Math
Milestones™

Name _____   Date _____

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 $x + 4\frac{1}{8} = \frac{2}{3}$.

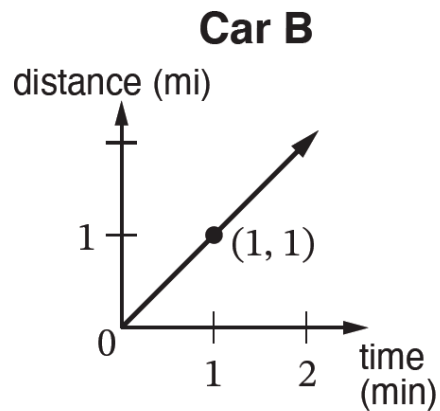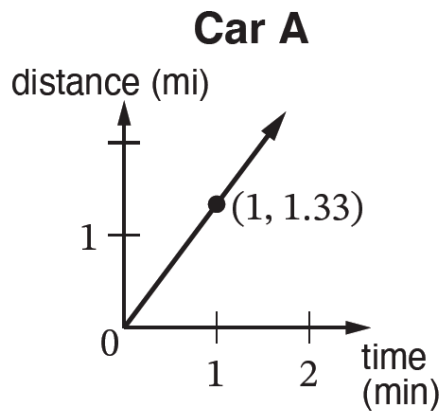   (1)   Is there a whole number that solves it?   Yes   No

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

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

Name _____   Date _____

Car A and Car B

Car A
distance (mi)

(1, 1.33)

1

0   1   2   time (min)

Car B
distance (mi)

(1, 1)

1

0   1   2   time (min)

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?

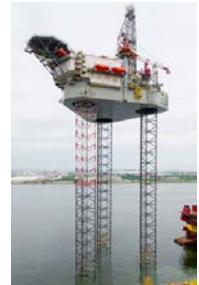This task is not designed for numerical scoring.

Name _____   Date _____

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?

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) $2 - \left(-\frac{1}{2}\right)$

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

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

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

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

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

This task is not designed for numerical scoring.

Name _____   **Date** _____

Triangle Conditions

In ΔABC, side AB is 4 units long, side BC is 3 units long, and angle A measures 30°. Sketch two ways ΔABC might look.

Name _____   Date _____

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.

Name _____   Date _____

Temperature Change

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

Name _____   **Date** _____

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?

Name _____   **Date** _____

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	**Liba**
$29 - 5 = 24$	Let x be the # of balloons in a pack.
$24 \div 4 = 6$	$4x + 5 = 29$
	$4x = 24$
	$x = 6$