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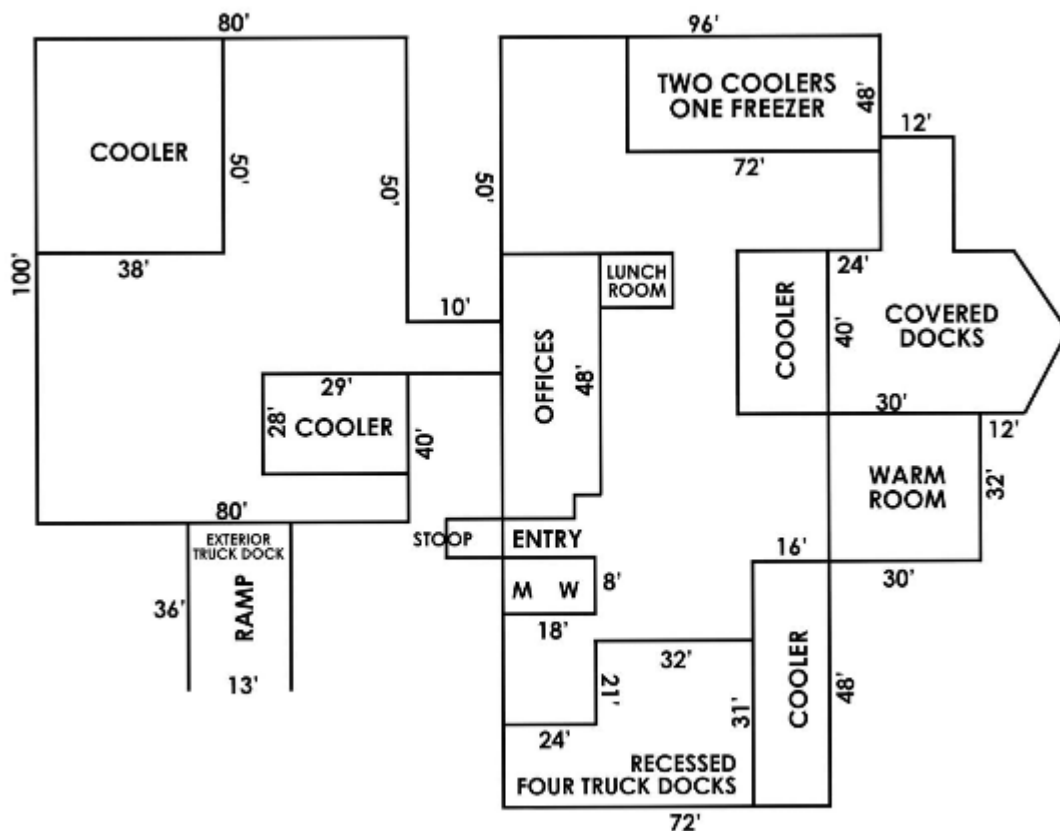
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Topic: 1

Graphic Problem Solving

The graphic problem-solving section of the technician occupations exam requires you to apply your knowledge of basic arithmetic to common scenarios in technician occupation knowledge. Specifically, the graphic problem-solving section presents you with a drawing and asks you a series of questions based on the information within it. The graphic problem-solving section consists of 16 questions and must be completed within 30 minutes. The questions will be based on two drawings. Each question will be followed by five possible answer choices; the fifth answer choice will be “N,” meaning none of the above. The good news here is that the only math knowledge required for this section is addition and subtraction, and occasionally multiplication if you’re asked to find an area. You won’t have to calculate percentages or work with fractions. Since the entire math involved is conceptually simple, we will focus our attention on the specific kinds of problems you will encounter in the graphic problem-solving section and how to approach them. The most common type of drawing featured on the graphic problem-solving section of the exam is the floor plan. Indeed, all of the drawings used in this section of the exam are either floor plans or equivalent diagrams. A basic example of a floor plan is given below.



You are no doubt familiar with this kind of diagram. This particular floor plan is for a food distribution warehouse (hence the large number of coolers). The numbers indicate the distances in feet along each wall. Although this floor plan is drawn roughly to scale, you should not expect the diagrams on your exam to be to scale. Therefore, you should only use information that is explicitly given in the picture; just because one distance appears to be greater than another does not make it so. When you are presented with a floor plan like this, you will probably be asked a few questions requiring you to find a distance. For example, you might be asked to find the width of the recessed four truck docks. The number on the bottom of the docks is the measure of the width of the docks and the adjacent cooler, and therefore cannot be the answer. In order to find the width of the docks, you will have to perform one of two calculations. Either you will have to add the two widths on the top of the docks (24 feet and 32 feet, respectively), or you will have to take the combined length of the docks and cooler (72 feet) and subtract the width of the cooler (16 feet). Either way, you will end up with a distance of 56 feet. Some questions will ask you to compare two distances. For example, you might be asked to calculate how much longer the cooler in the top left corner is than the cooler in the bottom right corner. Since the cooler in the top left is 50 feet long and the cooler in the bottom right is 48 feet long, subtraction indicates that the cooler in the top left is two feet longer than the cooler on the bottom right. You will also be asked to find the area of a particular part of the floor plan. For instance, imagine that you are asked to find the area of the warm room. Remember that the formula for area is $\text{Area} = \text{length} \times \text{width}$. The length of the warm room is 32 feet, and the width is 30 feet. The area, then, is $32 \times 30 = 960$ square feet. Some questions may ask you to combine the areas of a few different rooms; simply calculate the respective areas individually and then perform whatever operations are necessary. In rare cases, you may be asked to find the area of an

irregularly shaped room. For example, imagine you are asked to find the area of the recessed four truck docks. The best way to solve this type of problem is to break the room down into separate rectangles. The recessed four truck docks in the floor plan above can be broken down into two rectangles by extending an imaginary line out from the 24-foot wall until it intersects with the 31-foot wall. The top rectangle has a length of 21 feet and a width of 32 feet, and therefore has an area of 672 square feet. The bottom rectangle has a length of 10 feet (found by subtracting the 21-foot section from the 31-foot wall) and a width of 56 feet (found by adding the 24-foot and 32-foot walls), and therefore has an area of 560 square feet. Thus, the total area of the recessed four truck docks is $672 + 560 = 1,232$ square feet. This kind of problem is rare on the technician occupations exam, but it can be solved easily if you take your time and break it down into simple steps. Finally, you will be asked a few questions that require you to demonstrate knowledge of ratios. For instance, the test might ask you the following question how many times longer is the cooler in the bottom right corner than the warm room adjacent to it? The length of the cooler is 48 feet, and the length of the warm room is 32 feet. Before we perform any simplification, then, we can state that the ratio is 48:32. But, in order to solve this problem, we will need to simplify the 32 into a 1, so that we will know how many units of cooler there are for every unit of warm room. This is accomplished by dividing each side of the ratio by 32. 32 divided by 32 is one, of course. 48 divided by 32 is 1.5. In other words, the cooler is 1.5 times as long as the warm room.

There is another way in which ratios can appear on the graphic problem-solving section of the technician occupations exam. For instance, imagine the question was phrased this way: what is the ratio between the length of the bottom-right cooler and the length of the warm room adjacent? If the problem is phrased this way, you will need to perform a slightly different operation on the ratio 48:32. Instead of dividing both sides by 32, you can find the greatest common factor of each number and divide by that. Remember that the greatest common factor is the largest number that both sides of the ratio can be divided by evenly. In this case, the greatest common factor is 16. If we divide both sides by 16, we derive the simplest form of the ratio, 3:2. Although the graphic problem-solving section of the exam is generally considered to be the easiest component, some of these problems can be tricky. In particular, many candidates have a hard time working with ratios at first. The best way to improve your skill on the graphic problem-solving section of the exam is to find some basic floor plans on the internet and practice finding lengths, areas, and ratios. Even better, you can print out some simple floor plans and cover up various lengths and widths, and then see if you can figure out the hidden values based on the numbers that are still visible. The calculations required for this section of the exam should not be a problem; as a matter of fact, they are considerably less difficult than those you will be performing in the mathematical usage section. The most challenging thing about the graphic problem-solving section of the exam is just becoming comfortable with the style and structure of the diagrams used in technician occupation fields.

Reasoning from Rules Example Problems

Question: 1

If an employee wants to dispose of a "Confidential" document, where should he or she put it?

- A. In the blue recycle bin
- B. In the gray recycle bin
- C. In the blue shred bin

- D. In the gray shred bin
- E. In the green trash bin

Answer: D

Question: 2

A young girl undergoes surgery and a subsequent hospital stay costing a total of \$30,000. Her mother and father each have a family policy that fully covers the cost of both the surgery and hospital stay. Neither policy stipulates a copayment or coinsurance, nor does each policy have a coordination of benefits provision. How much in total insurance benefits is the family eligible to collect?

- A. \$30,000, because the coordination of benefits provisions prevents collecting on the same claim twice.
- B. \$24,000, because the insurance company will pay 80% of the expenses, and the parents will pay the remaining 20%, or \$6,000.
- C. \$60,000, because each of the parents has a separate policy covering the surgery, they can collect double on the same claim.
- D. \$20,000, because each of the parents will pay a maximum of \$10,000.
- E. \$10,000, because each claim benefit is limited to \$10,000.

Answer: A

Question: 3

Suppose Thompson, Inc. files an international patent application. Prior to the application being published, an employee from Johnson, Inc., a rival firm, asks the patent office in the receiving country about Thompson's application. An employee of the office provides the employee from Johnson with the filing date, title, and a brief summary of the invention. Is this proper, and why?

- A. Yes, because the national office has the authority to inform third parties that the application has been designated.
- B. Yes, because the office employee only released a brief summary of the invention, instead of a detailed description.
- C. No, because the office cannot release any information about an international application to a third party, in accordance with paragraph (2)(a).
- D. No, the office could have released the filing date and title, but not a description of the invention.
- E. No, the office could have released a description of the invention, but not the filing date and title.

Answer: D

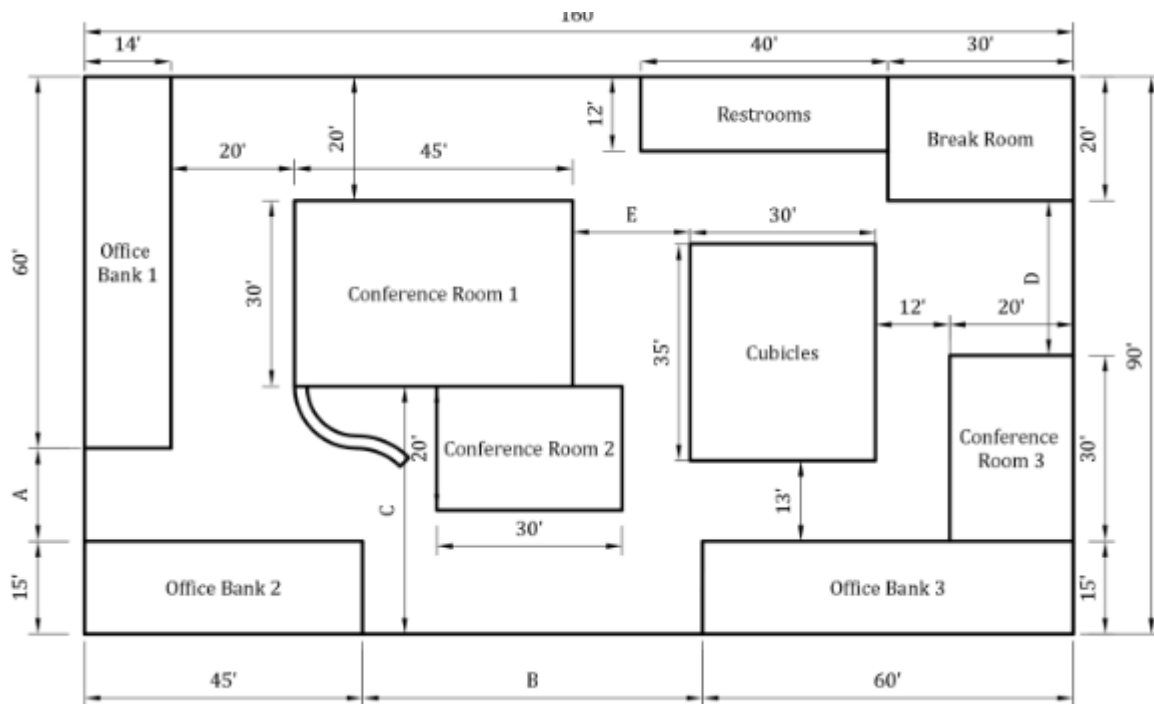
Topic: 2

Technician Occupations

Graphic Problem Solving

Use this diagram to answer the following 8 questions.

Figure 1. Office Building Floor Plan



Question: 4

What is the distance A from Office Bank 1 to Office Bank 2?

- A. 10'
- B. 12'
- C. 15'
- D. 20'

Answer: C

Explanation:

15'. To find the unknown distance A, subtract the known widths from the total width of the property. The total width of the property is 90'. The other known widths are 60' and 15'. To find A, subtract 60' and 15' from 90'. $A + 60' + 15' = 90'$. $A = 90' - 60' - 15' = 15'$.

Question: 5

What is the distance B from Office Bank 2 to Office Bank 3?

- A. 55'
- B. 62'
- C. 45'
- D. 59'

Answer: A

Explanation:

5'. To find the unknown length B, subtract the known lengths from the total length of the property. The total length of the property is 160'. The known lengths are 45' and 60'. To find B, subtract 45' and 60' from 160'. $B + 45' + 60' = 160'$. $B = 160' - 45' - 60' = 55'$.

Question: 6

A pair of identical gears is run by one large central gear. Which gear spins faster? (If equal, mark C.)



- A. Option A
- B. Option B
- C. Option C

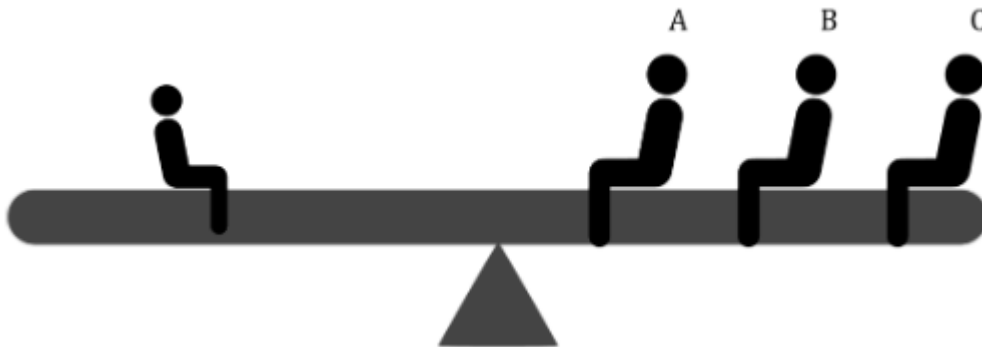
Answer: C

Explanation:

Because the outer gears have the same number of teeth and are driven by the same gear, they will spin at the same rate.

Question: 7

A large man and a small man are trying to use the see-saw. Where should the large man sit to balance the see-saw?



- A. Option A
- B. Option B
- C. Option C

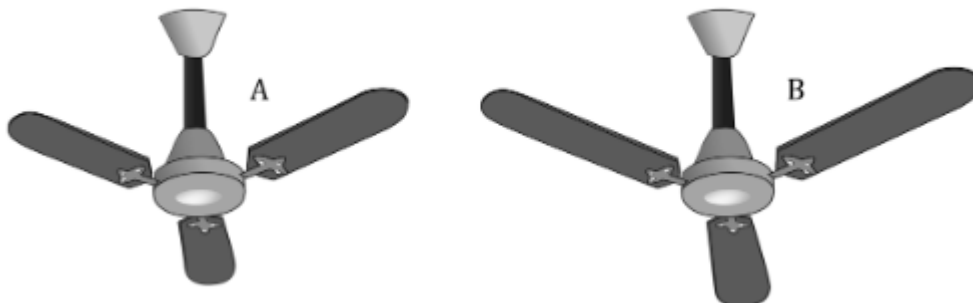
Answer: A

Explanation:

Because the force of the large man exerts a larger torque on the see-saw than the small man at the same radius, the large man should be closer to the center of the see-saw than the small man.

Question: 8

Two fans spin at the same rotational speed. One fan has longer blades. Which fan will move more air? (If equal, mark C.)



- A. Option A

- B. Option B
- C. Option C

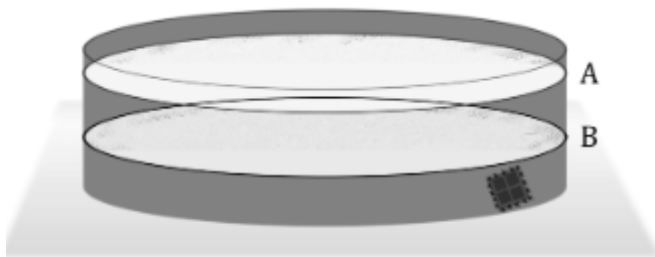
Answer: B

Explanation:

The fan with the longer blades will be able to contact and force more air.

Question: 9

An above ground swimming pool has a patch on one side near the base. Which height of water is more likely to break the patch?(If equal, mark C.)



- A. Option A
- B. Option B
- C. Option C

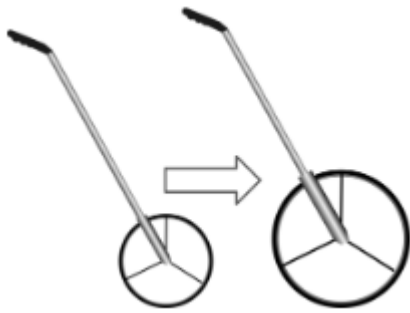
Answer: A

Explanation:

The patch will break with the highest pressure. The pressure at the patch will increase if there is a higher water level.

Question: 10

A measuring wheel measures distance by rolling a wheel on the ground and counting the number of rotations of that wheel. If someone replaces the wheel with a larger wheel, will the measuring device measure distances to be longer (A), shorter (B), or the same distance (C) as they actually are?



- A. Option A
- B. Option B
- C. Option C

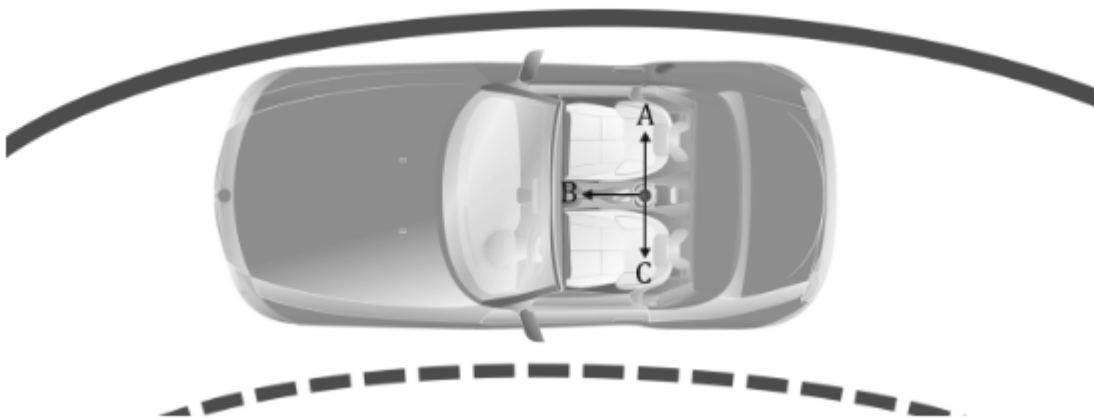
Answer: B

Explanation:

The larger wheel will not rotate as much as the smaller wheel going the same distance. Because the device only measures rotation, the device will measure distances to be shorter than they actually are.

Question: 11

A cup of coffee is set in a cup holder in a car. If the car curves left around a corner too quickly, which direction will the coffee spill?



- A. Option A
- B. Option B
- C. Option C

Answer: A

Explanation:

The coffee cup will be accelerating inward with the car, but the fluid will tend to not accelerate, spilling out of the curve



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