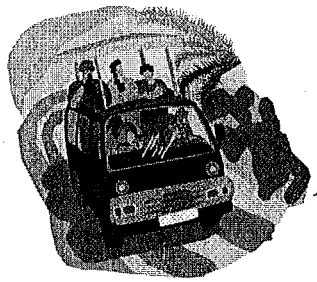
Algebra 2
Adventure

Name_____
Date_____



Algebra 2 Adventure

Please be sure to show your work as well as
the stations you visited in the order that you visited them.

Station Number	WORK

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STATION

1

Solve: Over what interval is $y = |x + 4|$ decreasing?

(Hint: Use your Calculator – what does decreasing mean?)

a. $(-\infty, 4)$ Go to Station # 4

b. $(-\infty, -4)$ Go to Station # 7

c. $(-4, \infty)$ Go to Station # 10

d. $(4, \infty)$ Go to Station # 5

STATION

2

Solve: Find the sum of the finite arithmetic sequence: 15, 18, 21, …., 39

(*Hint: What is the question asking? What formula do we use?)*

a. 93 — Go to Station #8

b. 134 — Go to Station #4

c. 243 — Go to Station # 10

d. 267 — Go to Station # 1

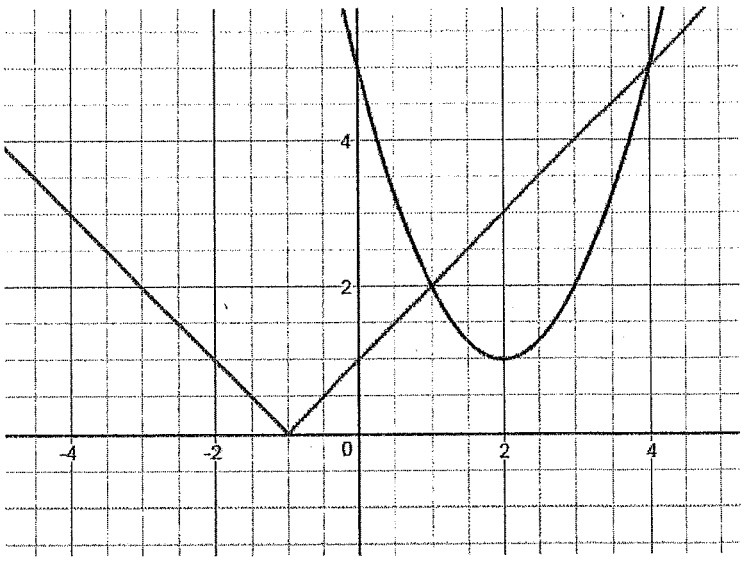
STATION

3

Solve: Use the graph to solve the equation

(Hint: What is a solution?)

$$x^2 - 4x + 5 = |x + 1|$$



a. $x = 1$ and $x = 4$ — Go to Station #5

b. $x = 2$ and $x = 5$ — Go to Station #10

c. $x = -1$ — Go to Station # 7

d. $x = 4$ — Go to Station #11

STATION

4

Solve: What is the vertex of the graph of $f(x) = x^2 - 4x - 3$?

(*Hint:* $h = \frac{-b}{2a}$)

a. (2, 15) Go to Station # 14

b. (2, -7) Go to Station # 12

c. (2, -7) Go to Station # 13

d. (-2, -3) Go to Station # 1

STATION

5

Solve: An arrow is launched from the top of a platform. The equation $h(t) = -16t^2 + 64t + 80$ gives the height, *h*, in feet of the arrow *t* seconds after it is launched. How long will it be before the arrow hits the ground? Round your answer to the nearest whole number.

(*Hint: Where does it hit the groud?)*

a. -1 Go to Station # 8

b. 8 Go to Station # 2

c. 5 Go to Station # 16

d. 7 Go to Station # 5

STATION

6

Solve $0 = x^2 + 12x + 72$.

a. $6 + 6i, 6 - 6i$ Go to Station # 10

b. $-6 + 6i, -6 - 6i$ Go to Station # 11

c. $-6+i\sqrt{2}, -6-i\sqrt{2}$ Go to Station # 12

d. $-12+i\sqrt{2}, -12-i\sqrt{2}$ Go to Station # 9

STATION

7

Solve: A ball is thrown off the top of a dock.

The equation $h(t) = -5t^2 + 30t + 18$ give the height, h, in meters, of the ball t seconds after it is launched. Does the ball reach the height of 75 meters?

(Hint: What would we call the high point? How do we find it?)

a. Yes — Go to Station # 12

b. No — Go to Station # 6

STATION

8

Determine the number of real solutions to the system $\begin{cases} y = 4x^2 - 1 \\ y = x - 4 \end{cases}$

(Hint: What part of the quadratic formula tells us the number of solutions?)

a. 0 real solutions — Go to Station # 13

b. 1 real solution — Go to Station # 5

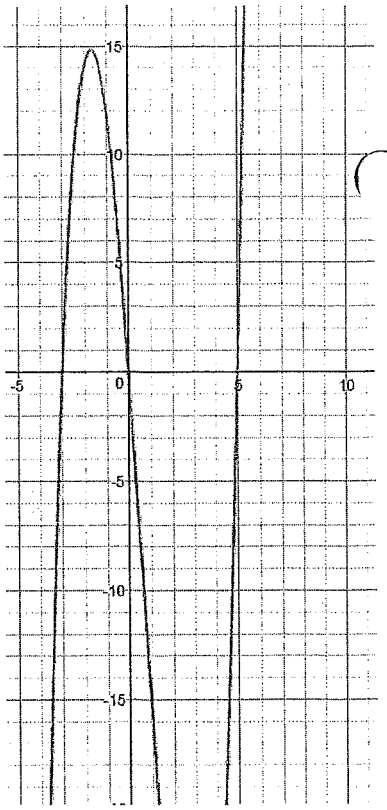
c. 2 real solutions — Go to Station # 3

STATION

9

The graph of function f is shown. Use the zeros and the turning points of the graph. What is the rule for f?

(Hint: Work backwards – what do you know about the zeros? How can you change those to match the expressions below?



a. $x^3 + 3x - 5$ Go to Station # 13

b. $x^3 + 2x^2 + 15x$ Go to Station # 9

c. $x^3 - 2x^2 - 15x$ Go to Station # 14

d. $x^3 - 2x^2 + 15$ Go to Station # 8

STATION

10

Simplify $(5x^3 - 2x^2) - (3x^3 + 9x^2 - 5)$

(Hint: distribute the negative before you combine)

a. $2x^3 - 11x^2 + 5$ — Go to Station # 4

b. $2x^3 - 11x^2 - 5$ — Go to Station # 2

c. $2x^3 + 7x^2 + 5$ — Go to Station # 16

d. $2x^3 + 7x^2 - 5$ — Go to Station # 1

STATION

11

Over what interval is the graph of the polynomial function $f(x) = x^3 + 4x^2 - 11x - 30$ increasing?

a. $(-\infty, -5) \text{ and } (3, \infty)$ Go to Station # 1

b. $(-5, -2) \text{ and } (3, \infty)$ Go to Station # 2

c. $(-\infty, -5) \text{ and } (-2, 3)$ Go to Station # 9

d. $(-\infty, -3.67) \text{ and } (1, \infty)$ Go to Station # 15

STATION

12

Use synthetic division to divide $4x^3 - 5x^2 + 8$ by $x + 2$

a. $4x^2 - 13x + 26 - \frac{44}{x+2}$ Go to Station # 8

b. c. $4x^2 + 13x + 26 - \frac{44}{x+2}$ Go to Station # 4

c. $4x^2 - 13x - 26 + \frac{44}{x+2}$ Go to Station # 5

d. . $4x^2 - 13x + 26 - \frac{4}{x+2}$ Go to Station # 16

STATION

13

Find the zeros of the function $f(x) = x^3 + 3x^2 - 10x - 24$ and describe the behavior of the graph at each zero.

a. Graph crosses x-axis at 3 and -2 and touches x-axis at -4 — Go to Station # 7

b. Graph crosses x-axis at 3, -2, and -4 — Go to Station # 9

c. Graph crosses x-axis at 3, -10, and -24 — Go to Station # 3

d. Graph crosses x-axis at 3 and -10 and touches x-axis at -24 — Go to Station # 12

STATION

14

What are all the real and complex solutions of $x^3 - 4x^2 + 9x = 36$

(Hint: Use the calculator to find the first solution...then try synthetic division)

a. 4, 3, -3 — Go to Station # 13

b. -4, 3, 3*i* — Go to Station # 16

c. 4, 3*i*, -3*i* — Go to Station # 3

d. 3, 4*i*, -4*i* — Go to Station # 2

STATION

15

What is the vertex of the graph of $f(x) = x^2 - 8x + 11$?

(Hint: What formula do you use?)

a. (-5, 4) Go to Station # 1

b. (4, -5) Go to Station # 2

c. (-4, 8) Go to Station # 13

d. (8, 11) Go to Station # 8

STATION

16

Over what interval is the graph of the polynomial function $f(x) = x^3 + x^2 - 6x$ increasing?

a. $(-\infty, -2.1)\ and\ (1.8, \infty)$ Go to Station # 2

b. $(-1.8, 1.1)$ Go to Station # 13

c. $(-\infty, -3)\ and\ (-1, 2.1)$ Go to Station # 8

d. $(-\infty, -1.8)\ and\ (1.1, \infty)$ Go to Station # 1