Academic Algebra 1

R10 Practice Test

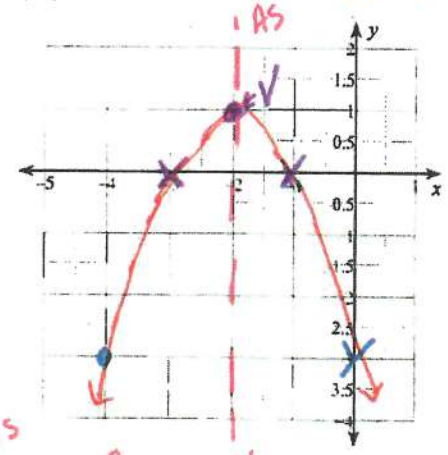
me KEY ID: 1

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



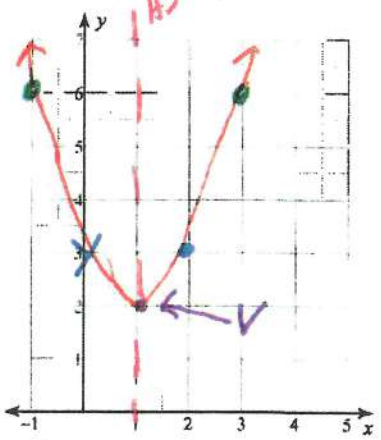
$x = \frac{-B}{2A} = \frac{4}{2(-1)}$ $x = -2$

x	-4	-3	-2	-1	0
y	-3	0	1	0	-3

SOLUTION $x = -3, -1$

2) $f(x) = x^2 - 2x + 3$ A = 1 B = -2 C = 3 (0, 3)

shape, y INT

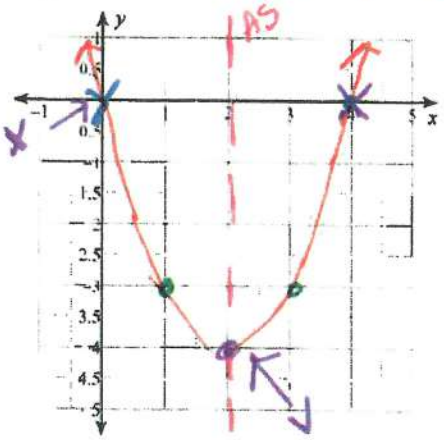


AS $x = \frac{2}{2(1)}$ $x = 1$

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 $x = \frac{+4}{2(1)}$ $x = +2$

x	0	1	2	3	4
y	0	-3	-4	-3	0

SOLUTION $x = 0, 4$

STEP 1: ISOLATE x^2

Solve each equation by taking square roots.

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

$-10 \quad -10$

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

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

DON'T FORGET $\pm$

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

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

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

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

$-11 \quad -11$

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

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

Cannot take $\sqrt{\ }$ of a negative number

x = NO SOLUTION

$D = B^2 - 4AC$

Find the discriminant of each quadratic equation then state the number and type of solutions.

6) $2n^2 + 8n + 8 = 0$

$A = 2 \quad B = 8 \quad C = 8$

$D = 64 - 4(2)(8)$

$D = 0$

1 Solution

7) $-6n^2 + n - 9 = 0$

$A = -6 \quad B = 1 \quad C = -9$

$D = 1 - 4(-6)(-9)$

$D = -215$

No Real Solution

Solve each equation with the Quadratic formula.

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

$-2 \quad -2$

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

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

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

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

$x = \dfrac{-4 + 8}{4}$ $\quad x = \dfrac{-4 - 8}{4}$

$x = 1$ $\quad x = -3$

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

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

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

$-2 \quad -2$

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

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

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

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

$x = \dfrac{-5 + 11}{2}$ $\quad x = \dfrac{-5 - 11}{2}$

$x = 3$ $\quad x = -8$

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

$-2x \quad -2x$

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

$+4 \quad +4$

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

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

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

$x = \dfrac{2 \pm \sqrt{-4}}{2}$ ← $x = \text{NO SOLUTION}$

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

$-2 \quad -2$

$\frac{4N^2}{4} = \frac{100}{4}$

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

$N = \pm 5$

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

1 24
2 12
3 8
4 6

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

$x+3=0$ → $x=-3$

$x+8=0$ → $x=-8$

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

$+36 \quad +36$

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

$x+6 = \pm 4$

$-6 \quad -6$

$x = -6 \pm 4$

$x = -6+4$ → $x=-2$

$x = -6-4$ → $x=-10$

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

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

$x = \frac{5 \pm \sqrt{25-4(2)(-3)}}{2(2)}$

$x = \frac{5 \pm \sqrt{49}}{4}$

$x = \frac{5+7}{4}$ → $x=3$

$x = \frac{5-7}{4}$

$x = \frac{-2}{4}$

$x = -1/2$

15) $15x^2 = 25x$ ← EASY TO FACTOR

$-25x \quad -25x$

$15x^2 - 25x = 0$

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

$5x = 0$ → $x=0$

$3x-5=0$

$+5 \quad +5$

$\frac{3x}{3} = \frac{5}{3}$

$x = \frac{5}{3}$ ← KEEP AS AN IMPROPER FRACTION

NOTE: You can use any method you want!!

Solve each equation with the quadratic formula. Round 2 decimals. Show the final check step.

16) $5x^2 - 13 = 9x$

$5x^2 - 9x - 13 = 0$

$A = 5$, $B = -9$, $C = -13$

$$x = \frac{9 \pm \sqrt{81 - 4(5)(-13)}}{2(5)}$$

$$x = \frac{9 \pm \sqrt{341}}{10}$$ ← DO NOT ROUND

$x = \frac{9 + \sqrt{341}}{10}$ $\quad$ $x = \frac{9 - \sqrt{341}}{10}$

$x \approx 2.75$ $\quad$ $x \approx -.95$

C: $24.81 \approx 24.75$ ✓ $\quad$ C: $-8.49 \approx -8.55$ ✓

17) $-3x^2 = 2x - 6$

$+3x^2 \quad +3x^2$

$0 = 3x^2 + 2x - 6$

$A = 3$, $B = 2$, $C = -6$

$$x = \frac{-2 \pm \sqrt{4 - 4(3)(-6)}}{2(3)}$$

$$x = \frac{-2 \pm \sqrt{76}}{6}$$ ← DO NOT ROUND

$x = \frac{-2 + \sqrt{76}}{6}$ $\quad$ $x = \frac{-2 - \sqrt{76}}{6}$

$x \approx 1.12$ $\quad$ $x \approx -1.79$

C: $-3.76 \approx -3.76$ ✓ $\quad$ C: $-9.61 \approx -9.58$ ✓

18) $-6x^2 - 12x = -13$

$+13 \quad +13$

$-6x^2 - 12x + 13 = 0$

$A = -6$, $B = -12$, $C = 13$

$$x = \frac{12 \pm \sqrt{144 - 4(-6)(13)}}{2(-6)}$$

$$x = \frac{12 \pm \sqrt{456}}{-12}$$ ← DO NOT ROUND

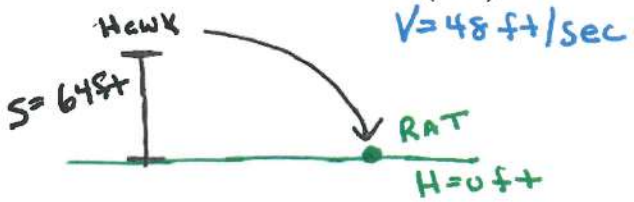
$x = \frac{12 + \sqrt{456}}{-12}$ $\quad$ $x = \frac{12 - \sqrt{456}}{-12}$

$x \approx -2.78$ $\quad$ $x \approx 0.78$

C: $-13.01 \approx -13$ ✓ $\quad$ C: $-13.01 \approx -13$ ✓

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)



(b) Write the model for height as a function of time using function notation (2PT)

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

Model

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

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

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

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

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

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

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

$T=4$ $\quad T=-1$

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

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.