1.1 Multiple Representations

Notes **APPLICATION**

1.

VERBALLY (time 0)

Before spending any time on social media, a person is 100% happy. A person loses 15% happiness every hour per week spent on social media

ALGEBRAICALLY

$m = \frac{\Delta y}{\Delta x} = \frac{(70)-(40)}{(2)-(4)} = \frac{30}{-2} = -15$ (m = −15 % / 1 hour)

$y - y_1 = m(x - x_1)$

$y - (40) = -15(x - (4))$

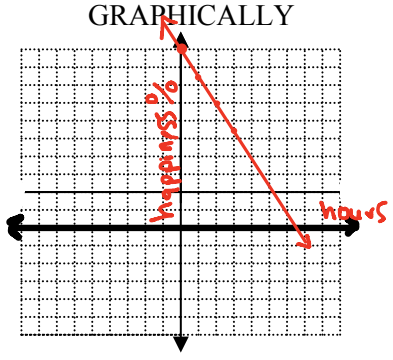
$y - 40 = -15x + 60$

$y = -15x + 100$

NUMERICALLY

time spent on social media per week (hours)	Amount of happiness as a percent
2	70
4	40
6	10

GRAPHICALLY



2. If $g(x) = -x^2 + (-x)^2$ then find…

a. $g(-2) = -(-2)^2 + (-(-2))^2$

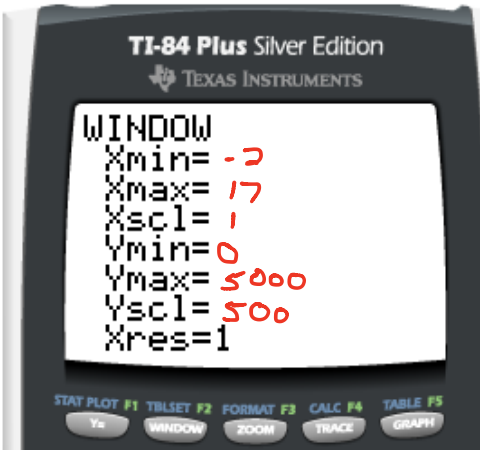
$= -4 + (2)^2$

$= -4 + 4$

$g(-2) = 0$

3. From 2000 to 2015, the amount of ear hair, in millions of hairs, sold domestically can be modeled by $E(t) = -5t^3 + 70t^2 - 10t + 1005$ where t is the number of years since 2005.

a. Graph with a friendly window. Record the window here →



b. What does $E(5)$ mean? Find it!

In 2005, how many dollars worth of ear hair is sold?

$2,080 million

c. Approximate the maximum sales.

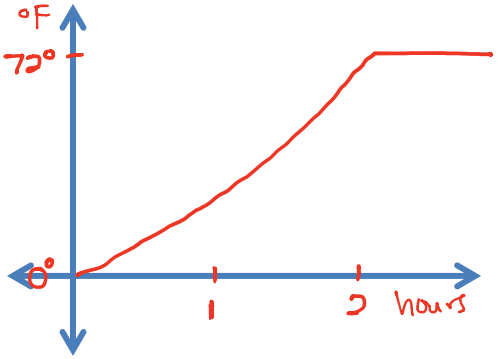
The maximum sales are about $2944.6182 million or $2,944,618,200

d. What does the y-intercept mean?

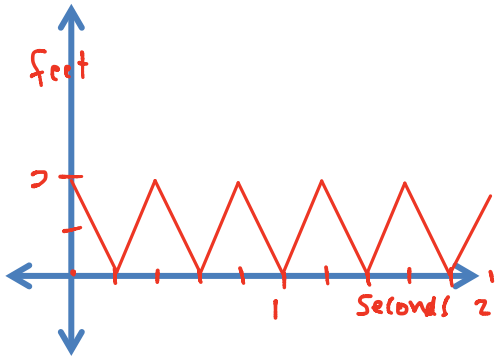
The amount of ear hair sold in millions of dollars in 2000.

4. Sketch a graph for each the verbal situation given below. Make sure to label the axis of your graph!

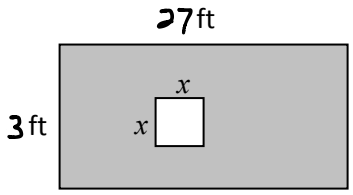
a. You get a large cup of ice from your ice box. Graph the temperature of the cup in the cup vs. time.



b. While at a park, you go on a dribbling rampage. Graph the ball's height above ground vs. time.

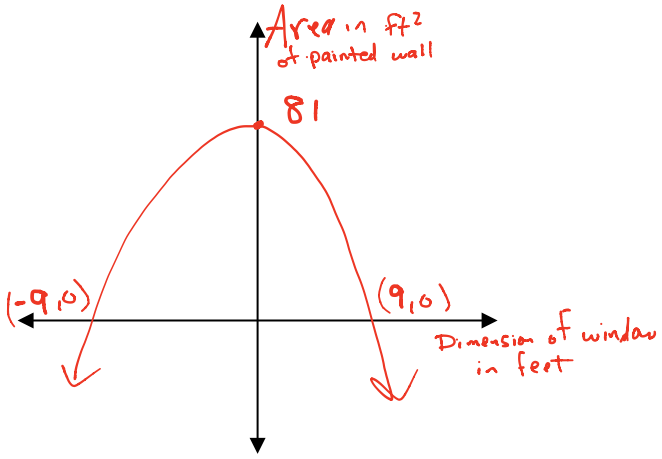


Bob the builder wants to paint a wall (shaded region below). Unfortunately, he does not know how big his square window is going to be. Help a builder out.



5. Explain why the function $A(x) = 81 - x^2$ represents the shaded area in the figure above.

The area of the paint wall is $l \cdot w$, or $27(3) = 81$ ft. Then if you subtract the area of the window, $x \cdot x = x^2$, you'll find area of shaded $= A_{\square} - A_{\square} = 81 - x^2$



6. Draw a rough sketch of the graph.

7. What does the x-axis represent?

Dimension of window in ft

8. What does the y-axis represent?

Area of painted wall in ft²

9. If the square has sides of 5 ft, what is the area of the shaded region?

$A(5) = 81 - (5)^2$
$= 81 - 25$
$A(5) = 56 \text{ ft}^2$

10. If the area of the shaded region is 21, what are the lengths of the sides of the square?

$21 = 81 - x^2$
$-60 = -x^2$
$60 = x^2$
$\pm\sqrt{60} = x$
$x \approx 7.746$ ft

11. What are the x-intercepts?

$0 = 81 - x^2$
$x^2 = 81$
$x = \pm 9$

12. What do the x-intercepts represent in this problem?

The dimensions of the square that would give painted area of zero.

13. Are the x-intercepts possible solutions for this problem? Why/Why not?

The x-int of -9 makes no sense length of the window would be -9 feet.

The x-int of 9 means no sense length of the window would be bigger the wall height.

14. Fill in the table. Describe what happens to $A(x)$ as x becomes infinitely small.

As x gets smaller, the painted area gets closer and closer to 81 ft²

x	$A(x)$
2	77
1	80
0.5	80.75
0.25	80.9375
0.1	80.99