

Name \_\_\_\_\_

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## Phone Cost

The cost of a phone is the phone's price, \$264, plus 6.25% tax.

(1) Use the expression  $P + 0.0625 * P$  to find the cost.

(2) Use the expression  $P * 1.0625$  to find the cost.

(3) Apply properties of operations to the expression  $P + 0.0625 * P$  to produce the expression  $P * 1.0625$ .

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## Utility Pole Scale Drawing

A utility pole 24 feet long has  $28\frac{1}{4}$ -inch circumference at the top and  $47\frac{1}{8}$ -inch circumference 6 feet from the base. Create and label a scale drawing of the pole in side view, with scale  $\frac{1}{4}$  inch = 1 foot.

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## Writing Sums as Products

Write each sum as a product with the given factor.

*Example:*  $8 + 6x = 2 \cdot ?$

*Answer:*  $8 + 6x = 2(4 + 3x)$

(1)  $6y + 12 = 3 \cdot ?$

Answer: \_\_\_\_\_

(2)  $-5w + 35 = (-5) \cdot ?$

Answer: \_\_\_\_\_

(3)  $4z + 1 = 4 \cdot ?$

Answer: \_\_\_\_\_

(4)  $9ay - 9by + 27cy = 9y \cdot ?$

Answer: \_\_\_\_\_

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## Foul Play

The Hawks were leading the Pistons in basketball by a score of 100–98. Just as time was running out, a Pistons player tried a 3-point shot. His defender had two choices: allow the shot, or stop it by fouling the Pistons player. Fouling would give the Pistons player 3 one-point free throws. The defender chose to foul and later wondered if it was a good choice.



- (1) To analyze the defender's choice, let's assume that for the Pistons player, every 3-point shot has a probability  $\frac{1}{3}$  of going in, and every free throw has probability 90% of going in.
  - (a) If the defender allows the shot, what is the probability that the shot wins the game as time runs out?
  - (b) If the defender stops the shot by fouling, estimate the probability that the free throws win the game.
- (c) Write a paragraph arguing for or against the defender's choice, based on probability calculations and/or simulations.

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*Pencils down* Think about the equation  $x + 4\frac{1}{8} = \frac{2}{3}$ .

(1) Is there a whole number that solves it?      Yes    No

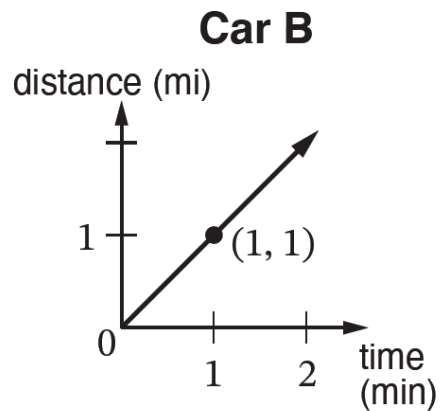
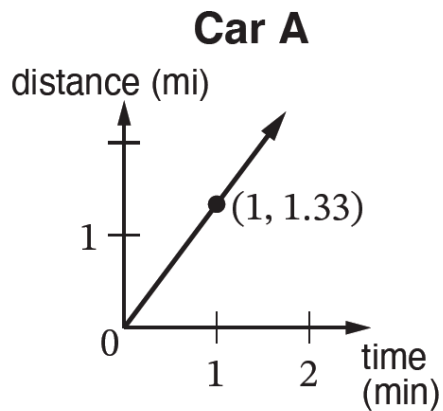
(2) Is there a non-whole number that solves it?      Yes    No

(3) Convince a classmate that your answers are right.

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## Car A and Car B



Car A and Car B were moving at constant speed, as shown in the graphs.

- (1) At the end of the first minute, how many miles had each car moved?
- (2) Which car was moving faster?
- (3) For the faster car, write a formula for the number of miles moved in  $n$  minutes.
- (4) How many miles does the faster car move in 10 minutes?

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## Speed Limit

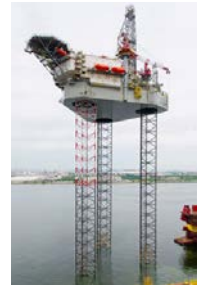
If the speed limit in Canada is 100 km/hr and you are driving 65 mph, are you over or under the limit? By how much?

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## Oil Business

In 2018, an oil company rented an oil rig for \$100,000 per day. The company drilled a well and started pumping oil.



- (1) How much oil must be sold each day to equal the rental cost? Note: 42 gal of oil could be sold for \$70 in 2018.
  
- (2) The company estimates that the profit,  $P$ , in millions of dollars, after pumping oil for  $D$  days is  $P = 0.5D - 40$ .
  - (a) What is the profit after the first day of pumping oil?
  
  - (b) On another sheet of paper or using technology, make a table of pairs of values  $(D, P)$  and graph the ordered pairs.
  
  - (c) How can the company make \$30M of profit?
  
- (3) An equivalent expression for  $P$  is  $0.5(D - 80)$ . How does the 80 in this expression relate to the company's situation?



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## Calculating with Rational Numbers

(1) Calculate.

(a)  $-4.1 + 4$

(b)  $5 \div (-6)$

(c)  $-1(-1 - 1)$

(d)  $2 - (-\frac{1}{2})$

(e)  $(-\frac{3}{8})(-8)$

(f)  $0 - \frac{1}{3}$

(g)  $\frac{1}{7.9} * 7.9$

(h)  $(\frac{1}{2} - \frac{1}{4})(-9 + 9)$

(2) Show calculation 1(a) on a number line.

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## Triangle Conditions

In  $\triangle ABC$ , side  $AB$  is 4 units long, side  $BC$  is 3 units long, and angle  $A$  measures  $30^\circ$ . Sketch two ways  $\triangle ABC$  might look.

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## Ticket Offers

Nechama is shopping online for a ticket to a play. Website A offers a discount of \$7.50 off the theater price. Website B offers a discount of 25% off the theater price.



- (1) Is it mathematically possible that Website A is a better deal than Website B? Prove your answer.
  
  
  
  
  
  
  
  
  
  
- (2) Is it mathematically possible that Website B is a better deal than Website A? Prove your answer.

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## Temperature Change

In 1972 in Loma, Montana, the temperature changed from  $-54^{\circ}\text{F}$  to  $+49^{\circ}\text{F}$  in a 24-hr period. Calculate the average rate at which the temperature changed. Answer to the nearest tenth in units of degrees/hr.

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## Wire Circle

A 15.1-inch long wire is bent into the shape of a circle with 2.9 inches left over. To the nearest 0.1 inch, what is the diameter of the circle?

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## Comparing Rose's and Liba's Solutions

Rose and Liba both solved this problem:

*Jannat has 4 packs of balloons and 5 single balloons—29 balloons in all. How many balloons are in a pack?*

Explain both of Rose's steps. Check that Liba's equations are all true statements about the balloons.

**Rose**

$$29 - 5 = 24$$

$$24 \div 4 = 6$$

**Liba**

Let  $x$  be the # of balloons in a pack.

$$4x + 5 = 29$$

$$4x = 24$$

$$x = 6$$