MCR3U9 **Semester 2, 2015 - 2016**

Grade 11 Pre-AP Functions
Quiz – Unit 1 – Function Concepts, Notation, Perspectives, Applications

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Victim: M. Solutions You keep producing impressive work Mr. S.!!

KU	APP	COM
16/16	16/16	10/10

(Up to 4 marks can be deducted for communication errors.)

Modified True/False (6 KU)

State whether each statement is ***true*** or ***false***. ~~If false,~~ ***change*** ~~the~~ ***underlined part*** to make the statement true.

√ = ½ mark

1. **T/F** F ✓ $f(2-3) = f(2) - f(3)$ **Change:** f(-1) ✓

2. **T/F** T ✓ If $g(-1) = 3$ then $(-1,3)$ lies of the graph of g. **Change:** ✓

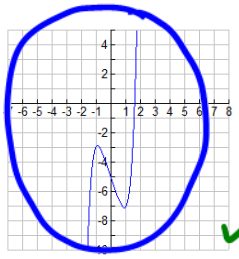
3. **T/F** F ✓ All functions are relations and all relations are functions. **Change:** but not all ✓

4. **T/F** F ✓ The function $h(t) = -4.9t^2 + 14t + 2$ describes the height, in metres, of a ball thrown vertically upward, t seconds after it was thrown. Then $h(0)$ means the height of the ball when it hits the ground. **Change:** the initial height of the ball ✓

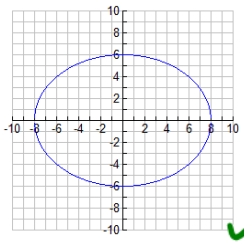
5. **T/F** F ✓ The function $g(x) = x^2$ is one-to-one. **Change:** g(x) = x ✓

6. **T/F** F ✓ The symbol $f(u)$ is read "f u." **Change:** "f of u" ✓

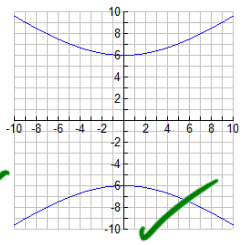
7. Circle the relations that are functions. **(10 KU)**



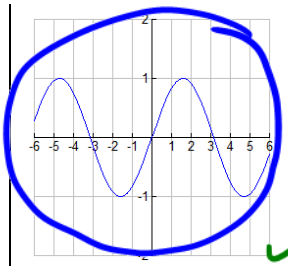
$|y| = 16 - x^2$ ✓



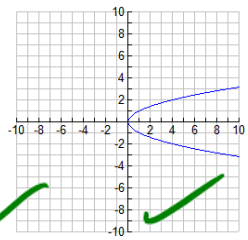
$\{(1,1),(1,2),(1,3),(1,5)\}$ ✓



$x^2 - y^2 = 0$ ✓



$\{(0,2),(1,2),(2,2)\}$ ✓



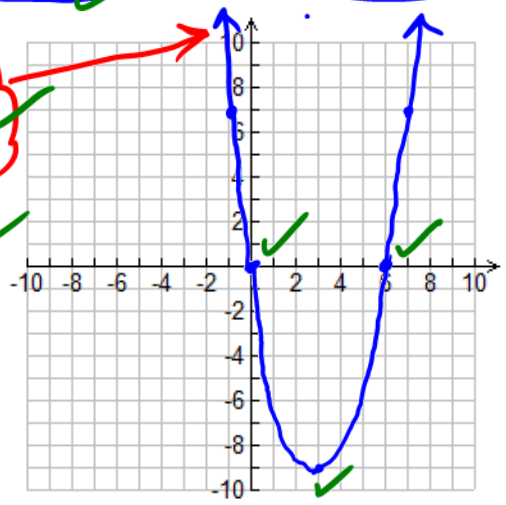
$y = x^3 + 2x^2 - 3x + 1$ ✓

8. Sketch a graph of the following function:

$$f(x) = \frac{x^3 + 5x^2 - 66x}{x + 11} = \frac{x(x^2 + 5x - 66)}{x+11}$$

$$= \frac{x(x+11)(x-6)}{x+11} = x(x-6),\ x \neq -11$$ ✓

There is a hole at (-11, 187) ✓

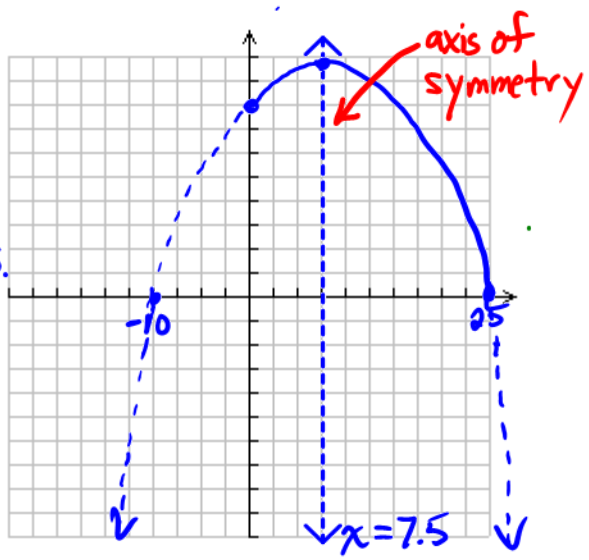


In addition, state the domain and range of f. **(8 APP)**

Domain = $\{x \in \mathbb{R} \mid x \neq -11\}$ ✓

Range = $\{y \in \mathbb{R} \mid y \geq -9,\ y \neq 187\}$ ✓

9. A canoe-rental company charges $20 per canoe rental and averages 100 rentals per day. According to marketing studies of the canoe-rental industry, for every $2 increase in price, a typical company can expect to lose four rentals per day. How much should the company charge to maximize revenue? **(8 APP)**



Let x represent the # of $2 price increases and let $R(x)$ represent the revenue, in dollars, that is expected per day for x $2-increases in price.

$\therefore R(x) = \underbrace{(20+2x)}_{\text{price}}\underbrace{(100-4x)}_{\#\text{ rentals}}$

Now $R(x) = 2(10+x)[4(25-x)]$

$= 8(x+10)(25-x)$

$\therefore$ the zeros of R are -10 and 25

$\therefore$ the maximum value of R occurs at $x = \frac{-10+25}{2} = 7.5$

$\therefore 20+2x = 20+2(7.5) = 35$

$\therefore$ the revenue is maximized if the canoe-rental price is set to $35

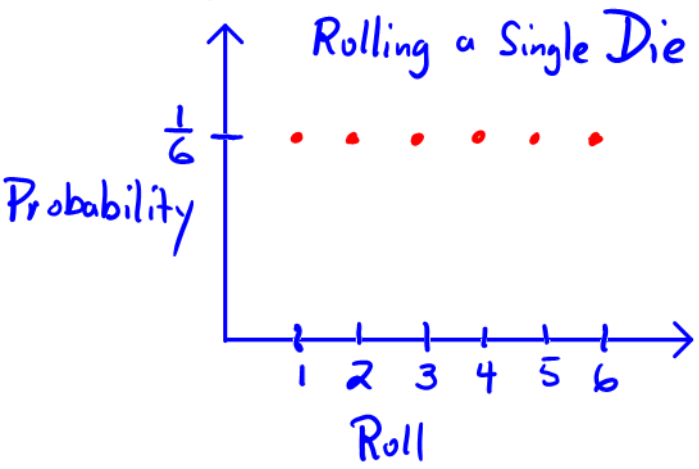
10. Explain the difference between discrete and continuous functions. Use one example of each to illustrate your explanation. **(5 COM)**

Discrete functions consist of a series of "disconnected" points. More precisely, the domain of a discrete function consists only of distinct values such as integers, rational numbers or isolated real numbers. Continuous functions, on the other hand, are defined for entire intervals (ranges) of real numbers.

(See next page for examples.)

Examples

Discrete ✓



Continuous ✓