**Notes**

1. Complete the following sentences by filling in the blank with either directly or indirectly.
   1. The intensity of a light, *I*, is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ proportional to the square of the distance, *d*, between the light source and the viewer.
   2. The circumference of a circle, *C*, is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ proportional to the radius, *r*.
2. Write the general equation for both functions in #1.
3. Below are functions that were discussed last class. Sketch a graph for each function given.

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |

1. An estimate for the lifespan, *L*, in years of a mammal in captivity as a function of their body mass, *M*, in kilograms is given by the function



Is the lifespan longer for a mammal of body mass 60 kilograms or for a mammal of body mass 70 kilograms? Explain.

1. Consider the accompanying graph of , where *p* is a positive number.
2. Is *p* even or odd?
3. Is  or ?
4. As \_\_\_\_\_\_
5. As \_\_\_\_\_\_
6. Sketch a graph for the following directly proportional power functions:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |

1. The intensity, *I*, of a light from a point source is indirectly proportional to the square of the distance, *d*, from the light source.
   1. Express this relationship as a function where *I* is the dependent variable.
   2. If the intensity is 4 watts per square meter at a distance of 6m from the source, solve for the constant of proportionality *k* and write the specific equation for this situation.
   3. Find the intensity at a distance of 8 meters from the source.
   4. Fill in the table and explain what happens to the intensity of a light as the distance from the light source gets larger (*d* → +∞).

|  |  |
| --- | --- |
| **Distance in m**  **(*d*)** | **Intensity in watts per square meter**  **(*I*)** |
| 8 |  |
| 100 |  |
| 1000 |  |
| 10000 |  |

* 1. Will the intensity of the light source, *I*, ever equal 0?
  2. Explain what happens to the intensity of a light as the distance from the light source gets smaller (*d* → 0)?

|  |  |
| --- | --- |
| **Distance in m**  **(*d*)** | **Intensity in watts per square meter**  **(*I*)** |
| 8 |  |
| 2 |  |
| 0.5 |  |
| 0.1 |  |

* 1. Does it make sense to discuss a distance of 0 meters from the light source?
  2. Sketch a graph of this function.



* 1. Write the equations of the asymptotes.

**Visualizing Indirectly Proportional Power Functions – Part 2**

1. Fill in the table below and then graph the functions.

|  |  |  |
| --- | --- | --- |
|  |  |  |
| −3 |  |  |
| −2 |  |  |
| −1 |  |  |
| −0.5 |  |  |
| −0.25 |  |  |
| 0 | Not possible – you can’t divide by 0 | |
| 0.25 |  |  |
| 0.5 |  |  |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |

|  |  |
| --- | --- |
|  |  |
|  |  |

1. Sketch a graph for the following indirectly proportional power functions:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |