





Power Up: Math ACT Prep, Week 10

Right Triangle Trigonometry



K20
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Essential Question

How can I increase my ACT score?



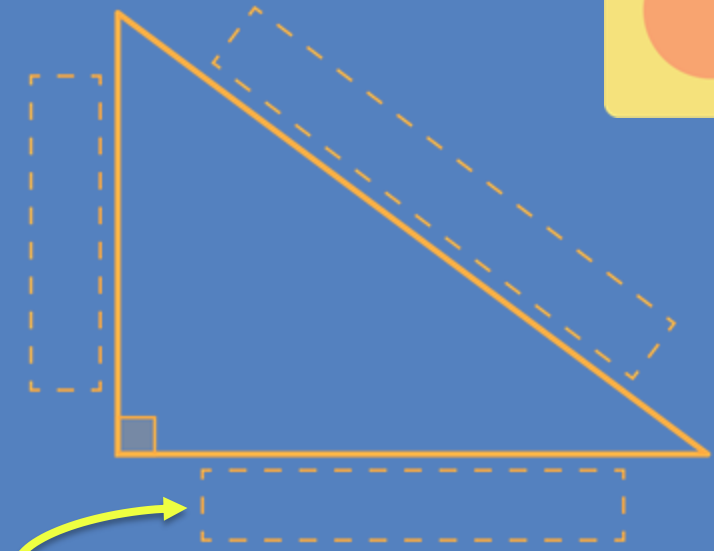
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Learning Objectives

- Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths.
- Apply basic trigonometric ratios to solve right-triangle problems.

How I Know It

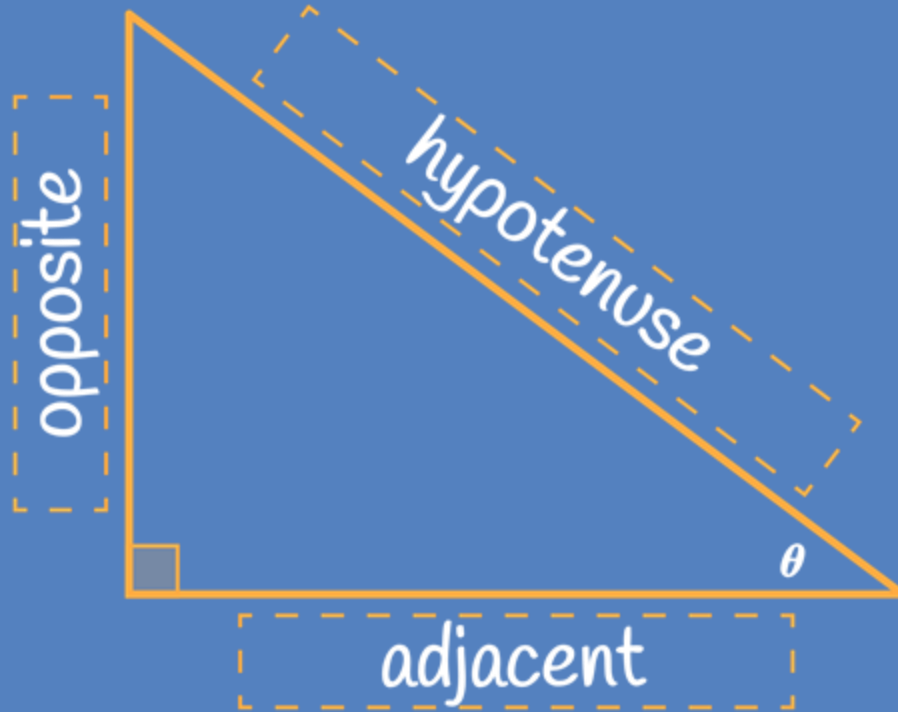
- 1) Label each side of each triangle using the words: *opposite*, *adjacent*, or *hypotenuse*.
- 2) Then write 1-2 sentences explaining how you knew which word to use.



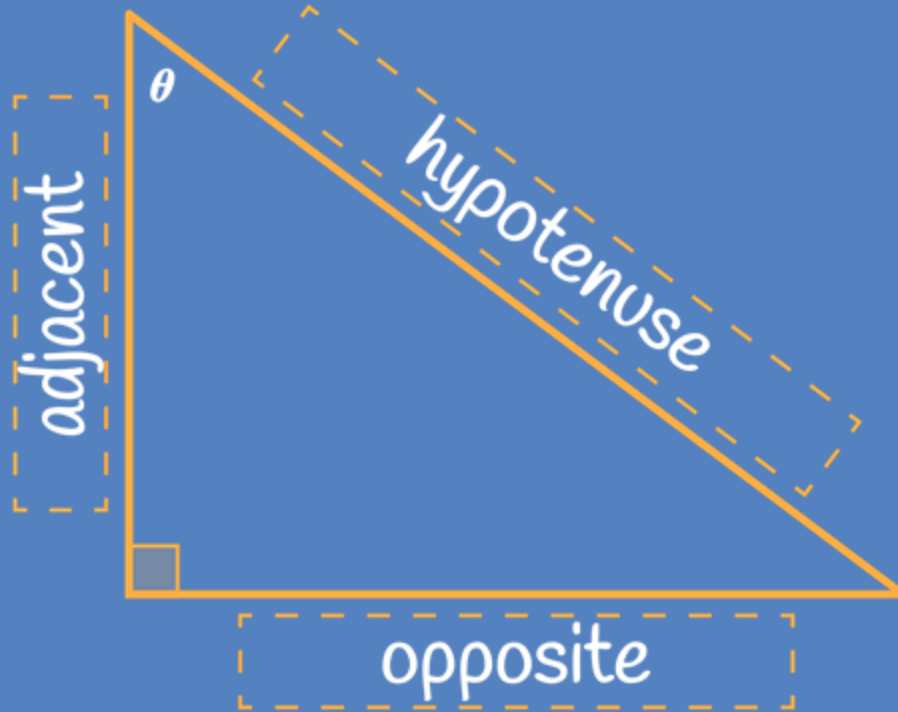
*I knew that this was the
___ side because ___.*



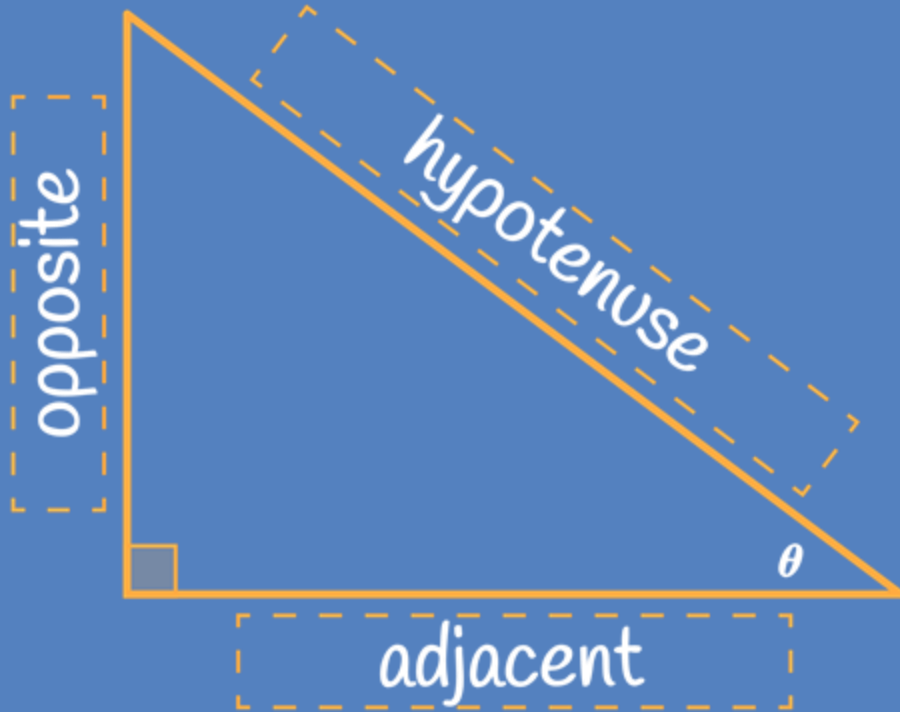
How I Know It: Triangle 1



How I Know It: Triangle 2

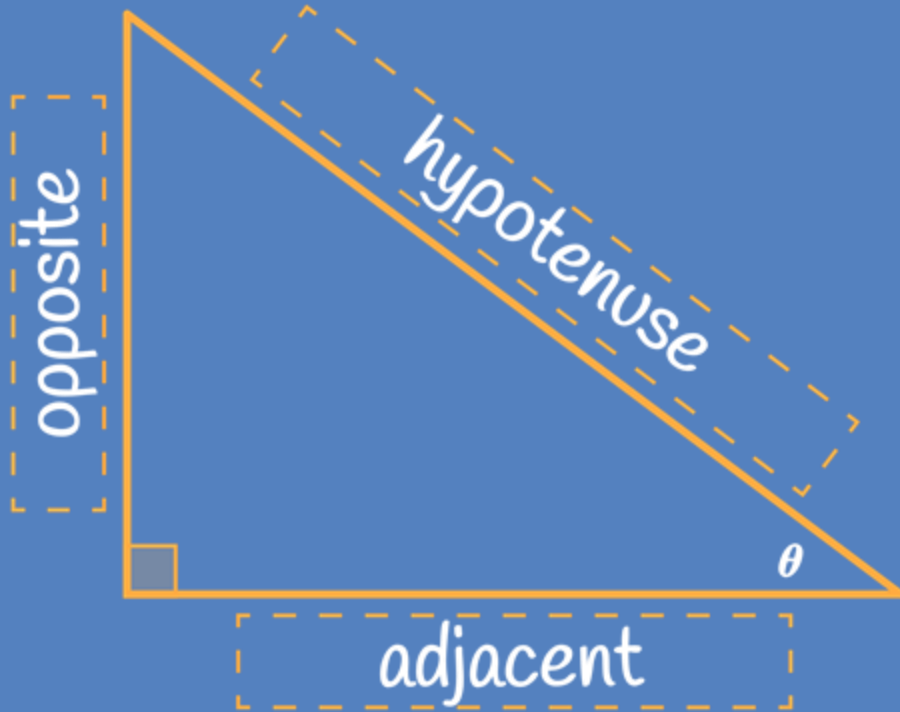


Guided Notes: Right Triangle Trigonometry



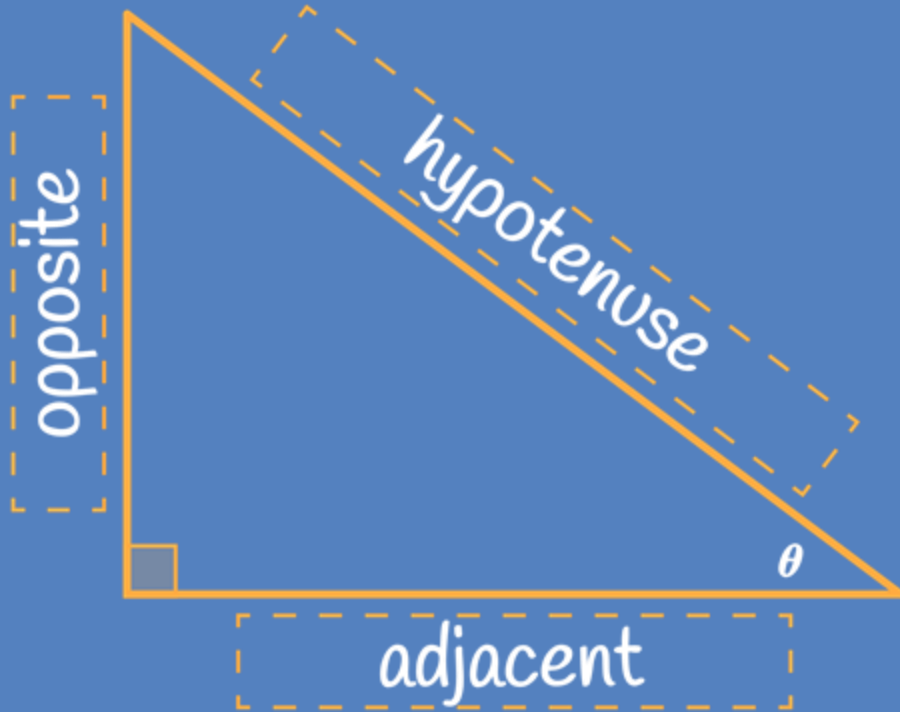
- The **sine** of the angle is the ratio of the opposite side to the hypotenuse.
- $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$

Guided Notes: Right Triangle Trigonometry



- The **cosine** of the angle is the ratio of the adjacent side to the hypotenuse.
- $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$

Guided Notes: Right Triangle Trigonometry



- The **tangent** of the angle is the ratio of the opposite side to the adjacent side.
- $\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$

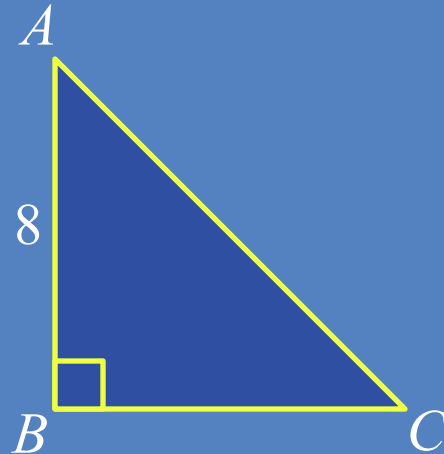
Guided Notes

- Let's complete the Guided Notes together.

Find the Unknown Value (Question 1)

- In right triangle $\triangle ABC$, where B is the right angle, $AB = 8$ inches, and $\sin C = 4/7$. What is the value of $\cos A$?

$$\sin C = \frac{4}{7}$$

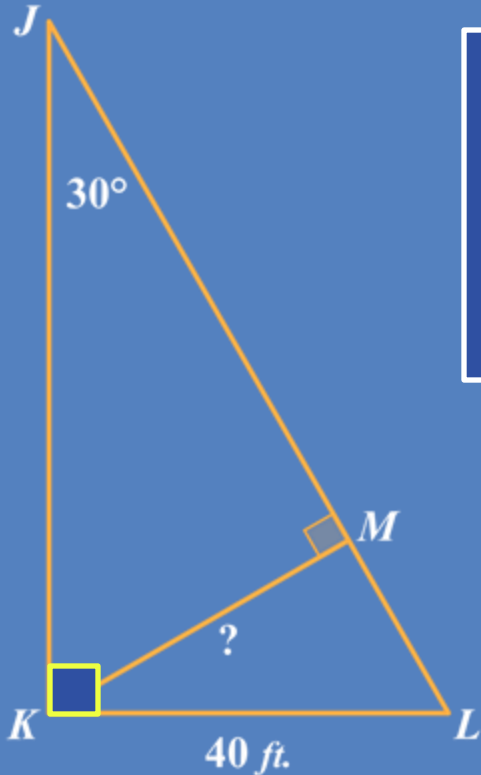


$$\cos A = ?$$

$$\cos A = \sin C$$

$$\cos A = \frac{4}{7}$$

Find the Unknown Value (Question 2)



$$m\angle JKM = 60^\circ.$$

Since $m\angle JKL = 90^\circ$,
 $m\angle MKL = 30^\circ$.

$$KM = ?$$

$$\cos 30^\circ = \frac{KM}{40}$$

$$KM = 40 \cdot \cos 30^\circ$$

$$KM = 20\sqrt{3}$$

Exit Ticket

Leave your paper face down until the timer starts.



5-Minute Timer

Exit Ticket (Answers)

- 1) D
- 2) G
- 3) C
- 4) G
- 5) D

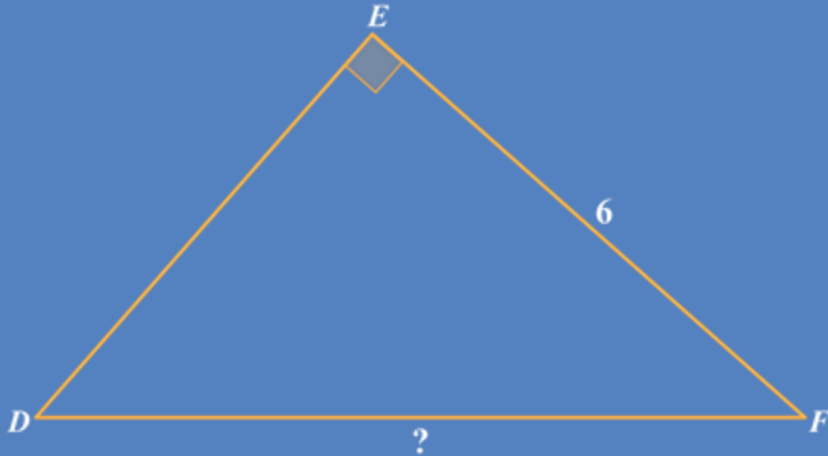
How well did you do?

Remember, it is 100% okay to not get 100% of the questions correct on the ACT.



Exit Ticket (Solution 1)

- In $\triangle DEF$..., $\cos F = 3/4$ and EF is 6 cm. What is DF ...?



$$\cos F = \frac{3}{4} = \frac{6}{8}$$

$$\cos F = \frac{\text{adjacent}}{\text{hypotenuse}}$$

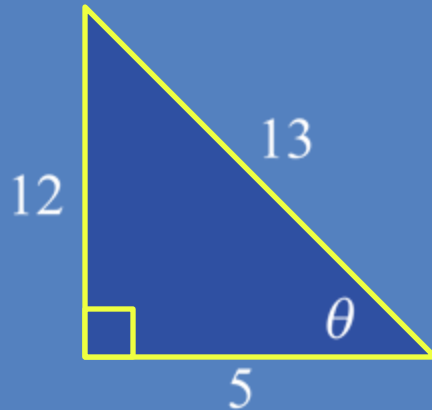
$$DF = 8$$

Exit Ticket (Solution 2)

- For an angle with measure θ in a right triangle, $\cos\theta = 5/13$ and $\tan\theta = 12/5$. What is the value of $\sin\theta$?

$$\cos\theta = \frac{5}{13}$$

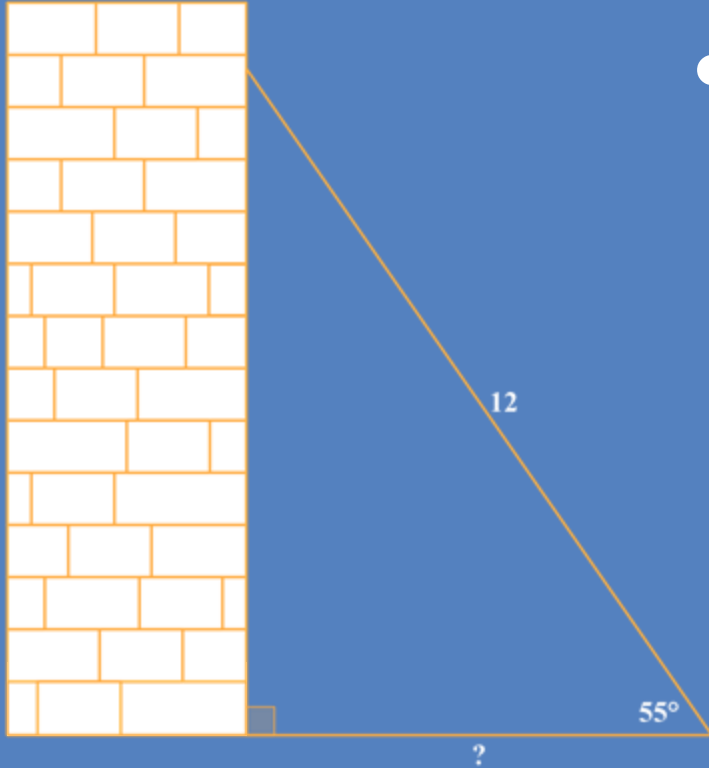
$$\tan\theta = \frac{12}{5}$$



$$\sin\theta = ?$$

$$\sin\theta = \frac{12}{13}$$

Exit Ticket (Solution 3)



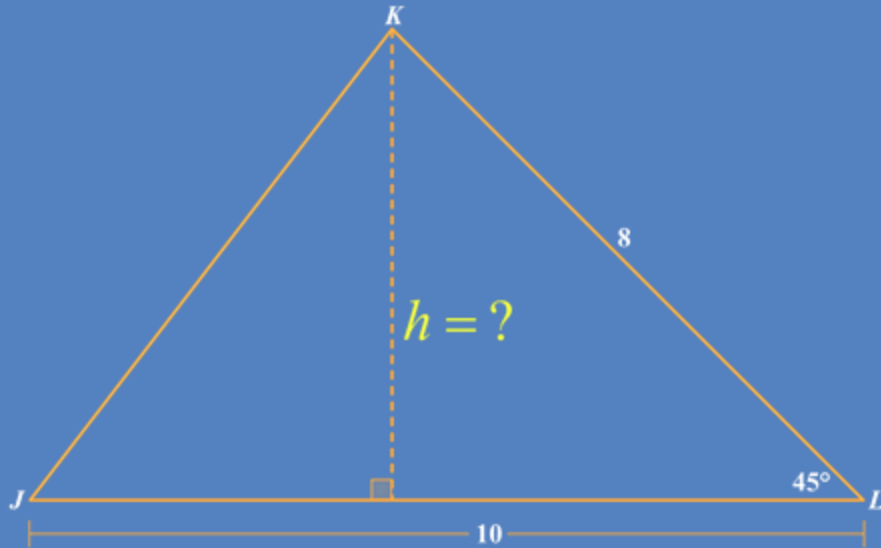
- ..., a 12-foot ladder forms an angle of 55° with the level ground ... The distance, in feet, between the bottom of the ladder and the building ...?

$$\cos 55^\circ = \frac{?}{12}$$

$$\Rightarrow 12 \cdot \cos 55^\circ = ?$$

Exit Ticket (Solution 4)

- What is the area, in square inches, of $\triangle JKL$?



$$\sin 45^\circ = \frac{h}{8}$$

$$h = 8 \cdot \sin 45^\circ$$

$$h = 4\sqrt{2}$$

$$A = \frac{1}{2}(10)h = ?$$

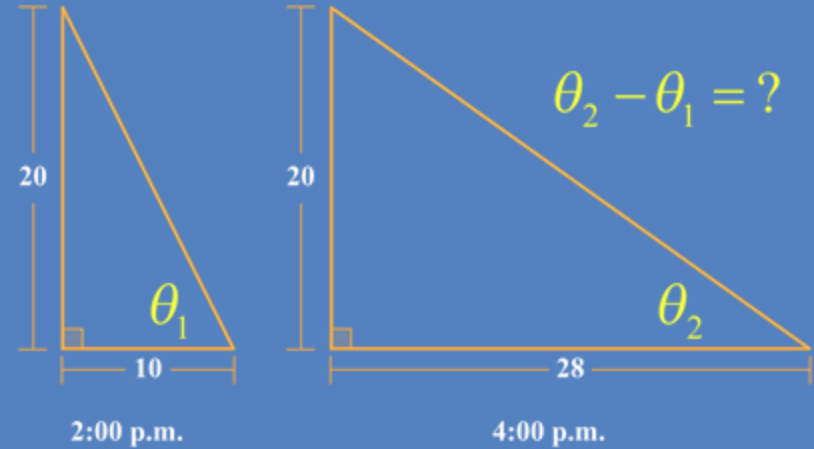
$$A = 5(4\sqrt{2})$$

$$= 20\sqrt{2}$$

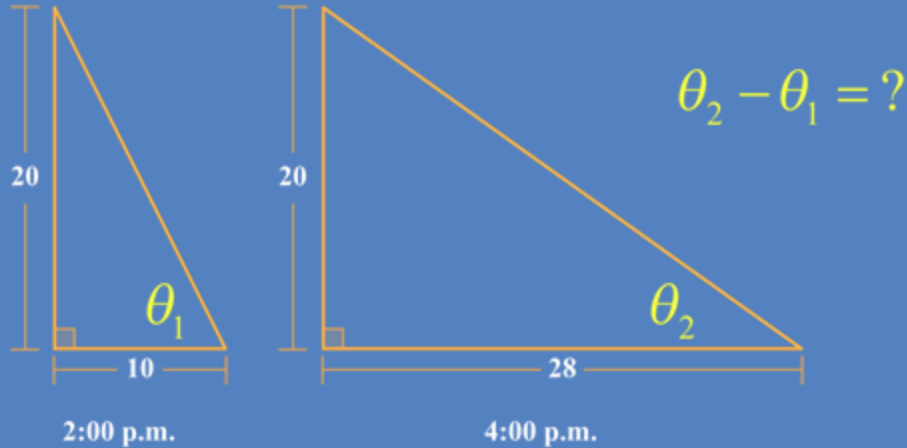
Exit Ticket (Solution 5)

- A **20-foot-tall** flagpole casts a **shadow** at **2:00 p.m.** that extends **10 feet** horizontally ...

Then at **4:00 p.m.**, the shadow extends to **28 feet** horizontally ... Which of the following expressions equals the **positive difference** in the measures of the **angle of elevation from the end of the shadow to the top of the flagpole** at 2:00 p.m. and at 4:00 p.m.?



Exit Ticket (Solution 5)



$$\tan \theta_1 = \frac{20}{10}$$

$$\theta_1 = \tan^{-1}\left(\frac{20}{10}\right)$$

$$\tan \theta_2 = \frac{20}{28}$$

$$\theta_2 = \tan^{-1}\left(\frac{20}{28}\right)$$

$$\theta_2 - \theta_1 =$$

$$\tan^{-1}\left(\frac{20}{10}\right) - \tan^{-1}\left(\frac{20}{28}\right)$$



You Powered Up!

Achievement Unlocked:
Right Triangle Trigonometry



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ACT: State Testing and National Testing



- **State Testing:** In states requiring high school students to take the ACT, the exam must be offered during the school day at the school.
- **National Testing:** These are exams offered on Saturdays and are given on the same date at several locations. Sign up early to get your preferred location.

ACT: State Testing



- Be ready for state testing in **April!**
- Study, practice, and prepare between now and then.
- Your April score can be used towards college admissions and scholarship applications. **Do your best!**

ACT: Superscoring



Why take the ACT more than once?

- You can average your best scores from each subject area to create a higher composite score: a **superscore**!
- Remember, you can unlock admission into colleges and universities and scholarships the higher you score.

ACT: National Testing



- The ACT is offered multiple times a year at many different locations.
- Search for “ACT test dates” and select the link that will send you to the official ACT website: www.act.org/...
- Find the table of information about national test dates.

ACT: National Testing

To take this test, register by this date.



Test Date	Regular Registration Deadline	Late Registration Deadline	Photo Upload and Standby Deadline
June 14, 2025	May 9	May 27	June 6
July 12, 2025	June 6	June 20	July 4
...	...	...	...

Register by May 9th to take the ACT on June 14th.

ACT: National Testing



Tests are usually offered each year during the following months:

- February
- April
- June
- July
- September
- October
- December

Plan ahead and don't wait until the last minute to register. Avoid paying late registration fees!

ACT: National Testing



- Test Information Release (**TIR**): This is a copy of the multiple-choice ACT with your answers and a copy of the correct answers. It can also include the prompt and grading rubric for the writing portion with your scores.
- **If you qualify for a fee waiver, this is free.** Ask your school counselor to see if you are eligible.