**2**. [8 points] The UM Etsy Club is 3D printing a new bracelet design called the Helix Monster. The cost of the materials for one bracelet depends on the inner circumference of that bracelet. The cost of materials $B$ (in dollars) for a Helix Monster bracelet with an inner circumference of $c$ centimeters is given by:

$$B = h(c) = 2 + 0.4c$$

**a**. [2 points] If the club members want to spend at most \$12 in materials on a Helix Monster bracelet, what is the largest the bracelet's inner circumference could be? *Include units.*

*Solution:*

$$12 = 2 + 0.4c$$
$$10 = 0.4c$$
$$10/0.4 = c$$
$$25 = c$$

$c = \frac{12-2}{0.4} = 25$ **cm**

**b**. [3 points] Another member creates a Swirling Storm design that has different production costs. The cost ($B$, in dollars) to produce one Swirling Storm design with inner circumference $c$ is given by

$$B = s(c) = 2.5 + 0.25c$$

For what values of $c$ does the Helix Monster design cost less? For what values of $c$ does the Swirling Storm design cost less? *Express your answers using inequalities or interval notation below. Show all work. No explanation needed.*

*Solution:* To find when one bracelet switches from being cheaper to more expensive, we need to find at which value of $c$ the two cost functions intersect.

$$2 + 0.4c = 2.5 + 0.25c$$
$$0.15c = 0.5$$
$$c = 0.5/0.15 = 10/3$$

Because the Helix Monster starts out cheaper (\$2 vs. \$2.50), we know it will be cheaper for smaller values of $c$. After they intersect, Swirling Storm will be cheaper.

Helix Monster is cheaper when: $0 \le c < 10/3$ **cm**

Swirling Storm is cheaper when: $c > 10/3$ **cm**

**c**. [3 points] The club decides to produce a large batch of Swirling Storm bracelets with inner circumference 24cm. The price to rent the printer for the day is \$120. Write an expression for the total cost $T$ (in dollars) for producing $n$ Swirling Storm bracelets for inner circumference 24cm.

*Solution:* The cost for each Swirling Storm bracelet with an inner circumference of 24cm is

$$s(24) = 2.5 + 0.25 \cdot 24 = 8.5.$$

So the cost to produce $n$ such bracelets, including the cost of the printer rental, will be :

$$120 + 8.5n$$

$T =$ $120 + 8.5n$