

Principles of Technology (EOY) Final Exam

- 1** A vehicle travels from Ferris High School to Dallas City Hall and returns to Ferris High School. The vehicle travels a total of 42 miles in 45 minutes. What is the speed in miles per hour?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 2** A fast-pitch baseball is thrown from the pitchers mound to the catcher at home plate (60 feet away). The ball reaches the catcher in 0.37 seconds. What is the speed of the ball in miles per hour with no decimal (no rounding)?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 3** A hiker starts walking at coordinates $32^{\circ}32'11.4''\text{N}$ by $96^{\circ}38'46.6''\text{W}$ and travels due North for 5 miles. They then turn West for 2 miles before turning SouthEast and hiking for approximately 5.385 miles to return to 1 foot west of their starting position. The total trip took 2.5 hours to complete. What was the velocity of the hiker in feet/hour?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 4** A hiker starts walking at coordinates $32^{\circ}32'11.4''\text{N}$ by $96^{\circ}38'46.6''\text{W}$ and travels due North for 5 miles. They then turn West for 2 miles and stop. The total trip took 1.5 hours to complete. What was the velocity of the hiker in miles/hour? HINT: Round displacement to 3 decimal places for calculation.

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 5** A bullet is launched from a gun at a dead-stop to a velocity of 50 meters/second in $\frac{1}{100}$ th of a second. What is the acceleration of the bullet in meters/second²?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 6** A water balloon is launched from a dead-stop to a velocity of 20 meters/second in $\frac{1}{10}$ th of a second. What is the acceleration of the water balloon in meters/second²?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 7** A bullet has a mass of 0.0042 kg and is launched at an acceleration of 440,000 meters per second². How much force does the bullet impart upon impact in Newtons?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 8** A water balloon has a mass of 0.1 kg and is launched at an acceleration of 200 meters per second². How much force does the water balloon impart upon impact in Newtons?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 9** What is the maximum height a projectile can achieve if launched with $V_0 = 75$ and $\theta = 90^\circ$?

TOOL: Use the Excel calculator provided on Google Classroom.

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 10** What is the maximum range a projectile can achieve if launched with $V_0 = 75$ and $\theta = 90^\circ$?

TOOL: Use the Excel calculator provided on Google Classroom.

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 11** What is the launch angle of a projectile that is launched with $V_0 = 35$ and reaches a maximum range of 95.75 meters?

TOOL: Use the Excel calculator provided on Google Classroom.

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 12** What is the launch angle of a projectile that is launched with $V_0 = 65$ and reaches a maximum height of 35.66 meters?

TOOL: Use the Excel calculator provided on Google Classroom.

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 13** What is the velocity of a projectile that is launched at 45° and reaches a maximum height of 75 meters?

TOOL: Use the Excel calculator provided on Google Classroom.

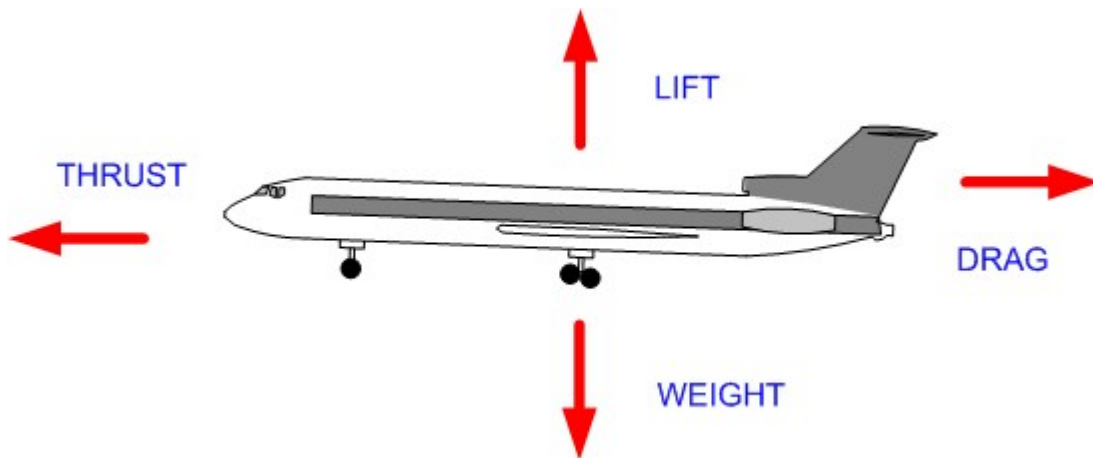
Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 14** What is the velocity of a projectile that is launched at 32.25° and reaches a maximum range of 100 meters?

TOOL: Use the Excel calculator provided on Google Classroom.

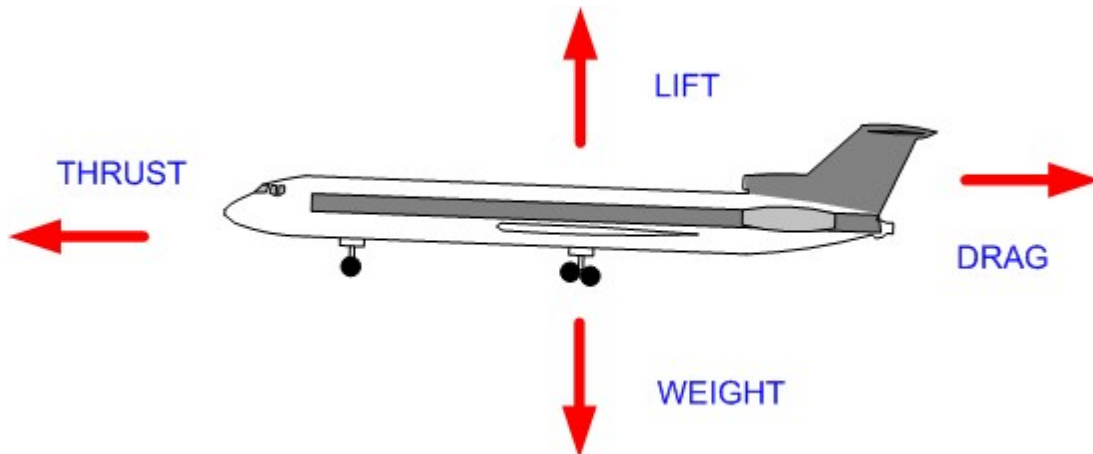
Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

15 What is the minimum number of degrees of difference between lift and thrust?



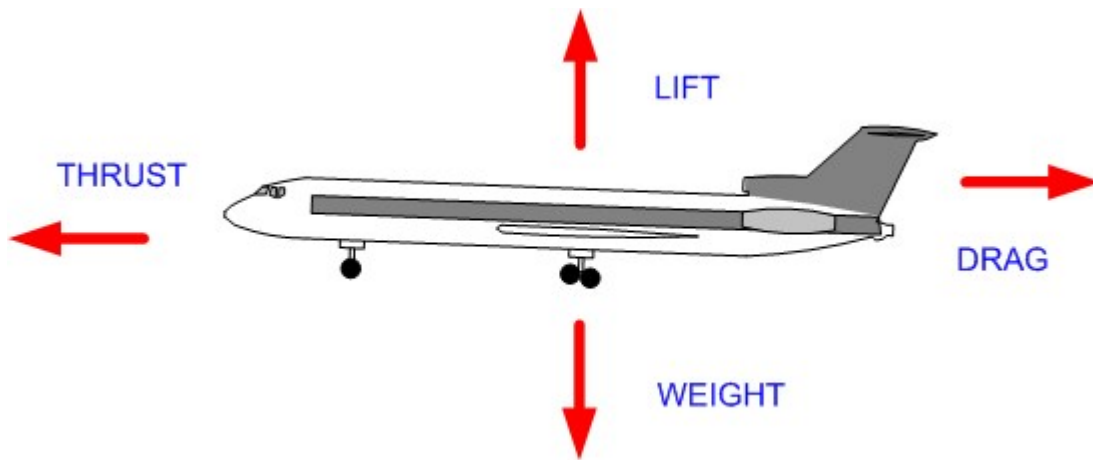
Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

16 What is the minimum number of degrees of difference between lift and weight?



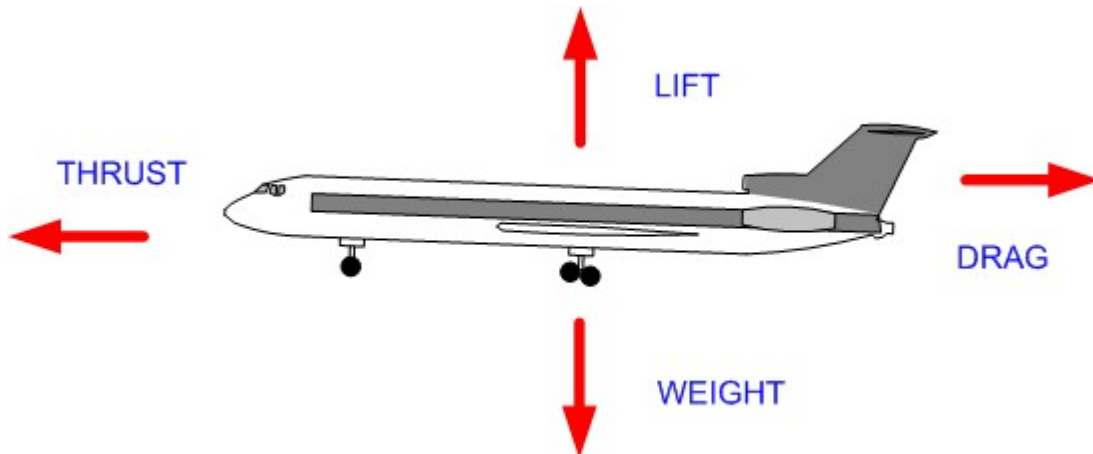
Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

17 What is the minimum number of degrees of difference between lift and drag?



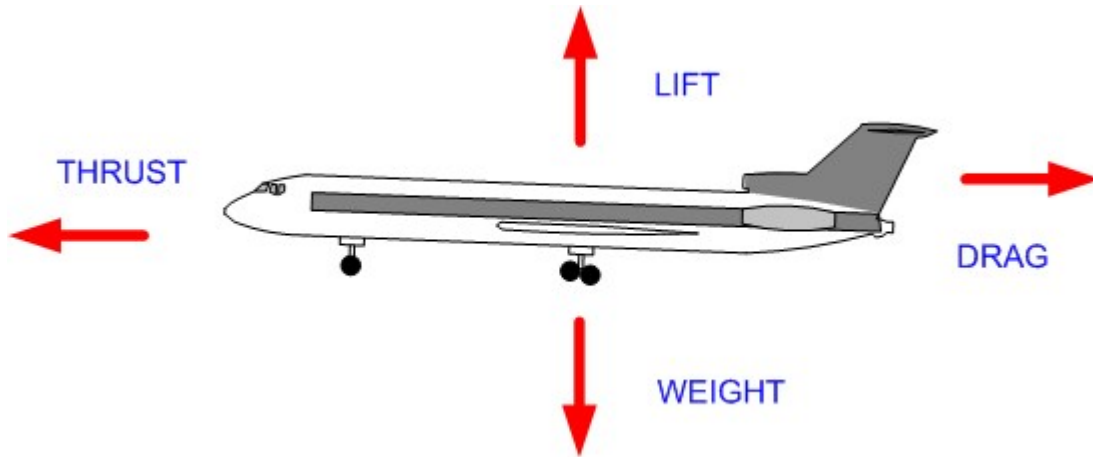
Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

18 What is the minimum number of degrees of difference between thrust and drag?



Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

19 What is the minimum number of degrees of difference between thrust and weight?



Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 20** An aircraft jet engines are producing 100,102 Newtons of thrust force and the aircraft is encountering 90,167 Newtons of drag forces. What is happening to the speed of the aircraft?
- A** It is holding steady
 - B** It is increasing
 - C** It is decreasing
 - D** Thrust and Drag have no impact on speed
- 21** An aircraft is experiencing a lift acceleration of $19.6 \text{ meters/second}^2$ and a weight acceleration of $9.8 \text{ meters/second}^2$. What is happening to the altitude of the aircraft?
- A** It is holding steady
 - B** It is increasing
 - C** It is decreasing
 - D** Lift and Weight have no impact on altitude

- 22** An aircraft jet engines are producing 100,102 Newtons of thrust force and the aircraft is encountering 90,167 Newtons of drag forces. What is the total unbalanced (net) force of the jet?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 23** An aircraft is experiencing a lift acceleration of 19.6 meters/second² and a weight acceleration of 9.8 meters/second². What is the total unbalanced (net) force on the jet?

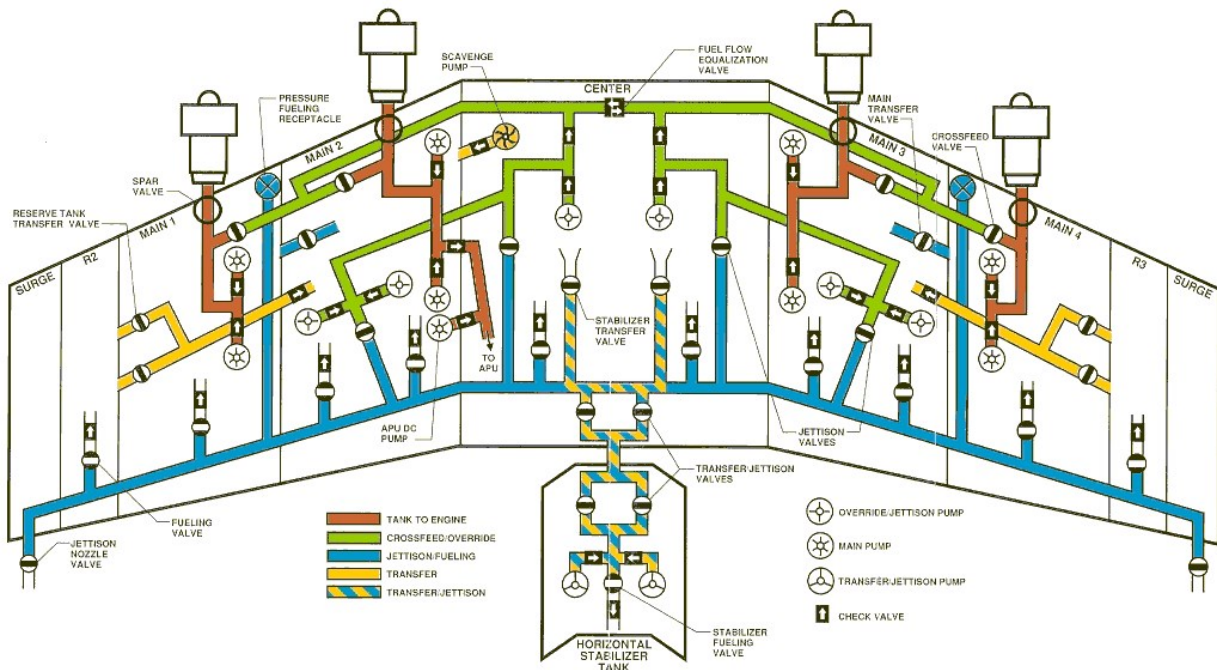
Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 24** An aircraft is experiencing 97,255 Newtons of drag force while in flight. How much thrust force must the jet engines produce to hold the aircraft at a stable speed?

- A** 48,627.5 Newtons
- B** 97,255 Newtons
- C** 194,510 Newtons
- D** Can't be calculated with parameters given

25 Review the Boeing 747 fuel system diagram below. Main Engine 1 is producing 22,150 Newtons of force. Main Engine 2 is producing 22,150 Newtons of thrust force. Main Engine 3 is producing 19,900 Newtons of thrust force. Main Engine 4 is producing 19,900 Newtons of thrust force. The aircraft is encountering 88,600 Newtons of drag force. The left and weight forces are both balanced at 9.8 meters/second².

Which way is the aircraft turning?



- A** Up
- B** Down
- C** Left
- D** Right