -58
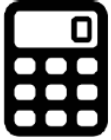
(MGSE9-12.F.IF.8a) Show Zeros, Extrema, Symmetry
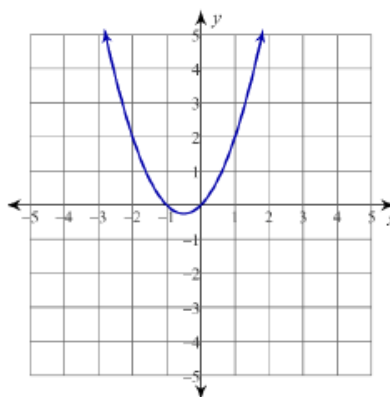
x	$f(x)$
2	6
3	11
4	18
5	27

15. Compare the function represented by the table to the function represented by the graph to determine which statement is true.

A) The tabled function has a lower minimum value.

B) The tabled function has a greater maximum value.

C) The graphed function has a lower minimum value.

D) The graphed function has a greater maximum value.
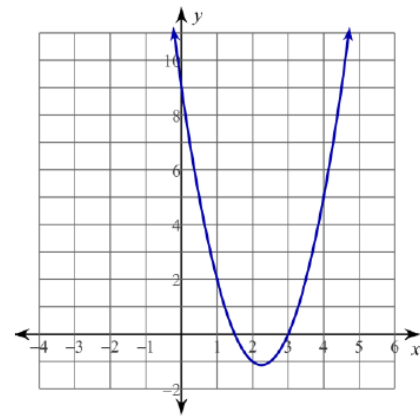
(MGSE9-12.F.IF.9) Compare Properties

Transformations

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

$+$ up
$-$ down

stretch $a > 1$

compress $0 < a < 1$

$+$ $-$

$+$ left
$-$ right
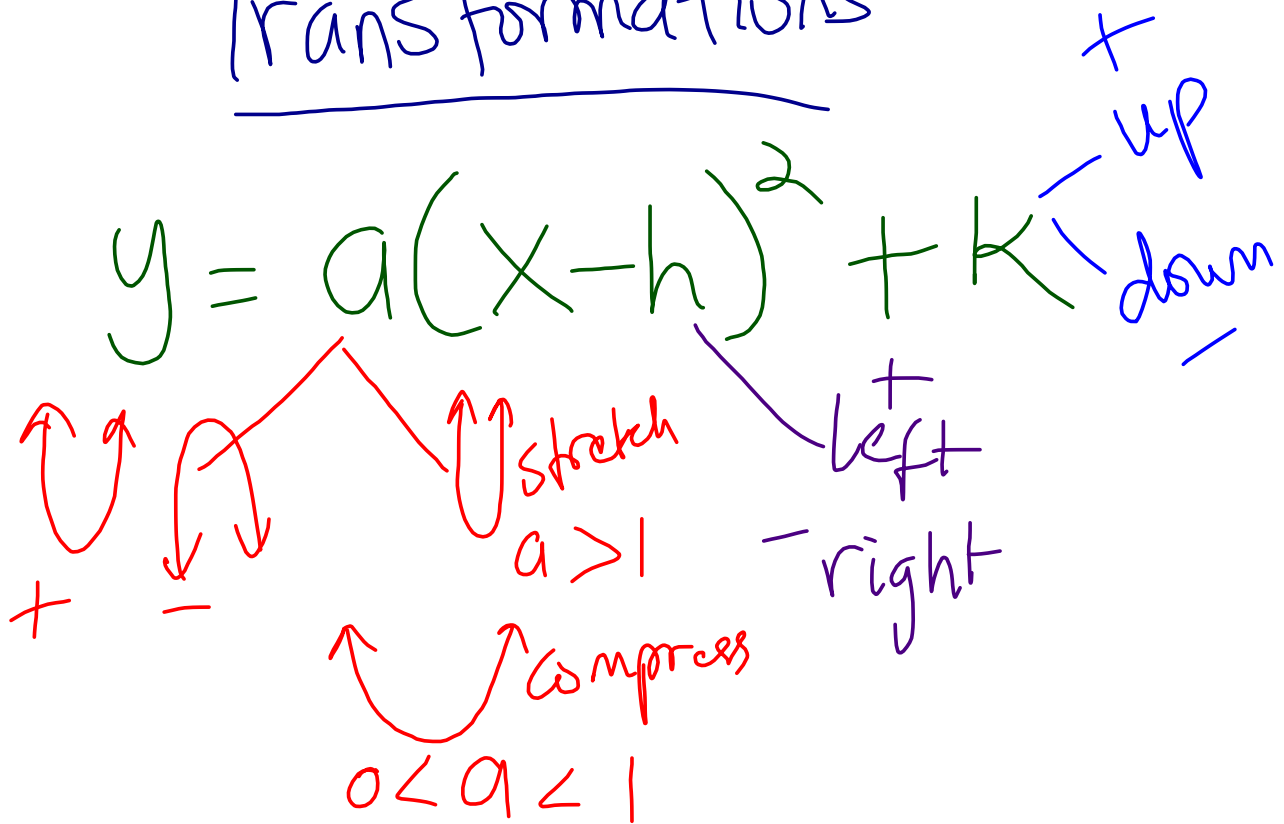
High School HS Algebra
ALG_PS_EOC_Unit 3b

Name:_____   Block:_____

16. How many x-intercepts does the graph of
    $y = -(x + 1)^2 - 2$ have? $V = (-1, -2)$
    A) 0   Vertex will be below the
    B) 1   x-axis, and parabola will open
    C) 2   down. So, no x-intercepts.
    D) 3
    (MGSE9-12.F.IF.8a) Show Zeros, Extrema, Symmetry

17. Solve the quadratic equation by completing the
    square.
    $$x^2 + 6x - 5 = 0$$
    A) $x = 3 \pm \sqrt{14}$
    B) $x = 1 \pm \sqrt{11}$ $x^2 + 6x = 5$
    C) $x = -3 \pm \sqrt{14}$ $2 = 3^2 = 9$
    D) $x = -1 \pm \sqrt{11}$
    (MGSE9-12.A.REI.4a) Complete Square To Solve

    $$x^2 + 6x + 9 = 5 + 9$$
    $$\sqrt{(x+3)^2} = \sqrt{14}$$
    $$x + 3 = \pm\sqrt{14}$$
    $$-3 \quad -3$$
    $$\boxed{x = -3 \pm \sqrt{14}}$$

19. Which function could the graph represent?
    A) $f(x) = x^2 - 3x + 9$
    B) $f(x) = 2x^2 - 9x + 9$
    C) $f(x) = 4x^2 - 9x + 7$
    D) $f(x) = -2x^2 - 4x + 1$
    (MGSE9-12.A.CED.2) Graph Equations