

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

### Orbital and Escape Velocity Practice

#### Astronomy

**Directions:** For each of the satellites in the table below. Calculate BOTH the orbital velocity and the escape velocity needed for it to leave Earth completely. Be sure to show the formula, all variables, all units, and all steps for each one! Remember, the mass of Earth is  $5.98 \times 10^{24}$  kg, so the mass of the satellites won't affect the center of mass. What will be significant is the radius! Before beginning the calculations, complete the radius conversions in the table and then use that information to help you with the formula.

Satellite	Satellite Mass (kg)	Earth's Mass (kg)	Distance from Earth's Center (km)	Distance from Earth's Center (m)
1	50	$5.98 \times 10^{24}$	7,000	
2	100	$5.98 \times 10^{24}$	8,000	
3	200	$5.98 \times 10^{24}$	10,000	
4	200	$5.98 \times 10^{24}$	14,000	
5	400	$5.98 \times 10^{24}$	17,000	
6	400	$5.98 \times 10^{24}$	21,000	
7	800	$5.98 \times 10^{24}$	24,000	

**Satellite 1**

Orbital Velocity  
Formula:

Escape Velocity  
Formula:

Variables:

Variables:

ALL Work:

ALL Work:

Final Answer:

Final Answer:

**Satellite 2**

Orbital Velocity  
Formula:

Escape Velocity  
Formula:

Variables:

Variables:

ALL Work:

ALL Work:

Final Answer:

Final Answer:

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**Satellite 3**

Orbital Velocity  
Formula:

Escape Velocity  
Formula:

Variables:

Variables:

ALL Work:

ALL Work:

Final Answer:

Final Answer:

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**Satellite 4**

Orbital Velocity  
Formula:

Escape Velocity  
Formula:

Variables:

Variables:

ALL Work:

ALL Work:

Final Answer:

Final Answer:

**Satellite 5**

Orbital Velocity  
Formula:

Escape Velocity  
Formula:

Variables:

Variables:

ALL Work:

ALL Work:

Final Answer:

Final Answer:

**Satellite 6**

Orbital Velocity  
Formula:

Escape Velocity  
Formula:

Variables:

Variables:

ALL Work:

ALL Work:

Final Answer:

Final Answer:

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**Satellite 7**

Orbital Velocity

Formula:

Escape Velocity

Formula:

Variables:

Variables:

ALL Work:

ALL Work:

Final Answer:

Final Answer: