

Physical and Chemical Sciences
Force and Motion

Additional FCAT Practice Questions

Directions: Select the best answer for each of the following questions

1. Abe rolls a golf ball down a hallway. The ball travels 20 meters (m) in 4.0 (s). What is the average velocity of the ball in meter per second (m/s)?
 - A. 4.0 m/s
 - B. 5.0 m/s
 - C. 80 m/s
 - D. 24 m/s

2. Dragsters are very powerful vehicles.

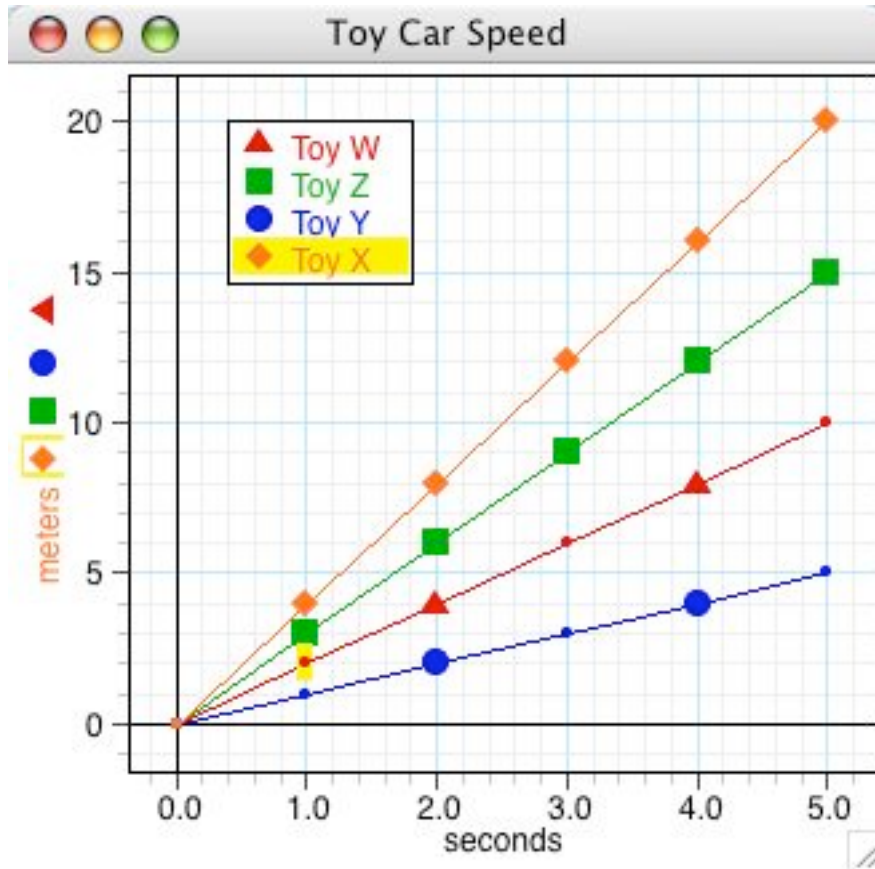


In about 6 seconds, a dragster goes from zero velocity to 400 km/h. What is the best description of the dragster's motion during the race?

- A. The dragster was negatively accelerating
- B. The dragster was positively accelerating
- C. The dragster had a velocity that was not changing
- D. The dragster had a negative velocity

3. Three students, Alice, Beatrice, and Candice, decide to race their bicycles down a hill. Beatrice reaches the bottom of the hill first, followed by Alice, then Candice. Considering these results, which of the following statements is true?
- A. Beatrice had the highest average velocity
 - B. Candice had the highest average velocity
 - C. Alice had the highest average velocity
 - D. All three racers had the same average velocity
4. Which of the following is the proper way to calculate velocity?
- A. Distance added to time
 - B. Distance multiplied by time
 - C. Time divided by distance
 - D. Distance divided by time

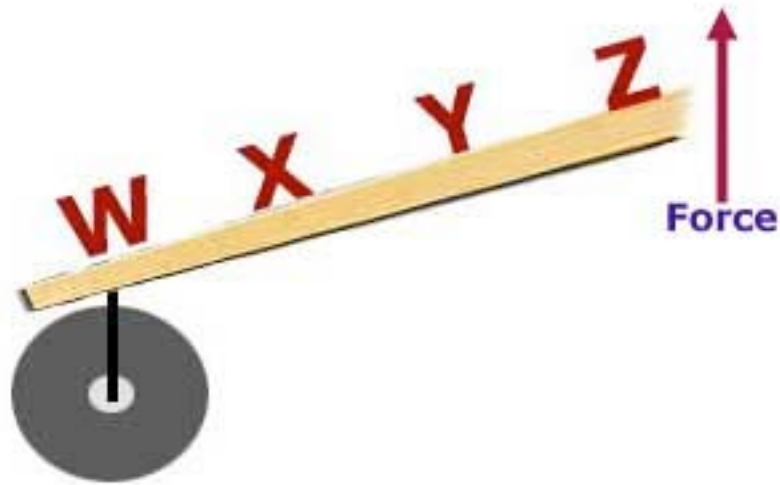
5. Danforth compares the speed of toy cars by recording how far they travel in 10 seconds.



Based on the data collected in the graph, which toy was the fastest?

- A. Toy W
 - B. Toy X
 - C. Toy Y
 - D. Toy Z
6. You notice your teacher's car has run out of gas on the way to school, so it must be pushed the rest of the way. In pushing the car, you apply a force of 120 newtons (N) over a distance of 50 meters (m). How much work, in newton-meters (Nm), have you done?
- A. 600 Nm
 - B. 6000 Nm
 - C. 170 Nm
 - D. 2.4 Nm

7. Your friend builds a very simple lever device to move some heavy items in her backyard.



In what position would you recommend placing the load in order to get the greatest mechanical advantage?

- A. Position W
 - B. Position X
 - C. Position Y
 - D. Position Z
8. You get a job painting houses for the summer, and at your first job site your employer asks you to scrape the paint from some cement stairs. Which simple machine would be best for scraping the paint from the stairs?
- A. Wheel and axle
 - B. Lever
 - C. Wedge
 - D. Screw

9. A ratchet screwdriver works conveniently by allowing you to keep turning without having to reposition your hand.



What type of simple machine is this type of screwdriver?

- A. Lever
 - B. Wedge
 - C. Screw
 - D. Wheel and axle
10. While working on some landscaping you decide to move a large rock with the help of a lever arrangement.



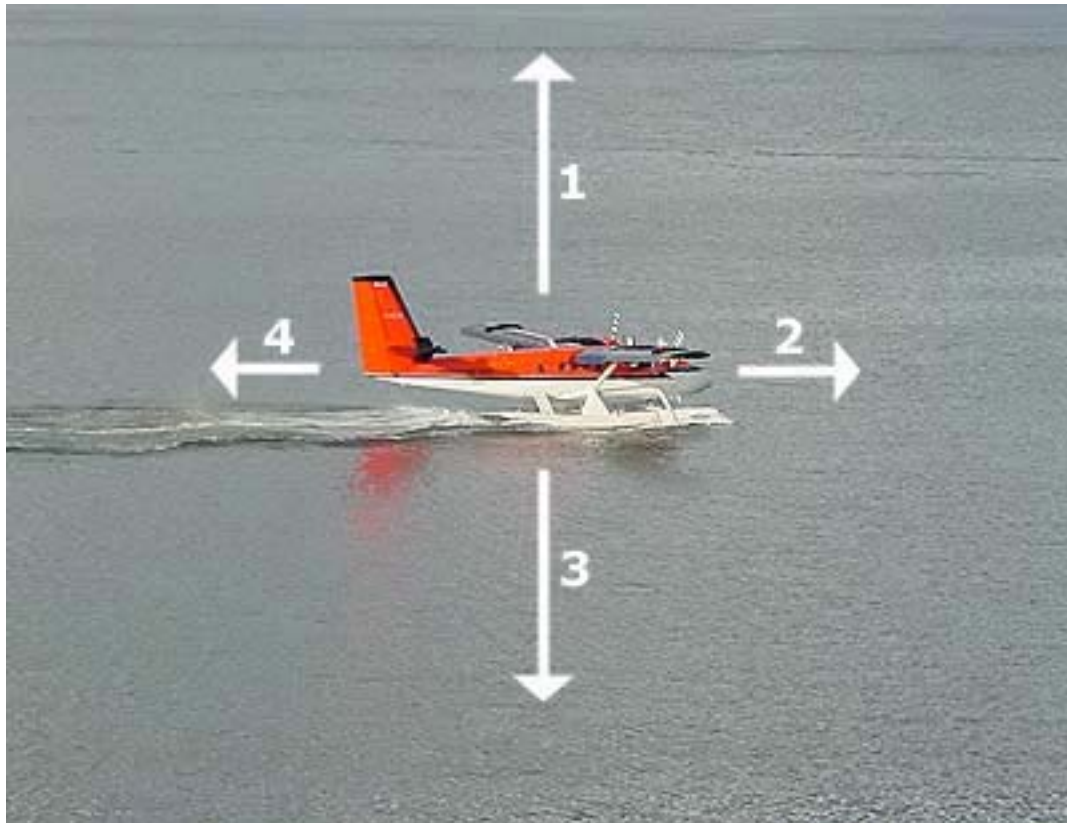
Which of the following is true regarding the position of the fulcrum?

- A. It does not matter where the fulcrum is, there force advantage will be the same wherever it is placed.
- B. Putting the fulcrum further away from the rock will give you a greater force advantage to move the rock easier.
- C. Putting the fulcrum closer to the rock will give you a greater force advantage to move the rock easier.
- D. It would make more sense to place the fulcrum where the effort force is.

11. When a floatplane lands on the water, it is subject to many forces. In the following photo, different forces are illustrated with arrows and numbers. INSERT GRAPHIC HERE. Which of the forces in the photo represents the force of friction?

- A. Force 1
- B. Force 2
- C. Force 3
- D. Force 4

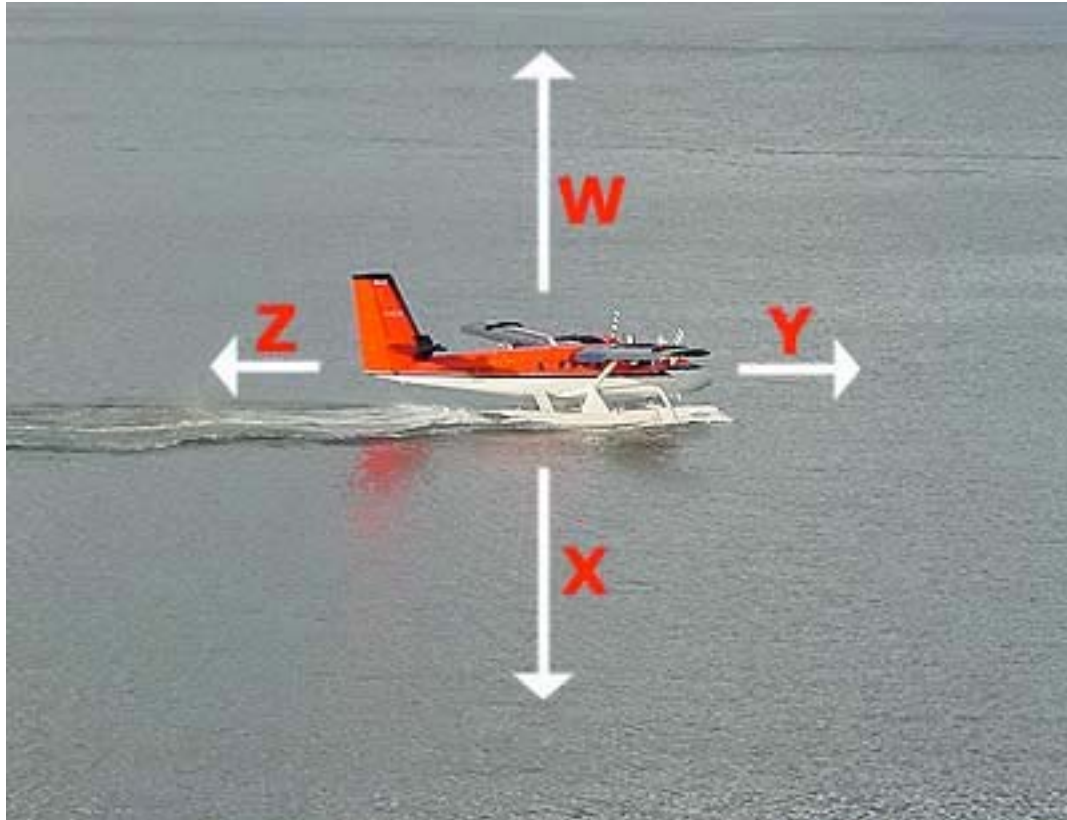
12. When a floatplane lands on the water, it is subject to many forces. In the following photo, different forces are illustrated with arrows.



If forces Y and Z are equal, what can be concluded about the motion of the floatplane?

- A. The floatplane is moving at a steady speed
- B. The floatplane is slowing down
- C. The floatplane is speeding up
- D. The floatplane is sinking

13. When a floatplane lands on the water, it is subject to many forces. In the following photo, different forces are illustrated with arrows.



If force "W" is reduced, what will happen to the motion of the floatplane?

- A. The floatplane will start sinking in the water
- B. The floatplane will start rising in the water
- C. The floatplane will speed up going forward
- D. The floatplane's motion will stay the same

14. During an experiment, a mass is hung from the bottom of a force sensor.



If the forces 1 and 2 indicated in the photo are equal, which of the following statements is true?

- A. Because of gravity, there is a net downward force on the mass
- B. The mass is moving upward
- C. The mass is moving downward
- D. There is no net force on the mass

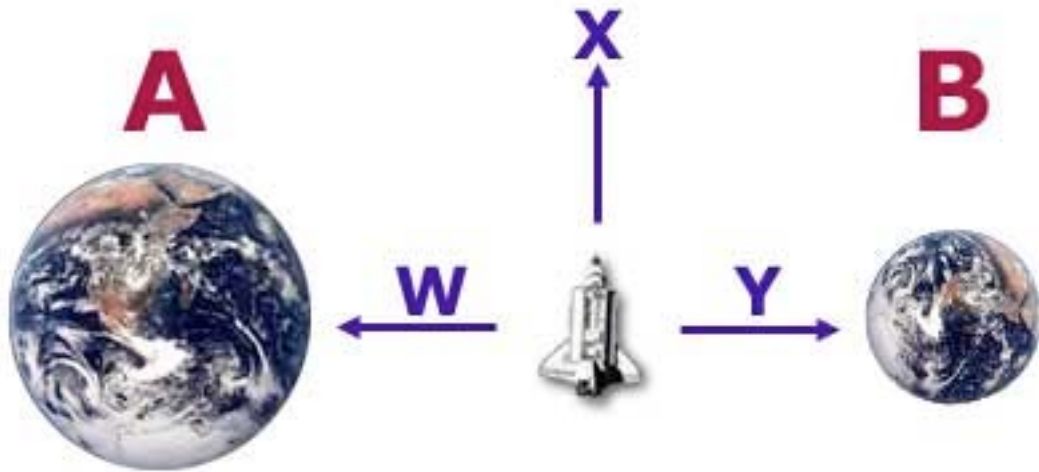
15. During an experiment, a mass is hung from the bottom of a force sensor. The arrows in the photo are the same size, and indicate the forces of gravity and the sensor acting on the mass.



Which of the following best describes the motion of the mass resulting from the forces on it?

- A. The mass moves downward due to the force exerted downward by gravity
- B. The mass moves upward due to the force exerted by the sensor
- C. The mass does not move because the forces acting on it are equal.
- D. The mass moves sideways due to the forces exerted by the sensor and gravity

16. Imagine a spaceship that has lost power and is now floating in space between two planets. Planet A has twice the mass of planet B.



- How will the force of gravity affect the spaceship?
- A. Gravity will cause the spaceship to move in direction W
 - B. Gravity will cause the spaceship to move in direction X
 - C. Gravity will cause the spaceship to move in direction Y
 - D. There will be no motion of the spaceship due to gravity
17. Gravitational forces pull on the ocean waters of the Earth to cause tides. What is most responsible for this gravitational pull?
- A. The core of the Earth
 - B. The Sun
 - C. The Moon
 - D. Outer space

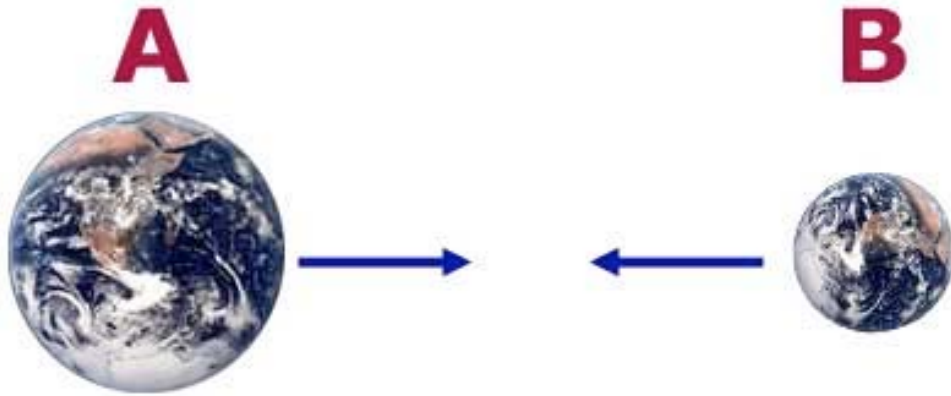
18. Two people are weighed on scales. The person on scale A is twice the size of person B; as a result, scale A reports twice the weight as scale B. What is the reason for this difference in weight?
- A. Person B has twice the mass as the person A
 - B. Person A has twice the mass as the person B
 - C. Gravity is twice as powerful on person A that it is on person B
 - D. Gravity is twice as powerful on person B that it is on person A
19. In an imaginary experiment, the weight of a person is measured on both Earth and Jupiter.



The weight on Earth is 600 newtons (N), while the weight on Jupiter is 1400 N. What is responsible for this difference in weight?

- A. Gravity is about 2.3 times greater on Earth than it is on Jupiter
- B. Gravity is about 2.3 times greater on Jupiter than it is on Earth
- C. The person is 2.3 times more massive on Jupiter
- D. The person is 2.3 times more massive on Earth

20. Isador uses a computer program to perform a simulated gravity experiment. He creates two planets in the program, planet **A** being twice as massive as planet **B**.



When he allows the simulation to run, the planets move toward each other. Which of the following best explains why the planets move together?

- A. The planets move together because of orbital speed.
- B. Only planet A exerts a gravitational force (on planet B)
- C. Only planet B exerts a gravitational force (on planet A)
- D. The planets exert a gravitational force on each other

Answers

1. B
2. B
3. A
4. D
5. B
6. B
7. A
8. C
9. D
10. C
11. D
12. A
13. A
14. D
15. C
16. A
17. C
18. B
19. B
20. D