

# Quiz 1A, Business Calculus

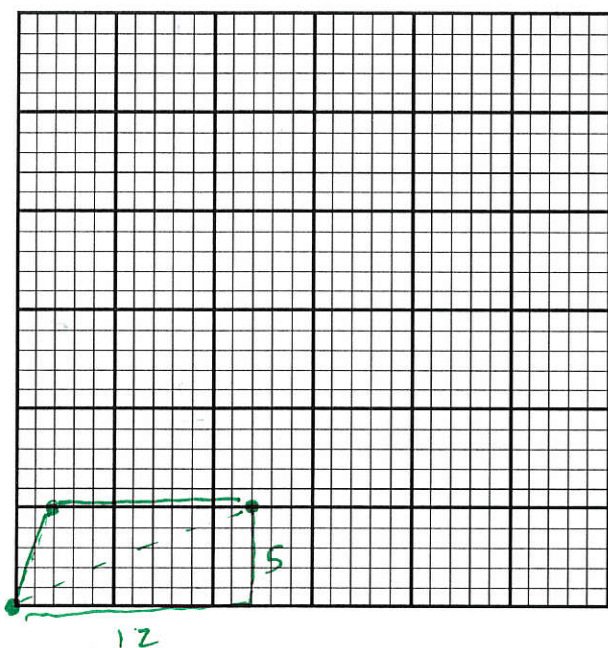
Spring 2017 - Dr. Graham-Squire

Name: Key

≈ 5 min

→ give 20 @ end of class.

1. (4 points) Amazon is trying to figure out the cheapest route to deliver a package to a house. The Amazon shipping center is at the point (0,0), and the home is at the point (12,5), with each number measured in miles. Amazon can either ship the package directly by drone, at a cost of \$1.25 per mile, or they can ship the package via drone (still at a cost of \$1.25 per mile) to a post office located at (2,5), and the post office will deliver the package for \$8 from there. Is it cheaper to ship it directly via drone, or to ship it to the post office and pay the extra \$8? Show/explain your work.



Direct by drone; distance of

$$\sqrt{12^2 + 5^2} = \sqrt{169} = 13 \text{ miles}$$

$$\text{Cost} = 1.25 \times 13 = \boxed{\$16.25}$$

To post office is distance of  $\sqrt{2^2 + 5^2} = \sqrt{29} = 5.385 \text{ miles}$

$$\text{Cost of } 5.385(1.25) + 8 = \boxed{\$14.73}$$

Cheaper to go to post office!

- | if no  $\times 1.25$

2. (2 points) Simplify the expression by combining like terms, factoring and canceling, if possible. Show/explain your work.

$$\frac{2x^2 - 5x - (x^2 - 2x + 40)}{x^2 - 9x + 8}$$

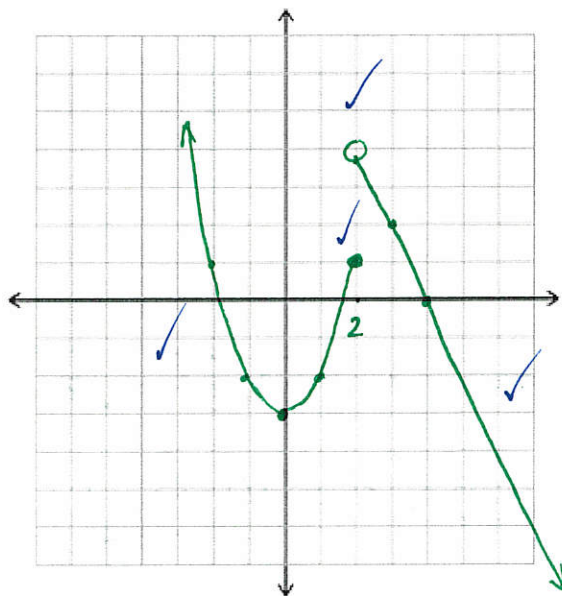
$$= \frac{2x^2 - 5x - x^2 + 2x - 40}{(x-8)(x-1)} \checkmark$$

$$= \frac{x^2 - 3x - 40}{(x-8)(x-1)} \checkmark$$

$$= \frac{\cancel{(x-8)}(x+5)}{\cancel{(x-8)}(x-1)} = \boxed{\frac{x+5}{x-1}} \checkmark$$

3. (4 points) Sketch a graph of the piecewise function, then answer the questions below. Make sure to place appropriate open and closed circles on your graph!

$$f(x) = \begin{cases} x^2 - 3 & \text{if } x \leq 2 \\ -2x + 8 & \text{if } x > 2 \end{cases}$$



$$x^2 - 3$$

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

$$-2x + 8$$

x	y
2	4
3	2
4	0

← open circle!

✓ Calculate (a)  $f(-3) = (-3)^2 - 3 = 9 - 3 = \boxed{6}$

✓ (b)  $f(2) = 2^2 - 3 = 1$

✓ (c)  $f(10) = -2(10) + 8 = -20 + 8 = \boxed{-12}$

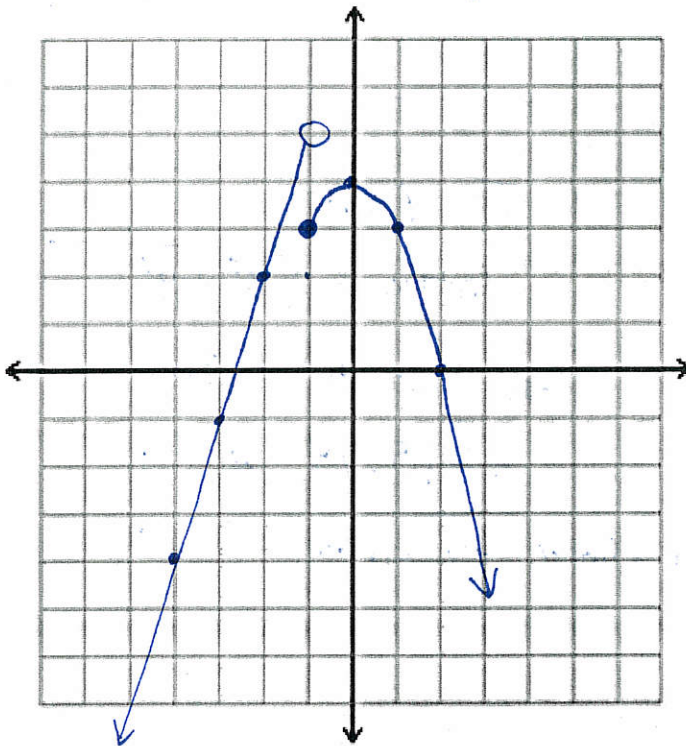
# Quiz 1B, Business Calculus

Spring 2017 - Dr. Graham-Squire

Name: Key

1. (4 points) Sketch a graph of the piecewise function, then answer the questions below. Make sure to place appropriate open and closed circles on your graph!

$$f(x) = \begin{cases} 3x + 8 & \text{if } x < -1 \\ 4 - x^2 & \text{if } x \geq -1 \end{cases}$$



$$3x + 8$$

x	y
-1	5
-2	2
-3	-1
-4	-4

← open!

$$4 - x^2$$

x	y
-1	3
0	4
1	3
2	0

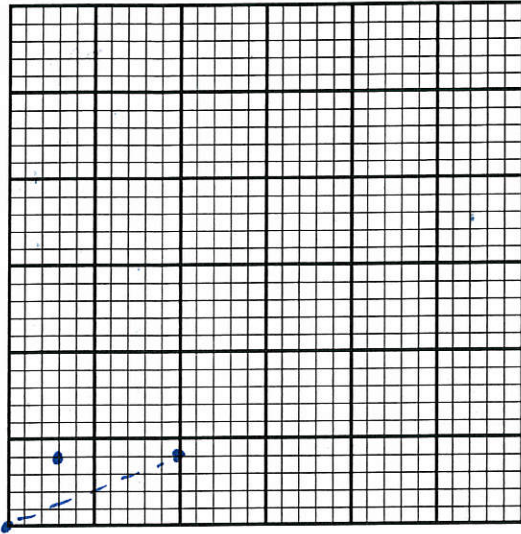
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Calculate (a)  $f(-3) = \boxed{-1}$

(b)  $f(-1) = \boxed{3}$

(c)  $f(10) = 4 - (10)^2 = 4 - 100 = \boxed{-96}$

2. (4 points) Amazon is trying to figure out the cheapest route to deliver a package to a house. The Amazon shipping center is at the point  $(0,0)$ , and the home is at the point  $(10,4)$ , with each number measured in miles. Amazon can either ship the package directly by drone, at a cost of \$1.15 per mile, or they can ship the package via drone (still at a cost of \$1.15 per mile) to a post office located at  $(3,4)$ , and the post office will deliver the package to the home for \$10 from there. Is it cheaper to ship it directly via drone, or to ship it to the post office and pay the extra \$10? Show/explain your work.



Direct by drone:

$$\text{dist} = \sqrt{(10-0)^2 + (4-0)^2} = \sqrt{116} = 10.7$$

$$\text{Cost} = 1.15(10.77) = \underline{\underline{\$12.39}}$$

To P.O.:

$$\text{distance} = \sqrt{3^2 + 4^2} = \sqrt{25} = 5$$

$$\text{Cost} = \$1.15(5) + \$10$$

$$= \underline{\underline{\$15.75}}$$

Cheaper to go direct by drone

3. (2 points) Simplify the expression by combining like terms, factoring and canceling, if possible. Show/explain your work.

$$\frac{3x^2 + 2x - (2x^2 - x + 28)}{x^2 - 9x + 20}$$

$$= \frac{3x^2 + 2x - 2x^2 + x - 28}{(x-4)(x-5)}$$

$$= \frac{x^2 + 3x - 28}{(x-4)(x-5)}$$

$$= \frac{(x+7)(\cancel{x-4})}{(\cancel{x-4})(x-5)} = \boxed{\frac{x+7}{x-5}}$$