Gravity Fields Practice Name:_____

Reflection and Self-Assessment

Completion: Circle the statement that best describes the completion of this practice.

- I completed every question on the practice.
- I did not complete some questions on the practice because:

_____

Answer Checking: Circle the statement that best describes how you checked your answers

- I checked all my answers against the key at the back and corrected any that were incorrect.
- I did not check all my answers and correct any mistakes because:

_____

Online Worked Solution: Circle the statement that best describes how you used the online worked solutions.

- I did not use the online worked solution at all.
- I used the online solution to understand some questions I got incorrect.
- I used the online solution to help me learn how to answer some questions.

Confidence: Circle the statement that best describes your confidence in answering questions of this type in the future.

- I am confident I can answer nearly any question of this type correctly without using notes or other assistance.
- I am confident I can answer **MOST** questions of this type correctly without using notes or other assistance.
- I am **NOT** confident I can answer most questions of this type correctly without using notes or other assistance.

Time: Circle the statement below that best describes the total amount of time you spent actively working on this practice:

Less than an hour	Between one and two hours	Between two and three hours	Between three and four hours	More than four hours

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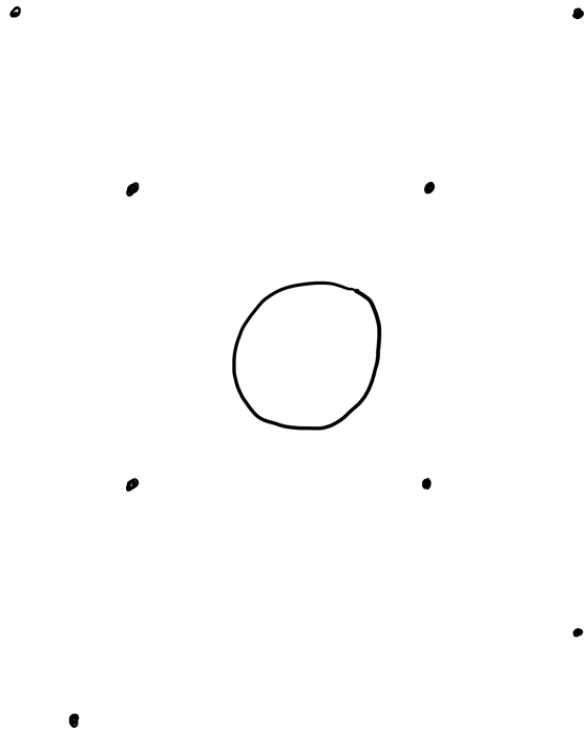
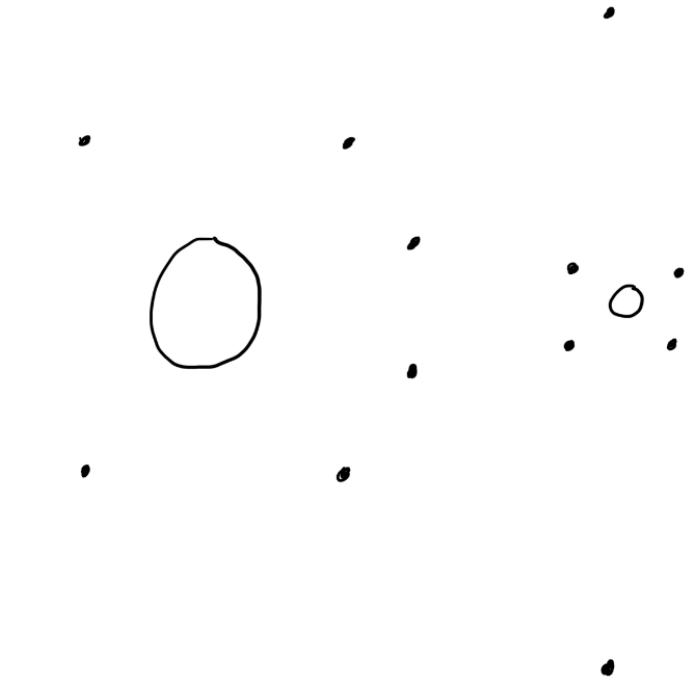
1. Roughly sketch the gravity field acting at each dot around a planet with arrows where the direction of the arrow indicates the direction of the field, and the length of the arrow the relative strength of the field.



2. Roughly sketch the gravity field acting at each dot around a planet and it's moon with arrows where the direction of the arrow indicates the direction of the field, and the length of the arrow the relative strength of the field.



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3. The mass of Mars is 6.39×10^{23} kg and its radius is 3389.5 km.
    a. Determine the strength of the gravity field on the surface of Mars.

    b. Determine how long it would take an object to fall from a height of 1.0m to the ground on Mars.

4. The mass of Pluto is 1.2×10^{22} kg, and its radius is 1185 km.
    a. Determine the strength of the gravity field on the surface of Pluto.

    b. Determine how long it would take an object to fall from a height of 1.0 m to the ground on Pluto.

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5. A neutron star is an incredibly dense object, a typical neutron star has a radius of about 10.0 km, a mass of 2.8×10^{30} kg.
    a. Determine the strength of the gravity field on the surface of a neutron star.

    b. Determine how long it would take an object to fall from a height of 1.0 m to the ground on the surface of a neutron star.

    c. How much energy would it take to lift a 5.0 kg object from the surface of the neutron star to a height of 1.0 m?

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6. Earth has a mass of 5.97×10^{24} kg and a radius of 6371 km.
    a. What is the strength of Earth's gravity field 1500 km **above** the surface?

    b. How far above the surface is the gravity field strength 1.5 N/kg?

7. The mass of a planet is 5.62×10^{23} kg. The strength of the gravity field on the surface is 4.3 N/kg. What is the radius of the planet?

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8. A planet orbits a star of mass 4.6×10^{30} kg at a radius of 2.4×10^{10} metres.
    a. What is the strength of the gravity field acting on the planet from the star?

    b. What is the centripetal acceleration of the planet?

    c. What is the length of the planet's year in Earth days?

9. The Earth has a mass of 5.97×10^{24} kg and a radius of 6371 km. A satellite orbits the Earth every 3.0 hours. How high **above** the surface of Earth planet is the satellite orbiting?

10. A geostationary orbit is one where a satellite orbits at the same rate the Earth turns. This causes the satellite to always be in the same place in the sky for people on the planet, so a satellite dish can be pointed at the satellite and doesn't have to be constantly readjusted. How high above the Earth should a satellite be placed so it is in geostationary orbit?

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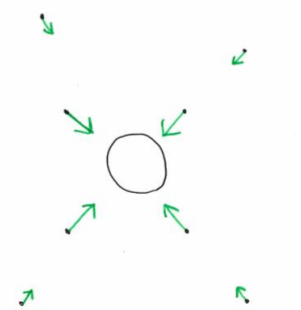
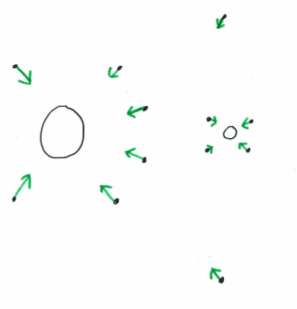
Answer Key				
1) Arrows should be shorter farther from the planet, and all point towards the planet e.g.) 	2)The planet has a greater mass so greater attraction. 	3a) 3.71 m/s^2	3b) 0.73 sec	4a) 0.57 m/s-
4b) 2.5 sec	5a) 1.9×10^{12} m/s^2	5b) 1.0×10^{-6} sec	5c) 9.4×10^{12} J	6a) 6.43 N/kg
6b) 9.9×10^{6} m or 9 900 km	7) 3.0×10^{6} m	8a) 0.53 N/kg	8b) 0.53 m/s^2	8c) 15 Earth days
9) 4.2×10^{6} m or 4 200 km	10) 3.59×10^{7} m or 35 900 km			