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Honors Algebra 2 Chapter 2 Part 2 Test Review

1) A 9 by 12 rectangular picture is framed by a border of uniform width. Given that the combined area of the picture and the frame is 180 square units, what is the width of the border?

2) A bicyclist is riding at a speed of 20mi/h when she starts down a long hill. The distance $d$ she travels in feet can be modeled by the function $d\left(t\right)=5t^{2}+20t$, where $t$ is the time in seconds.

a) The hill is 585 ft long. To the nearest second, how long will it take her to reach the bottom?

b) Suppose the hill were only half as long. To the nearest second, how long will it take her to reach the bottom?

3) A study found that a driver’s reaction time to $A(x)$ audio stimuli and his or her reaction time $V(x)$ to visual stimuli (both in milliseconds) can be modeled by

$$A\left(x\right)=0.0051x^{2}-0.319x+15 , 16\leq x70$$

$$V\left(x\right)=0.005x^{2}-0.23x+22, 16\leq x\leq 70$$

 where $x$ is the age (in years) of the driver.

 a) Write an inequality that you can use to find the x-values for which $A(x)$ is less than $V(x)$.

b) Use a graphing calculator to solve the inequality $A\left(x\right)<V(x)$. Describe how you used the domain $16\leq x\leq 70$ to determine a reasonable solution.

c) Based on your results from parts a and b, do you think a driver would react more quickly to a traffic light changes from green to yellow or to the siren of an ambulance? Explain.

4) A truck that is 11 feet tall and 7 feet wide is traveling under an arch. The arch can be modeled by $y=-0.0625x^{2}+1.25x+5.75$, where x and y are measured in feet.

 a) Will the truck fit under the arch?

 b) What is the maximum width that a truck 11 feet high can have and still make it under the arch?

 c) What is the maximum height that a truck 7 feet wide can have and still make it under the arch?

5) Your family has a rectangular pool that measures 18 feet by 9 feet. Your family wants to put a deck around the pool but is not sure how wide to make the deck. Determine how wide the deck should be when the total area of the pool and deck is 400 square feet.

***Find the roots of each equation by factoring.***

6) $3n^{2}-16n+20=0$ 7) $5x^{2}-14x=-8$ 8) $0=\left(x-1\right)^{2}+y^{2}$

9) Write a quadratic in standard form with the x-intercepts of 4 and 2 and a leading coefficient of 3.

10) Write a quadratic in vertex form with the x-intercepts of -1 and 3 and a leading coefficient of 2.

***Solve by completing the square.***

11) $x^{2}-14x=13$ 12) $3x^{2}-18x=48$

***Find a possible pair of integer value for a and c so that the quadratic equation has the given solution(s).***

13) $ax^{2}+4x+c=0$, two imaginary solutions

14) $ax^{2}-8x+c=0$; two real solutions

***Solve using the Quadratic Formula.***

15) $5x^{2}+38=3$ 16) $-3=4x^{2}+9x$

***Solve the inequality algebraically.***

17) $x^{2}-11x\geq -28$ 18) $\frac{1}{2}x^{2}+4x<1$