Power Up: Math ACT Prep, Week 8

Introduction to Story Problems
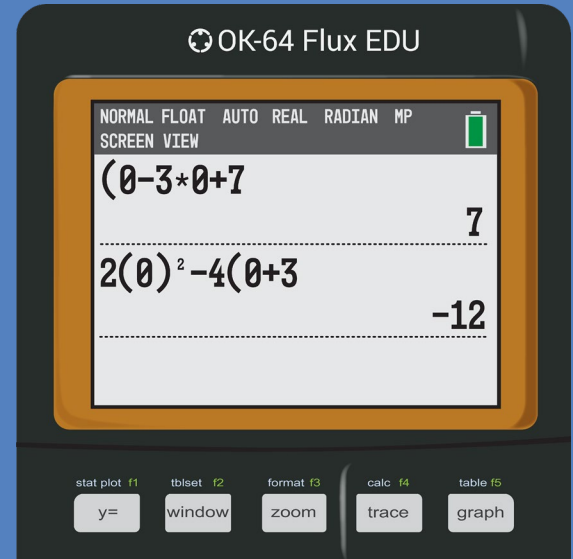
ACT PREP

K20
L·E·A·R·N

Error Analysis: *What Went Wrong?*

Consider the graphs of $g(\text{x}) = (x - 3)(x + 7)$ and $h(\text{x}) = 2x^2 - 4x + 3$. What is the sum of their y-intercepts?

$$g(0) = (0 - 3)(0 + 7)$$
$$= 7$$

$$h(0) = 2(0)^2 - 4(0) + 3$$
$$= -12$$

$$g(0) + h(0) = 7 + (-12) = \boxed{-5}$$

OK-64 Flux EDU

NORMAL FLOAT AUTO REAL RADIAN MP
SCREEN VIEW

(0−3∗0+7
                                    7
2(0)²−4(0+3
                                  −12

stat plot f1   tblset f2   format f3   calc f4   table f5

y=   window   zoom   trace   graph

Essential Question

How can I increase my ACT score?

Learning Objectives

- Identify and algebraically represent critical information from a story problem.

- Apply problem-solving skills.

Making Story Problems Less Scary

- Math problems hidden in a paragraph can feel quite intimidating; however, that is how and where we see math in the real-world.
- There are not many equations floating around, so we need to be problem-solvers and to be able to look at a situation and identify the critical information.

Steps to Solving Story Problems

1) Draw a Quick Sketch?

2) Label the Known.

3) Label the Unknown.

4) Write an Equation.

Steps to Solving Story Problems

- As you read a story problem, is a shape being described? As you read, draw a quick sketch of the shape.

- Maybe draw arrows indicating the direction being described.

- Every problem does **not** need a drawing.

1) **Draw a Quick Sketch?**
2) Label the Known.
3) Label the Unknown.
4) Write an Equation.

Steps to Solving Story Problems

- Underline or label any key information given.
- For example, if you read *the width of a rectangle is 5 cm*, then write *w = 5 cm*.
- Identify and label information as you read. The goal is to not re-read the problem.

1) Draw a Quick Sketch?
2) **Label the Known.**
3) Label the Unknown.
4) Write an Equation.

K20
L·E·A·R·N

ACT
PREP

Steps to Solving Story Problems

- What is the question asking?
- This information is often in the last sentence, but not always. For example, if you read *find the area of a rectangle,* then write ***A = ?***.
- Identify and label this unknown information as you read.

1) Draw a Quick Sketch?
2) Label the Known.
3) **Label the Unknown.**
4) Write an Equation.

Steps to Solving Story Problems

- Now that you have identified the given information (known) and what the question is asking (unknown), think about an equation that could relate the known(s) and unknown.

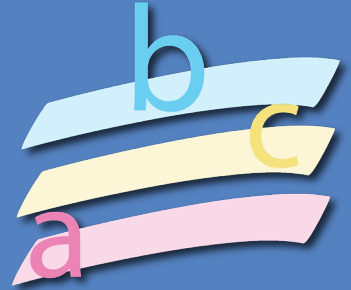- What equation could relate the area and width of a rectangle?

1) Draw a Quick Sketch?
2) Label the Known.
3) Label the Unknown.
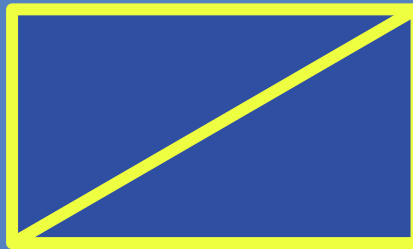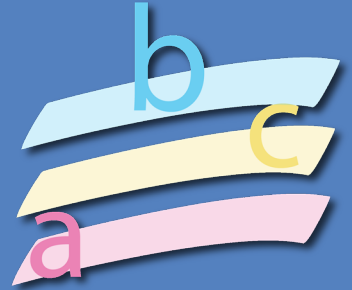4) **Write an Equation.**

Story Problems: Question 1

The diagonal of a rectangular movie theater screen is 84.1 feet. The width of the screen is 74.0 feet, and the height of the screen is 34 feet less than the width of the screen. Which of the following is the closest to the area, in square feet, of the television screen?
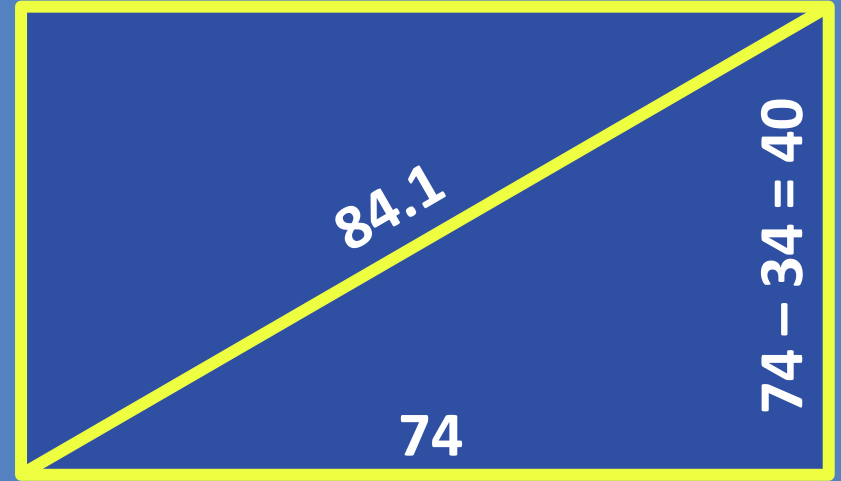
Would it be helpful to draw a quick sketch?

Story Problems: Question 1

The diagonal of a rectangular movie theater screen is 84.1 feet. The width of the screen is 74.0 feet, and the height of the screen is 34 feet less than the width of the screen. Which of the following is the closest to the area, in square feet, of the television screen?

Story Problems: Question 1

The **diagonal** of a rectangular movie theater screen is **84.1 feet**. The **width** of the screen is **74.0 feet**, and the **height** of the screen is **34 feet less than the width** of the screen. Which of the following is the closest to the **area**, in square feet, of the television screen?

Story Problems: Question 1

The **diagonal** of a rectangular movie theater screen is **84.1 feet**. The **width** of the screen is **74.0 feet**, and the **height** of the screen is **34 feet less than the width** of the screen. Which of the following is the closest to the **area**, in square feet, of the television screen?

84.1

74 − 34 = 40

74

$$A = (74)(40) = 2960$$

Story Problems on the ACT

- Since the ACT is a timed exam, it is important to not waste time.
- There are things we **think** about and things we **write**, but we do not need to show much work on the ACT.
- Let's compare what we **think** and what we **write** for questions on the ACT.

K20
L·E·A·R·N

ACT
PREP

Think

The **diagonal** of a rectangular movie theater screen is **84.1 feet**. The width of the screen is 74.0 feet, and the height of the screen is 34 feet less than the width of the screen. Which of the following is the closest to the area, in square feet, of the television screen?
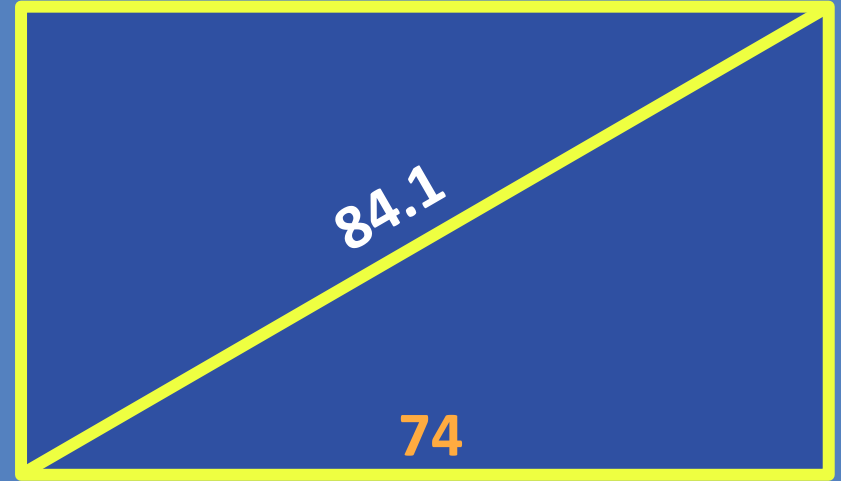
Step 1) Draw a Picture.

Write
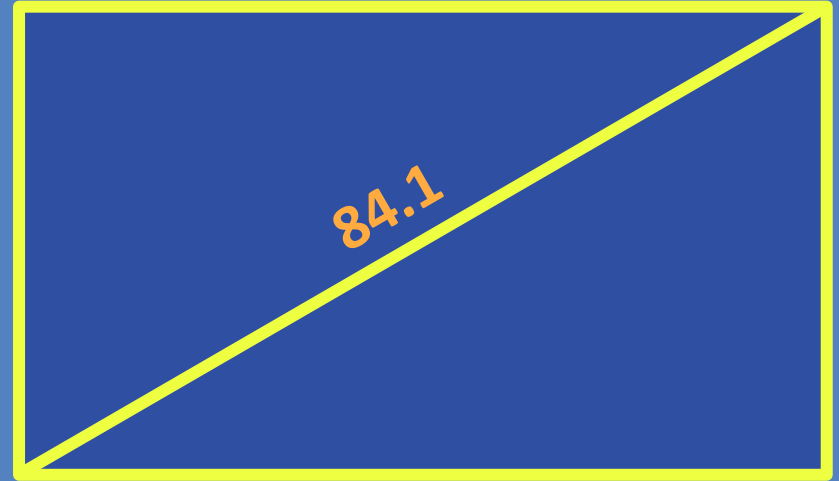
K20
L·E·A·R·N

ACT
PREP

Think

Write

The diagonal of a rectangular movie theater screen is 84.1 feet. The **width** of the screen is **74.0 feet**, and the height of the screen is 34 feet less than the width of the screen. Which of the following is the closest to the area, in square feet, of the television screen?
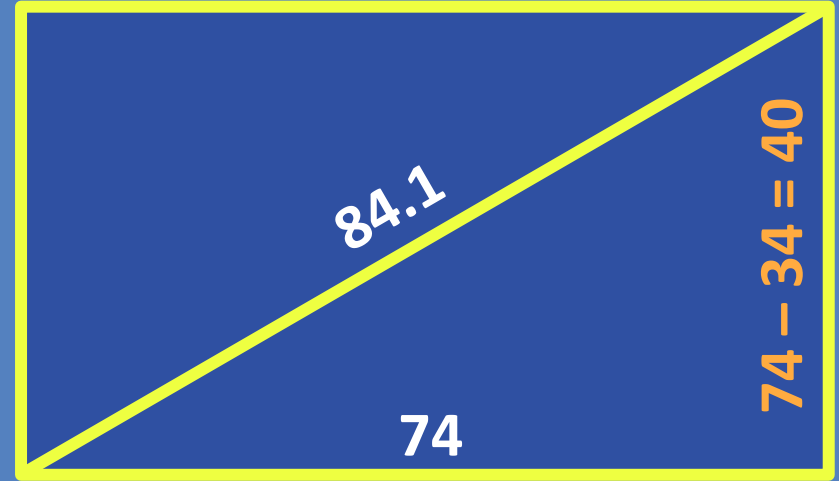
Step 2) Label the Known.

84.1

74

K20
L·E·A·R·N

ACT
PREP

Think

The diagonal of a rectangular movie theater screen is 84.1 feet. The width of the screen is 74.0 feet, and the **height** of the screen is **34 feet less than the width** of the screen. Which of the following is the closest to the area, in square feet, of the television screen?
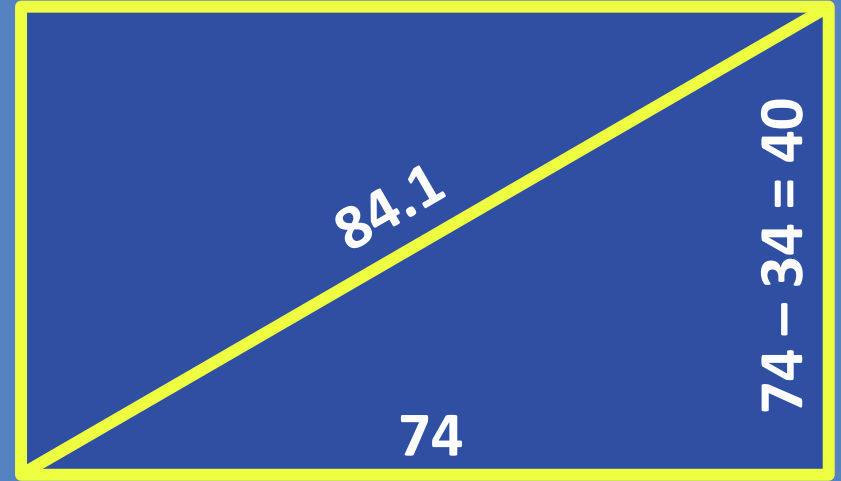
Step 2) Label the Known.

Write

*We might write $h = w - 34$.

Think

The diagonal of a rectangular movie theater screen is 84.1 feet. The width of the screen is 74.0 feet, and the height of the screen is 34 feet less than the width of the screen. Which of the following is the closest to the **area**, in square feet, of the television screen?
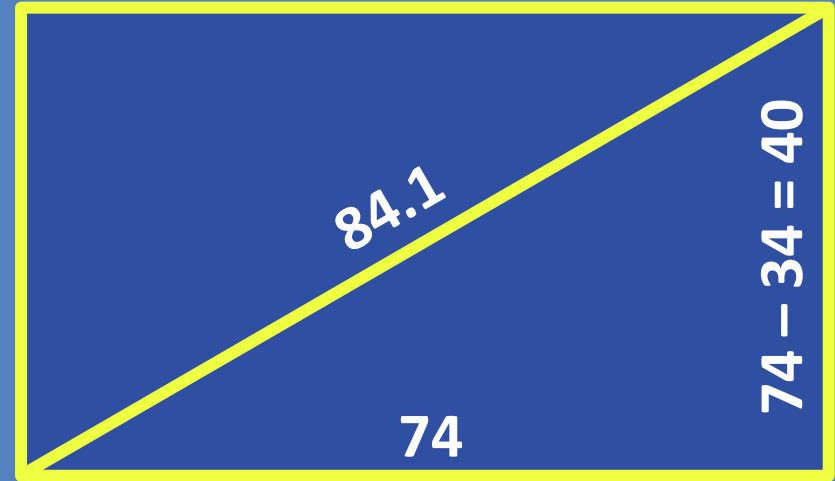
Step 3) Label the Unknown.

Write

84.1

$74 - 34 = 40$

74

$A = ?$

Think

The diagonal of a rectangular movie theater screen is 84.1 feet. The width of the screen is 74.0 feet, and the height of the screen is 34 feet less than the width of the screen. Which of the following is the closest to the **area**, in square feet, of the television screen?

Step 4) Write an Equation.

Write

84.1
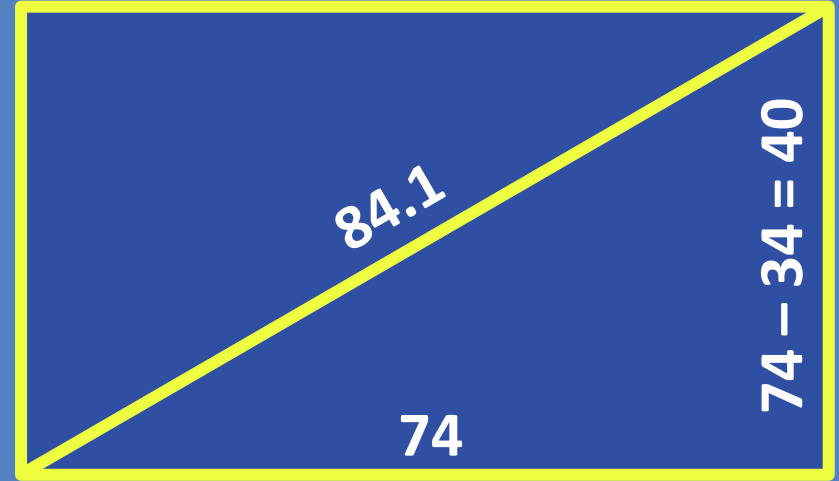
$74 - 34 = 40$

74

*We might write $A = b \cdot h$.

$A = ?$

$A = (74)(40) = 2960$

Think

- Now that I have an answer, let's look at the answer choices.
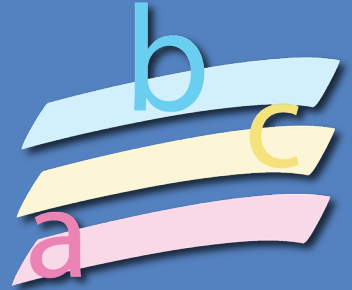- I see the answer is **D**.

Write

$$A = ?$$

$$A = (74)(40) = 2960$$

Story Problems: Question 2

Of the 450 tickets to see a local artist, there are three types of tickets for sale. 8% of the tickets are VIP tickets. Of those tickets NOT reserved for VIP, 18 are general admission tickets. How many tickets are available for sale that are NOT reserved for VIP and are NOT general admission tickets?

Story Problems: Question 2

Of the **450 tickets** to see a local artist, there are three types of tickets for sale. **8%** of the tickets are **VIP tickets**. Of those tickets **NOT** reserved for **VIP**, **18 are general admission tickets**. **How many tickets** are available for sale that are **NOT** reserved for **VIP** and are **NOT general admission tickets**?

$$total = 450$$

$$VIP = 8\%\left(450\right)$$

$$GA = 18$$

$$NOT\ VIP\ \&\ NOT\ GA = ?$$

$$450\left(1 - .08\right) - 18 = \boxed{396}$$
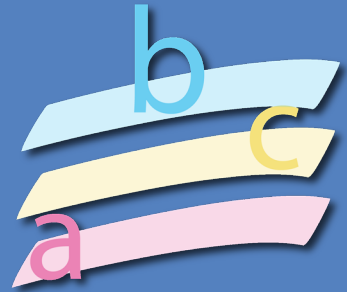
Exit Ticket

Leave your paper face down until the timer starts.

[5-Minute Timer](#)

Exit Ticket (Answers)
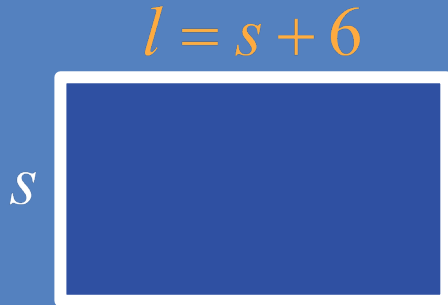
1) C

2) H

3) C

4) J

5) E

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

Exit Ticket (Solution 1)

- The **perimeter** … is **60 inches**. The **longer sides of the rectangle are each 6 inches longer than each of the shorter sides** …. What is the **length** … of one of the **longer sides** …?

$l = s + 6$

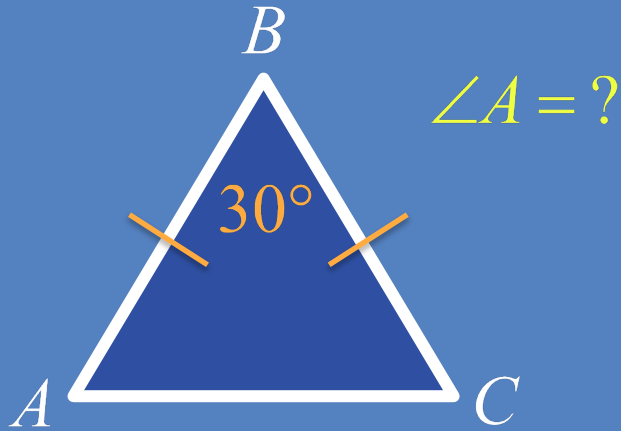$P = 60 = 2(l + s)$

$l = ?$

$30 = (s + 6) + s$

$l = (12) + 6$

$24 = 2s$

$l = 18$

$12 = s$

s

Exit Ticket (Solution 2)

- Given that **∠B is in the included angle between the two congruent sides** of the **isosceles triangle ΔABC**, and the **measure of ∠B is 30°**, what is the **measure of ∠A**?

$\angle A = ?$

$$\begin{pmatrix} Degrees\ in \\ a\ Triangle \end{pmatrix} - m\angle B = m\angle A + m\angle C$$

$$180 - 30 = 150 = 2 \cdot m\angle A$$

$$\boxed{75 = m\angle A}$$

B

30°

A   C

Exit Ticket (Solution 3)

- The … formula $A = A_0(3^{2t})$, where A is the **total amount** … **t minutes** after an **initial amount, A_0**, … began accumulating. Which … relates the **number of min.** … an **initial amount of 15 grams** … to **accumulate to 95 grams**?

$$A = A_0\left(3^{2t}\right)$$

$A =$ total amount

$t = $ min.

$A_0 = $ initial amount

$t = ?$

$A_0 = 15$

$A = 95$
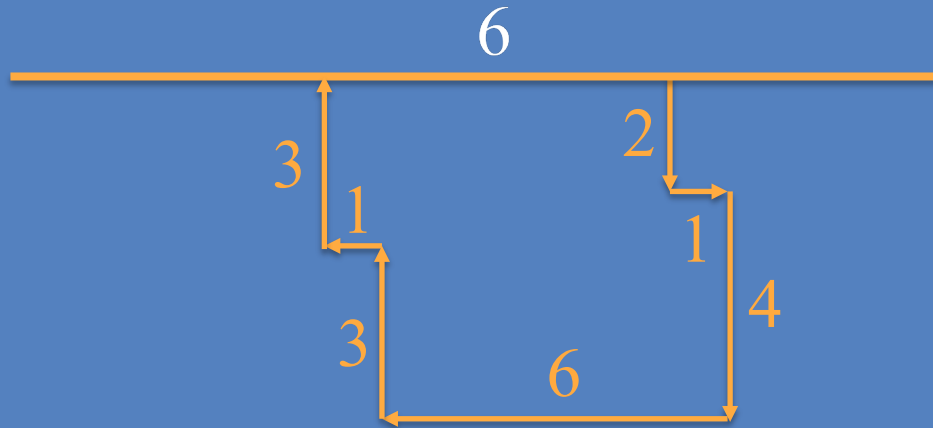
$$A = A_0\left(3^{2t}\right)$$

$$95 = 15\left(3^{2t}\right)$$

Exit Ticket (Solution 4 – Steps 1-2)

- Johnny … drives … a straight road that runs east and west, … detour driving 2 miles … south, then 1 mile … east, then 4 miles … south, then 6 miles … west, then 3 miles … north, then 1 mile … west, and then 3 miles … north …
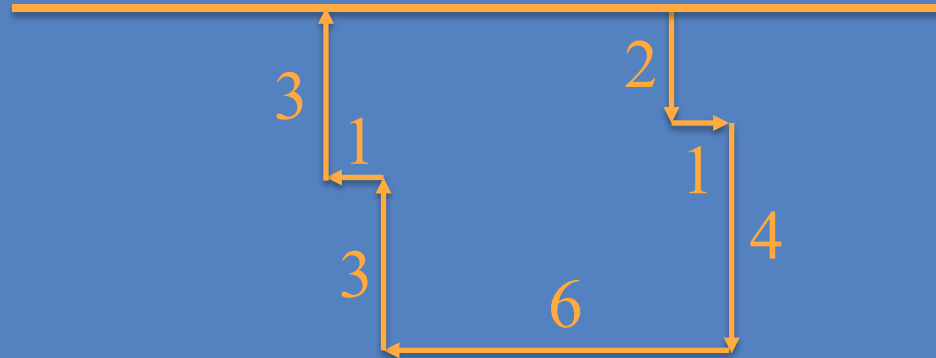
Exit Ticket (Solution 4 – Steps 3-4)

- **How many more miles** did he drive by taking the detour than if he could have stayed on the highway?

$$Detour - Original = ?$$

$$20 - 6 = \boxed{14}$$

Exit Ticket (Solution 5)

- … One employee earns **$7.50 per hour**…worked…: **7.25 hours** on Mon., **6.75 hours** on Tues., **9.25 hours** on Thurs., and **8.5 hours** on Fri. …the best estimate for the **employee's pay** …?

$$Wage = \$7.5 / hr$$

$$
\begin{array}{r}
7.25 \\
6.75 \\
9.25 \\
+\ 8.5 \\
\hline
31.75
\end{array}
$$

$$Pay = ?$$

$$Pay = Wage \cdot Hours$$

$$Pay = (7.5)(31.75)$$

$$\boxed{Pay = 238.125}$$

You Powered Up!

Achievement Unlocked:

Story Problems

ACT PREP

K20
L·E·A·R·N