Math Milestones™ — Grade 7

7:1 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 $P * 1.0625$.

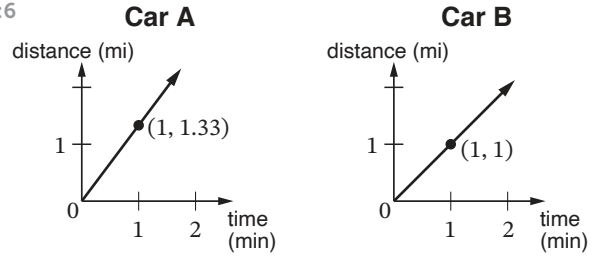
7:2 A utility pole 24 feet long has $28\frac{1}{4}$-inch circumference at the top and $47\frac{1}{8}$-inch circumference 6 feet from the base. Create and label a scale drawing of the pole in side view, with scale $\frac{1}{4}$ inch = 1 foot.

7:3 Write each sum as a product with the given factor. *Example:* $8 + 6x = 2 \cdot ?$ *Answer:* $8 + 6x = 2(4 + 3x)$. **(1)** $6y + 12 = 3 \cdot ?$ **(2)** $-5w + 35 = (-5) \cdot ?$ **(3)** $4z + 1 = 4 \cdot ?$ **(4)** $9ay - 9by + 27cy = (9y) \cdot ?$

7:4 *"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 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. **(2)** Write a paragraph arguing for or against the defender's choice, based on probability calculations and/or simulations.

7:5 *Pencils down* Think about the equation $x + 4\frac{1}{8} = \frac{2}{3}$. Is there a positive number that solves it? Is there a negative number that solves it? Tell how you decided.

7:6



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?

7:7 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?

7:8 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)** 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?

7:9 **(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.

7:10 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.

7:11 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? **(2)** Is it mathematically possible that Website B is a better deal than Website A? *Prove your answers.*

7:12 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.

7:13 A 15.1-in long wire is bent into the shape of a circle with 2.9 in left over. To the nearest 0.1 in, what is the diameter of the circle?

7:14 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.
$24 \div 4 = 6$	$4x + 5 = 29$
	$4x = 24$
	$x = 6$

Math Milestones™ Task List — Grade 7

The 14 Math Milestones™ tasks for grade 7 have been carefully crafted to embody grade 7 mathematics on one page.

7:1	Phone Cost		C P A	7.RP.A.3, 7.EE.A
7:2	Utility Pole Scale Drawing		A	7.G.A.1, 7.G.B.4
7:3	Writing Sums as Products		C P	7.EE.A.1
7:4	"Foul Play"		C A	7.SP.C
7:5	Is There a Solution? (Addition)	🚫	C	7.NS.A.1, 7.EE.B.4
7:6	Car A and Car B		C A	7.RP.A.2
7:7	Speed Limit		A	7.RP.A.1
7:8	Oil Business		A	7.RP.A.2b, 7.EE.A.2, 7.EE.B.4
7:9	Calculating with Rational Numbers	🚫	C P	7.NS.A
7:10	Triangle Conditions		C	7.G.A.2
7:11	Ticket Offers		C A	7.RP.A.3, 7.EE.B
7:12	Temperature Change		C A	7.RP.A.1, 7.NS.A
7:13	Wire Circle		A	7.EE.B.4
7:14	Comparing Rose's and Liba's Solutions		C	7.EE.B.4

C = Task has a conceptual focus. P = Task has a procedural skill & fluency focus. A = Task has an application focus. 🚫 = Task is not designed for use with calculators or other technology.

Standards for Mathematical Practice

MP.1	Make sense of problems and persevere in solving them.	7:3, 7:5, 7:8
MP.2	Reason abstractly and quantitatively.	7:1, 7:6, 7:8, 7:11, 7:12, 7:14
MP.3	Construct viable arguments and critique the reasoning of others.	7:5, 7:10, 7:11
MP.4	Model with mathematics.	7:2, 7:4, 7:6, 7:8, 7:12, 7:13
MP.5	Use appropriate tools strategically.	7:2, 7:4, 7:7, 7:8, 7:10, 7:13
MP.6	Attend to precision.	7:2, 7:7, 7:9, 7:10
MP.7	Look for and make use of structure.	7:1, 7:3, 7:5, 7:8, 7:9, 7:14
MP.8	Express regularity in repeated reasoning.	7:1, 7:11

Standards codes refer to www.corestandards.org. One purpose of the codes is that they may allow a task to shed light on the Standards cited for that task. Conversely, reading the cited Standards may suggest opportunities to extend a task or draw out its implications. Finally, Standards codes may also assist with locating relevant sections in curriculum materials, including materials aligned to comparable standards.

Math Milestones™

Math Milestones™ was created by Jason Zimba, John W. Staley, Elizabeth Meier, Sandra Alberti, Harold Asturias, and Phil Daro.

Math Milestones™ tasks are not designed for summative assessment. Used formatively, the tasks can reveal and promote student thinking. Student work on tasks could be collected in student portfolios.

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