Name: _____

11.4.D2 – FACTORED FORM OF QUADRATIC FUNCTIONS

Past due on: _____ Period: _____

Use a graphing calculator to graph the function that represents the problem situation. (Use the given axes as a guide for setting the WINDOW.) Identify the absolute maximum, zeros, the domain and range of the function in terms of both the graph and the problem situation, and the intervals of increase and decrease. Round your answers to the nearest hundredth, if necessary. *Refer to the THREE 11.3 examples "Identifying/Determining Domain & Range/ Zeros/Intervals of Increase & Decrease of a Quadratic Function" in the Chapter 11 Summary.*

1. A model rocket is launches from the ground with an initial velocity of 140 feet per second. The function $g(t) = -16t^2 + 140t$ represents the height of the rocket, $g(t)$, t seconds after it was launched.
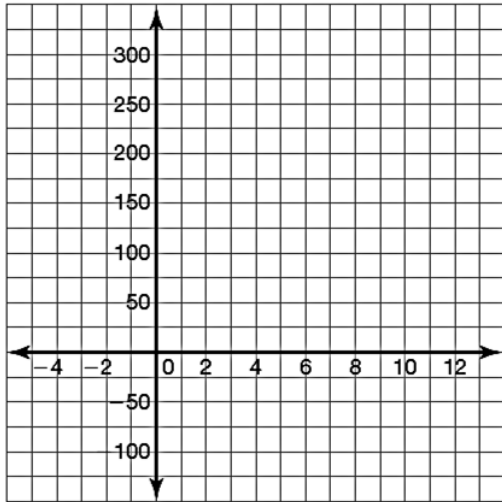
a. Identify the following characteristics:

Absolute maximum: _____

Zeros: _____

Domain of graph: _____

Domain of problem: _____

Range of graph: _____

Range of problem: _____

Interval of increase: _____

Interval of decrease: _____

b. What is the height of the model rocket at 5 seconds?

c. After approximately how many seconds is the model rocket at a height of 200 feet?

d. What is the maximum height of the rocket? At what time does the rocket reach this height?

Determine the direction of opening AND the x-intercepts of each quadratic function. If necessary, write the function in factored form. *Refer to the 11.4 example "Determining x-Intercepts from Functions in Factored Form" in the Chapter 11 Summary.*

2. $f(x) = (3x + 18)(x - 2)$ 3. $f(x) = (x + 8)(3 - x)$ 4. $f(x) = (-2x + 8)(x - 14)$

5. $f(x) = (x + 16)(2x + 16)$ 6. $f(x) = x(x + 7)$ 7. $f(x) = (-3x + 9)(x + 3)$

Write a quadratic function in factored form with each set of given characteristics. **Let $a = \pm 2$.** *Refer to the 11.4 example "Writing a Quadratic Function in Factored Form Given its x-Intercepts" in the Chapter 11 Summary.*

8. Opens downward & has *x*-intercepts $(-2, 0)$ & $(5, 0)$

9. Opens downward & has *x*-intercepts $(2, 0)$ & $(14, 0)$

10. Opens upward & has *x*-intercepts $(-8, 0)$ & $(-1, 0)$

11. Opens upward & has *x*-intercepts $(3, 0)$ & $(7, 0)$

12. Opens downward & has *x*-intercepts $(-5, 0)$ & $(2, 0)$

13. Opens upward & has *x*-intercepts $(-12, 0)$ & $(-4, 0)$

An X-box is a pattern for which the product of two numbers is placed on top, while the sum of the same two numbers is placed on the bottom. This pattern is demonstrated in the X-box at right. Copy and complete each X-box pattern below.

PRODUCT ↘

| xy |
| x | y |
| $x+y$ |

↗ SUM

14.

| 64 |
| 20 |

15.

| -60 |
| 17 |

16.

| 50 |
| 15 |

17.

| 48 |
| -19 |
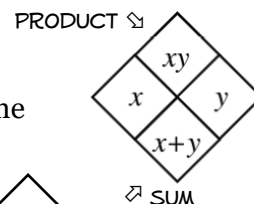
1ˢᵀ SEMESTER SPIRAL REVIEW – *Refer to the **Sequences table** your 1ˢᵗ semester summary card.*

18. Marco has \$2100 to deposit into an account. The interest rate available for the account is 2.5%. Complete the table: Use the simple and compound interest formula to complete each table. Round to the nearest cent.

TIME (YEARS)	SIMPLE INTEREST BALANCE	COMPOUND INTEREST BALANCE
EXPRESSION: t	EXPRESSION:	EXPRESSION:
5		
10		

Determine whether the sequence is arithmetic or geometric and then find the next 3 terms. Write its explicit formula and use it to determine the 10ᵗʰ term.

	19) $16, 30, 44, \ldots$	20) $2, -6, 18, \ldots$	21) $-1280, 320, -80, \ldots$
SEQUENCE TYPE			
NEXT 3 TERMS			
EXPLICIT FORMULA			
10ᵀᴴ TERM			