R10 KUTA Practice Test (NO Calculator)

Date_____ Period____

DIRECTIONS- CLEARLY SHOW WORK TO RECEIVE ANY CREDIT!!!!

Solve and check by Graphing.
1) Clearly graph each function and label the graph with key features: Y-INTERCEPT(Y),
vertex(V), axis of symmetry (AS), and solutions (X).
2) Clearly show calculations for the vertex and axis of symmetry.
3) Clearly plot 5 points and provide the table for these points.
4) Identify solutions by writing "SOLUTIONS are x=..."

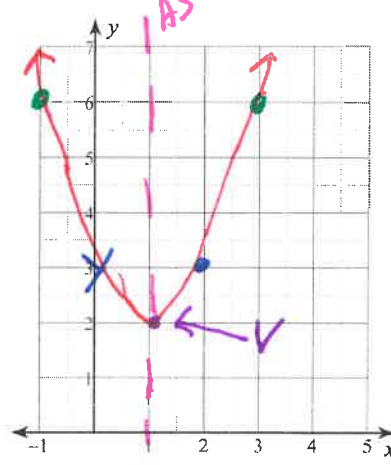1) $f(x) = -x^2 - 4x - 3$ $A = -1$ $B = -4$ $C = -3$

shape
y INT
$A = 1$ $B = -2$ $C = 3$
$(0, 3)$

2) $f(x) = x^2 - 2x + 3$
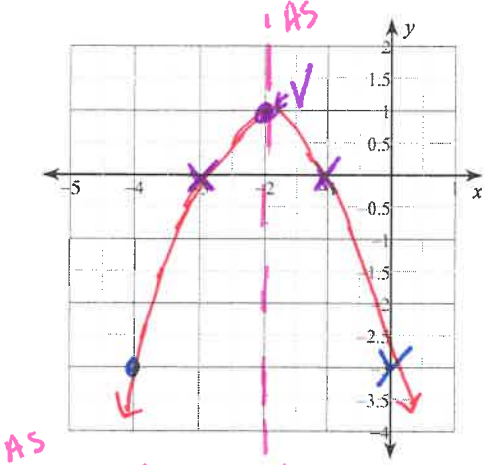
AS
$X = \dfrac{-B}{2A} = \dfrac{4}{2(-1)}$ $X = -2$

X	-4	-3	-2	-1	0
Y	-3	0	1	0	-3

SOLUTION X = -3, -1

AS $X = \dfrac{2}{2(1)}$ $X = 1$

X	-1	0	1	2	3
Y	6	3	2	3	6

SOLUTION: X = NO SOLUTION

3) $f(x) = x^2 - 4x$ $A = 1$ $B = -4$ $C = 0$
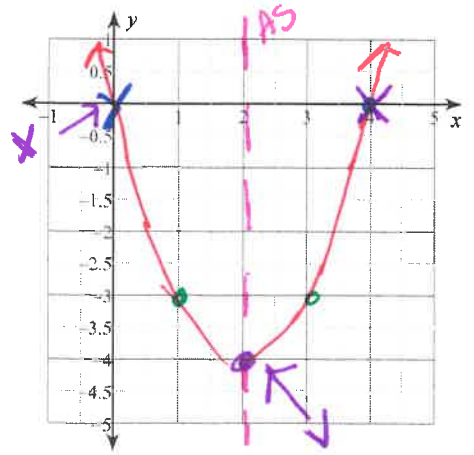
AS $X = \dfrac{+4}{2(1)}$ $X = +2$

X	0	1	2	3	4
Y	0	-3	-4	-3	0

SOLUTION
X = 0, 4

Solve each equation by taking square roots.

4) $100a^2 + 10 = 46$

$-10 \quad -10$

$100a^2 = 36$

$\dfrac{100a^2}{100} = \dfrac{36}{100}$

$\sqrt{a^2} = \sqrt{\dfrac{36}{100}}$

$a = \pm\dfrac{\sqrt{36}}{\sqrt{100}}$

Don't FORGET $\pm$

$a = \pm\dfrac{6}{10}$ reduce

$\boxed{a = \pm\dfrac{3}{5}}$ Keep as simplified fraction

5) $11 - 49x^2 = 60$

$-11 -11$

$\dfrac{-49x^2}{-49} = \dfrac{49}{-49}$

$\sqrt{x^2} = \sqrt{-1}$

$\boxed{x = \text{NO SOLUTION}}$

Cannot take $\sqrt{}$ of a Negative Number

Solve each equation by Completing the square.

6) $x^2 - 2x - 48 = 0$

$+48 \quad +48$

$x^2 - 2x + \boxed{1} = 48 + 1$

$\sqrt{(x-1)^2} = \sqrt{49}$

$x - 1 = \pm7$

$+1 \quad +1$

$x = 1 \pm 7$

$x = 1+7 \qquad x = 1-7$

$\boxed{x = 8} \qquad \boxed{x = -6}$

Don'T FORGET $\pm$

7) $x^2 + 16x + 24 = 9$

$-24 \quad -24$

$x^2 + 16x + \boxed{64} = -15 + 64$

$\sqrt{(x+8)^2} = \sqrt{49}$

$x + 8 = \pm7$

$-8 \quad -8$

$x = -8 \pm 7$

$x = -8+7 \qquad x = -8-7$

$\boxed{x = -1} \qquad \boxed{x = -15}$

DON'T FORGET TO CHECK IN THE ORIGINAL EQUATION

-2-

Solve each equation with the Quadratic formula.

8) $2x^2 + 4x - 4 = 2$

$\qquad \underline{-2 \quad -2}$

$2x^2 + 4x - 6 = 0$

$A = 2 \quad B = 4 \quad c = -6$

$X = \dfrac{-4 \pm \sqrt{16 - 4(2)(-6)}}{2(2)}$

$X = \dfrac{-4 \pm \sqrt{64}}{4}$

$X = \dfrac{-4 + 8}{4} \qquad X = \dfrac{-4 - 8}{4}$

$X = 1 \qquad\qquad X = -3$

STEP I –
PUT IN
STD FORM
$Ax^2 + Bx + C = 0$

QF :
$X = \dfrac{-B \pm \sqrt{B^2 - 4AC}}{2A}$

9) $x^2 + 5x - 22 = 2$

$\qquad \underline{-2 \quad -2}$

$x^2 + 5x - 24 = 0$

$A = 1 \quad B = 5 \quad C = -24$

$X = \dfrac{-5 \pm \sqrt{25 - 4(1)(-24)}}{2(1)}$

$X = \dfrac{-5 \pm \sqrt{121}}{2}$

$X = \dfrac{-5 + 11}{2} \qquad X = \dfrac{-5 - 11}{2}$

$X = 3 \qquad\qquad X = -8$

10) $x^2 - 2 = 2x - 4$

$\qquad \underline{-2x \quad -2x}$

$x^2 - 2x - 2 = -4$

$\qquad\quad \underline{+4 \quad\quad +4}$

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

$A = 1 \quad B = -2 \qquad B = 2$

$X = \dfrac{2 \pm \sqrt{4 - 4(1)(2)}}{2(1)}$

$X = \dfrac{2 \pm \sqrt{-4}}{2} \quad \longleftarrow \quad X = \text{NO SOLUTION}$

Solve each quadratic equation using any algebraic method (taking square roots, completing the square, quadratic formula, or factoring)

11) $2 + 4n^2 = 102$ ← NO X TERM ∴ TAKE SQ ROOTS

$\quad -2 \qquad -2$

$\dfrac{4n^2}{4} = \dfrac{100}{4}$

$\sqrt{n^2} = \sqrt{25}$

$\boxed{N = \pm 5}$

12) $x^2 + 11x + 24 = 0$ ← EASY TO FACTOR

$(x+3)(x+8) = 0$

$\begin{array}{cc} 1 & 24 \\ 2 & 12 \\ 3 & 8 \\ 4 & 6 \end{array}$

$X + 3 = 0 \qquad\qquad X + 8 = 0$

$\boxed{X = -3} \qquad\qquad \boxed{X = -8}$

13) $x^2 + 12x = -20$ ← COMPLETE SQUARE

$\quad +36 \qquad +36$

$\sqrt{(x+6)^2} = \sqrt{16}$

$X + 6 = \pm 4$

$\quad -6 \qquad -6$

$X = -6 \pm 4$

$X = -6 + 4 \qquad X = -6 - 4$

$\boxed{X = -2} \qquad\quad \boxed{X = -10}$

14) $2x^2 - 5x - 3 = 0$ ← QUAD FORMULA

$A = 2 \quad B = -5 \quad C = -3$

$X = \dfrac{5 \pm \sqrt{25 - 4(2)(-3)}}{2(2)}$

$X = \dfrac{5 \pm \sqrt{49}}{4}$

$X = \dfrac{5+7}{4} \qquad\qquad X = \dfrac{5-7}{4}$

$\boxed{X = 3} \qquad\qquad X = \dfrac{-2}{4}$

$\boxed{X = -1/2}$

15) $15x^2 = 25x$ ← EASY TO FACTOR

$-25x \quad -25x$

$15x^2 - 25x = 0$

$5x(3x - 5) = 0$

$5x = 0 \qquad\qquad 3x - 5 = 0$

$\boxed{X = 0} \qquad\qquad +5 \quad +5$

$\qquad\qquad\qquad \dfrac{3x}{3} = \dfrac{5}{3}$

$\qquad\qquad\qquad \boxed{X = \dfrac{5}{3}}$ ← KEEP AS AN IMPROPER FRACTION

NOTE: You can use any method you want!!

-4-

Standard Quadratic Equations - Clearly show work!!!!
1) Put in the equation in standard form. Keep the X-SQUARED term on the left side of the equation. Clearly show work.
2) Describe the shape. Justify.
3) Find the y-intercept. Justify
4) Find axis of symmetry and vertex. Clearly show work.
5) Find the discriminant of each quadratic equation then state the number of solutions. Clearly show work and explain your answer.

16) $-x^2 + 8 = 5 + 2x$

$-5-2x \quad -5 \quad -2x$

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

$A = -1 \quad B = -2 \quad C = 3$

Shape: opens down b/c $A = -1$

y-int $(0,3)$ b/c $C = 3$

AS: $x = -\frac{B}{2A} = \frac{2}{2(-1)}$

$\boxed{x = -1}$ must write as an
EQ of a line

$V(-1,4)$ $y = -(-1)^2 - 2(-1) + 3 = 4$

$D = B^2 - 4AC$
$D = 4 - 4(-1)(3)$
$\boxed{D = 16} \rightarrow 2$ solutions

17) $4x^2 - 7x = -5x - 1$

$+5x \quad +5x$
$+1 \quad +1$

$4x^2 - 2x + 1 = 0$

$A = 4 \quad B = -2 \quad C = 1$

Shape opens up b/c $A = 4$

Write as an ordered pair

y-int $(0,1)$ b/c $C = 1$

AS. $x = \frac{2}{2(4)} = \frac{2}{8}$

$\boxed{x = 1/4}$

$V(1/4, 3/4)$ $y = 4(\frac{1}{4})^2 - 2(\frac{1}{4}) + 1$

$y = \frac{1}{4} - \frac{2}{4} + 1$

$y = 3/4$

DISCRIMINANT (D)

$D = B^2 - 4$
$D = (-2)^2 - 4(4)(1)$
$\boxed{D = -12} \rightarrow$ NO SOLUTION

18) $-2x^2 - 7 = -5 + 4x$

$+5 \quad +5 \quad -4x$
$-4x$

$-2x^2 - 4x - 2 = 0$

$A = -2 \quad B = -4 \quad C = -2$

Shape: opens down b/c $a = -2$

y-int $(0, -2)$ b/c $C = -2$

AS: $x = \frac{4}{2(-2)} = \frac{4}{-4}$ $x = -1$

$V(-1,0)$ $y = -2(-1)^2 - 4(-1) - 2 = 0$

$D = (-4)^2 - 4(-2)(-2)$
$\boxed{D = 0} \rightarrow 1$ SOLUTION

5

A hawk, flying at a height of 64 feet, spots a rat on the ground. If he dives down to catch the rat at a speed of 48 feet per second, how long will it take him to catch the rat?

19) (a) Sketch and label the graph. Include units and label the variables.(1PT)

Hawk

$V = 48 \, ft/sec$

$S = 64 \, ft$

RAT

$H = 0 \, ft$
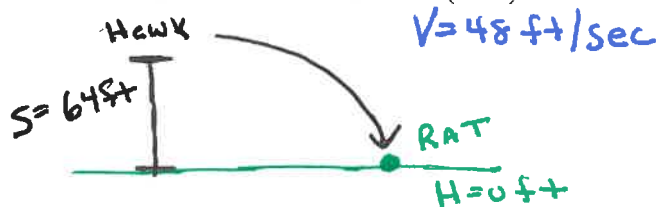
(b) Write the model for height as a function of time using function notation (2PT)

FORMULA $H = -16T^2 + VT + S$

Model
$h(t) = -16T^2 + 48T + 64$

21) Calculate the height of the hawk after 1 second. Clearly show your work. (1PT)

$t = 1$ second
find height

$h(1) = -16(1)^2 + 48(1) + 64$

$h(1) = -16 + 48 + 64$

$h(1) = -16 + 112$

$h(1) = 96$

The hawk will be at 96 ft after 1 second.

20) Find the time. Clearly show your work. (2PTs)

$h(t) = -16T^2 + 48T + 64$

$0 = -16T^2 + 48T + 64$

$0 = -16(T^2 - 3T - 4)$

$0 = -16(T-4)(T+1)$

$-16 = 0 \qquad T - 4 = 0 \qquad T + 1 = 0$

$T = 4 \qquad T = -1$

The hawk will catch the rat on the ground at 4 seconds.