

Name _____

Dividing with and without Remainders

32

★ In division, remainders may be expressed as whole numbers.

$$\begin{array}{r} 137R4 \\ 5 \overline{)689} \\ \underline{-5} \\ 18 \\ \underline{-15} \\ 39 \\ \underline{-35} \\ 4 \end{array}$$

The remainders may also be expressed as decimals. Add a decimal point and a zero after the ones place in the dividend, and divide. If necessary, add more zeroes to the dividend.

$$\begin{array}{r} 137.8 \\ 5 \overline{)689.0} \\ \underline{-5} \\ 18 \\ \underline{-15} \\ 39 \\ \underline{-35} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

Find the quotient. Express the remainder as a whole number or decimal.

- 1 $2,543 \div 20 = 127 R3$ $29,870 \div 2 = 14,935$ $467 \div 32 = 14 R19$
- 2 $9,634 \div 11 = 875 R9$ $48,962 \div 8 = 6,120 R2$ $558 \div 29 = 19 R7$
- 3 $7,725 \div 92 = 83 R89$ $67,054 \div 2 = 33,527$ $649 \div 17 = 38 R3$
- 4 $5,816 \div 83 = 70 R6$ $86,146 \div 6 = 14,357 R4$ $730 \div 95 = 7 R65$
- 5 $3,907 \div 74 = 52 R59$ $15,238 \div 5 = 3,047 R3$ $821 \div 73 = 11 R18$
- 6 $1,098 \div 65 = 16 R58$ $34,321 \div 4 = 8,580 R1$ $913 \div 81 = 11 R22$

7 There were 56,325 fans at a baseball game. If the stands were divided into 20 sections, how many fans were in each section? Express the remainder as both a whole number and a decimal.

$56,325 \text{ fans} \div 20 \text{ sections} = 2,816 R5 \text{ fans}$
 $= 2,816.25 \text{ fans}$

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Dividing Whole Numbers

42

★ $5652 \div 24 = ?$

$$\begin{array}{r}
 235 \\
 24 \overline{)5652} \\
 \underline{48} \\
 85 \\
 \underline{72} \\
 132 \\
 \underline{120} \\
 12
 \end{array}$$

The remainder is 12: $5,652 \div 24 = 235 \text{ R}12$.

Divide.

① $6 \overline{)3,270}$

$$\begin{array}{r}
 545 \\
 6 \overline{)3,270} \\
 \underline{30} \\
 27 \\
 \underline{24} \\
 30
 \end{array}$$

$4 \overline{)9,871} \text{ R}3$

$$\begin{array}{r}
 2467 \text{ R}3 \\
 4 \overline{)9,871} \\
 \underline{8} \\
 18 \\
 \underline{16} \\
 27 \\
 \underline{24} \\
 31 \\
 \underline{28}
 \end{array}$$

$8 \overline{)1,323} \text{ R}3$

$$\begin{array}{r}
 165 \text{ R}3 \\
 8 \overline{)1,323} \\
 \underline{8} \\
 52 \\
 \underline{48} \\
 43 \\
 \underline{40}
 \end{array}$$

$5 \overline{)9,762} \text{ R}2$

$$\begin{array}{r}
 1952 \text{ R}2 \\
 5 \overline{)9,762} \\
 \underline{5} \\
 47 \\
 \underline{45} \\
 26 \\
 \underline{25} \\
 12 \\
 \underline{10}
 \end{array}$$

② $12 \overline{)6,420}$

$$\begin{array}{r}
 535 \\
 12 \overline{)6,420} \\
 \underline{60} \\
 42 \\
 \underline{36} \\
 60
 \end{array}$$

$32 \overline{)5,872} \text{ R}16$

$$\begin{array}{r}
 183 \text{ R}16 \\
 32 \overline{)5,872} \\
 \underline{32} \\
 267 \\
 \underline{256} \\
 112 \\
 \underline{96} \\
 16
 \end{array}$$

$12 \overline{)7,362} \text{ R}6$

$$\begin{array}{r}
 613 \text{ R}6 \\
 12 \overline{)7,362} \\
 \underline{72} \\
 16 \\
 \underline{12} \\
 42 \\
 \underline{36}
 \end{array}$$

$86 \overline{)5,762} \text{ R}7$

$$\begin{array}{r}
 67 \\
 86 \overline{)5,762} \\
 \underline{516} \\
 602 \\
 \underline{602}
 \end{array}$$

③ $25 \overline{)2,550}$

$$\begin{array}{r}
 102 \\
 25 \overline{)2,550} \\
 \underline{50} \\
 50 \\
 \underline{50}
 \end{array}$$

$79 \overline{)4,424} \text{ R}56$

$$\begin{array}{r}
 56 \\
 79 \overline{)4,424} \\
 \underline{395} \\
 474 \\
 \underline{474}
 \end{array}$$

$80 \overline{)9,050} \text{ R}10$

$$\begin{array}{r}
 113 \text{ R}10 \\
 80 \overline{)9,050} \\
 \underline{80} \\
 105 \\
 \underline{80} \\
 250 \\
 \underline{240}
 \end{array}$$

$29 \overline{)3,016} \text{ R}16$

$$\begin{array}{r}
 104 \\
 29 \overline{)3,016} \\
 \underline{29} \\
 116 \\
 \underline{116}
 \end{array}$$

④ $42 \overline{)1,260}$

$$\begin{array}{r}
 30 \\
 42 \overline{)1,260} \\
 \underline{126}
 \end{array}$$

$92 \overline{)5,245} \text{ R}1$

$$\begin{array}{r}
 57 \text{ R}1 \\
 92 \overline{)5,245} \\
 \underline{460} \\
 645 \\
 \underline{644}
 \end{array}$$

$32 \overline{)2,576} \text{ R}16$

$$\begin{array}{r}
 80 \text{ R}16 \\
 32 \overline{)2,576} \\
 \underline{320} \\
 176 \\
 \underline{160}
 \end{array}$$

$35 \overline{)1,470}$

$$\begin{array}{r}
 42 \\
 35 \overline{)1,470} \\
 \underline{140} \\
 70
 \end{array}$$

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Dividing Whole Numbers

43

- ★ Dividing without leaving a remainder can result in a decimal quotient.

$$5652 \div 24 = ?$$

$$5652 \div 24 = 235.5$$

$$\begin{array}{r} 235.5 \\ 24 \overline{)5652.0} \\ \underline{48} \\ 85 \\ \underline{72} \\ 132 \\ \underline{120} \\ 120 \\ \underline{120} \\ 0 \end{array}$$

Divide.

$$\textcircled{1} \quad \begin{array}{r} 10,566.8 \\ 5 \overline{)52,834} \\ \underline{25} \\ 23 \\ \underline{30} \\ 34 \\ \underline{30} \\ 40 \end{array}$$

$$\begin{array}{r} 1,633 \\ 8 \overline{)13,064} \\ \underline{8} \\ 50 \\ \underline{48} \\ 26 \\ \underline{24} \\ 24 \end{array}$$

$$\begin{array}{r} 24,690.5 \\ 4 \overline{)98,762.0} \\ \underline{8} \\ 18 \\ \underline{16} \\ 27 \\ \underline{24} \\ 36 \end{array}$$

$$\begin{array}{r} 3,063.75 \\ 12 \overline{)36,765} \\ \underline{72} \\ 45 \\ \underline{36} \\ 90 \\ \underline{84} \\ 60 \end{array}$$

$$\textcircled{2} \quad \begin{array}{r} 3,239.75 \\ 16 \overline{)51,836} \end{array}$$

$$\begin{array}{r} 2,928.4 \\ 25 \overline{)73,210} \end{array}$$

$$\begin{array}{r} 948.75 \\ 20 \overline{)18,975} \end{array}$$

$$\begin{array}{r} 234 \\ 47 \overline{)10,998} \end{array}$$

$$\textcircled{3} \quad \begin{array}{r} 2,389.2 \\ 35 \overline{)83,622} \end{array}$$

$$\begin{array}{r} 2,339.5 \\ 32 \overline{)74,864} \end{array}$$

$$\begin{array}{r} 909.8 \\ 75 \overline{)68,235} \end{array}$$

$$\begin{array}{r} 145.2 \\ 95 \overline{)13,794} \end{array}$$

Solve.

- ④ The 18 classes at Pearson School collected \$24,830 in a fund-raising drive. On average, how much money was collected by each class?

$$\$ 24,830 \div 18 = 18 \overline{)24,830} \quad \begin{array}{r} 1,379.44 \end{array}$$

\therefore \$1,379.44 was the average amount collected per class

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Dividing Decimals

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★ Place the decimal point in the quotient above the decimal point in the dividend.

$$\begin{array}{r}
 2.05 \\
 8 \overline{)16.40} \\
 \underline{16} \\
 040 \\
 \underline{40} \\
 0
 \end{array}$$

Divide.

① $9 \overline{)36.81} \quad \begin{array}{r} 4.09 \\ \hline \end{array}$

$6 \overline{)30.42} \quad \begin{array}{r} 5.07 \\ \hline \end{array}$

$8 \overline{)64.32} \quad \begin{array}{r} 8.04 \\ \hline \end{array}$

$4 \overline{)500.20} \quad \begin{array}{r} 125.05 \\ \hline 4 \\ 10 \\ 20 \end{array}$

② $5 \overline{)125.45} \quad \begin{array}{r} 25.09 \\ \hline \end{array}$

$12 \overline{)672.24} \quad \begin{array}{r} 56.02 \\ \hline 60 \\ 72 \end{array}$

$18 \overline{)666.72} \quad \begin{array}{r} 37.04 \\ \hline \end{array}$

$42 \overline{)546.84} \quad \begin{array}{r} 13.02 \\ \hline \end{array}$

③ $14 \overline{)171.50} \quad \begin{array}{r} 12.25 \\ \hline \end{array}$

$35 \overline{)551.25} \quad \begin{array}{r} 15.75 \\ \hline \end{array}$

$72 \overline{)406.80} \quad \begin{array}{r} 5.65 \\ \hline \end{array}$

$16 \overline{)341.60} \quad \begin{array}{r} 21.35 \\ \hline \end{array}$

Solve.

④ All twelve members of the DiMarco family decided to buy a go-cart and split the cost. If the go-cart costs \$790.20, how much will each family member have to spend?

$$\$790.20 \div 12 \text{ people} = 12 \overline{)790.20} \quad \begin{array}{r} 65.85 \\ \hline \end{array}$$

∴ the cost is \$65.85 per person

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Dividing Decimals

45

✪ If both divisor and dividend are decimals, count the number of decimal places in the divisor. Move the decimal points in both divisor and dividend that many places to the left.

Then place the decimal point in the quotient above the decimal point in the dividend.

$$8.5 \overline{)19.55} \qquad 85 \overline{)195.5}$$

$$\begin{array}{r} 2.3 \\ 85 \overline{)195.5} \\ \underline{170} \\ 255 \\ \underline{255} \\ 0 \end{array}$$

Divide.

① $5.3 \overline{)34.45}$ (Handwritten: $5.3 \overline{)34.45}$ with 6.5 above)

$7.8 \overline{)98.28}$ (Handwritten: $7.8 \overline{)98.28}$ with 12.6 above)

$3.9 \overline{)99.84}$ (Handwritten: $3.9 \overline{)99.84}$ with 25.6 above)

$6.7 \overline{)97.15}$ (Handwritten: $6.7 \overline{)97.15}$ with 14.5 above)

② $12.5 \overline{)320.0}$ (Handwritten: $12.5 \overline{)320.0}$ with 25.6 above)

$18.6 \overline{)842.58}$ (Handwritten: $18.6 \overline{)842.58}$ with 45.3 above)

$11.2 \overline{)512.96}$ (Handwritten: $11.2 \overline{)512.96}$ with 45.8 above)

$25.5 \overline{)471.75}$ (Handwritten: $25.5 \overline{)471.75}$ with 18.5 above)

③ $36.3 \overline{)958.32}$ (Handwritten: $36.3 \overline{)958.32}$ with 26.4 above)

$68.4 \overline{)861.84}$ (Handwritten: $68.4 \overline{)861.84}$ with 12.6 above)

$27.3 \overline{)431.34}$ (Handwritten: $27.3 \overline{)431.34}$ with 15.8 above)

$10.6 \overline{)334.96}$ (Handwritten: $10.6 \overline{)334.96}$ with 31.6 above)

Solve.

④ A garden 39.2 meters wide is being divided into sections 5.6 meters wide. How many sections will there be?

$39.2 \text{ m} \div 5.6 \text{ m} = 5.6 \overline{)39.2} \rightarrow 7 \text{ sections}$
(Handwritten: $39.2 \text{ m} \div 5.6 \text{ m} = 5.6 \overline{)39.2} \rightarrow 7 \text{ sections}$ with "Section" written below the divisor)

⑤ Steve is cutting a 190.4 meter rope into pieces 1.4 meters long. How many pieces will he have?

$190.4 \text{ m} \div 1.4 \text{ m} = 1.4 \overline{)190.4} \rightarrow 136 \text{ pieces}$
(Handwritten: $190.4 \text{ m} \div 1.4 \text{ m} = 1.4 \overline{)190.4} \rightarrow 136 \text{ pieces}$ with "piece" written below the divisor)

Name _____ Date _____

Negative Numbers: \times and \div

Multiplication
 Pos \times Pos = Pos
 Pos \times Neg = Neg
 Neg \times Neg = Pos

Division
 Pos \div Pos = Pos
 Pos \div Neg = Neg
 Neg \div Neg = Pos

Solve.

① $5 \times (-9) = \underline{-45}$

② $-7 \times (-7) = \underline{49}$

③ $-100 \div (-2) = \underline{50}$

④ $-1 \div (-2) = \underline{0.5 \text{ or } \frac{1}{2}}$

⑤ $-4 \times 5 = \underline{-20}$

⑥ $-10 \div 5 = \underline{-2}$

⑦ $-4 \times 6 = \underline{-24}$

⑧ $12 \div (-12) = \underline{-1}$

⑨ $-8 \times (-6) = \underline{48}$

⑩ $-20 \div (-4) = \underline{5}$

⑪ $-5 \times 5 \times (-10) = \underline{250}$

⑫ $6 \times (-10) \times (-2) \times (-1) = \underline{-120}$

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Dividing Integers

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★ When dividing integers, keep these rules in mind:

If both the dividend and divisor are positive, the quotient will be positive.

$$+56 \div +7 = +8$$

If both the dividend and divisor are negative, the quotient will be positive.

$$-56 \div -7 = +8$$

If either the dividend or divisor is negative and the other is positive, the quotient will be negative.

$$+56 \div -7 = -8$$

Divide.

① $+32 \div +8 = 4$

$-72 \div +9 = -8$

$-64 \div -8 = 8$

② $+108 \div -7.2 = -15$

$-56.61 \div -3.7 = 15.3$

$+598.5 \div +7 = 85.5$

③ $-658.98 \div -52.3 = 12.6$

$-779.16 \div +17.2 = -45.3$

$+387.60 \div +8.5 = 45.6$

④ $-803.66 \div +14.3 = -56.2$

$+559.18 \div +38.3 = 14.6$

$-969.44 \div -66.4 = 14.6$

⑤ $+144 \div -12 = -12$

$+396.9 \div -16.2 = -24.5$

$-326.5 \div +5 = -65.3$

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Inverse Relationships

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★ Multiplication and division are inverse operations. They can be used to check each other.

To check multiplication, divide the product by either of the factors. If the quotient matches the other factor, your answer is correct.

To check division, multiply the quotient by the divisor and add the remainder. This result should match the dividend.

$63 \times 385 = 24,255$

$$\begin{array}{r} 385 \\ 63 \overline{)24,255} \\ \underline{-189} \\ 535 \\ \underline{-504} \\ 315 \\ \underline{-315} \\ 0 \end{array}$$

$3,875 \div 59 = 65 \text{ R}40$

$$\begin{array}{r} 65 \\ \times 59 \\ \hline 585 \\ +3,250 \\ \hline 3,835 \\ + 40 \\ \hline 3,875 \end{array}$$

Find the product or quotient, and then show how to check it.

- | | | |
|---|--|---|
| <p>① $889,185 \div 864 = 1,029 \text{ R}129$
 $\rightarrow 1,029 \cdot 864 + 129$</p> | <p>$346 \times 87 = 30,102$
 $\rightarrow 30,102 \div 87$
 or $30,102 \div 346$</p> | <p>$5,838 \div 29 = 201 \text{ R}9$
 $\rightarrow 201 \cdot 29 + 9$</p> |
| <p>② $272,258 \div 645 = 422 \text{ R}68$
 $\rightarrow 422 \cdot 645 + 68$</p> | <p>$437 \times 76 = 33,212$
 $\rightarrow 33,212 \div 437$
 or $33,212 \div 76$</p> | <p>$7,649 \div 98 = 78 \text{ R}5$
 $\rightarrow 78 \cdot 98 + 5$</p> |
| <p>③ $441,167 \div 426 = 1,035 \text{ R}257$
 $\rightarrow 1,035 \cdot 426 + 257$</p> | <p>$528 \times 45 = 23,760$
 $\rightarrow 23,760 \div 45$
 or $23,760 \div 528$</p> | <p>$9,450 \div 77 = 122 \text{ R}56$
 $\rightarrow 122 \cdot 77 + 56$</p> |
| <p>④ $632,243 \div 287 = 2,202 \text{ R}269$
 $\rightarrow 2,202 \cdot 287 + 269$</p> | <p>$619 \times 34 = 21,046$
 $\rightarrow 21,046 \div 34$
 or $21,046 \div 619$</p> | <p>$1,261 \div 56 = 22 \text{ R}29$
 $\rightarrow 22 \cdot 56 + 29$</p> |
| <p>⑤ $823,431 \div 938 = 877 \text{ R}805$
 $\rightarrow 877 \cdot 938 + 805$</p> | <p>$700 \times 23 = 16,100$
 $\rightarrow 16,100 \div 23$
 or $16,100 \div 700$</p> | <p>$3,072 \div 35 = 87 \text{ R}27$
 $\rightarrow 87 \cdot 35 + 27$</p> |
| <p>⑥ $114,034 \div 759 = 150 \text{ R}184$
 $\rightarrow 150 \cdot 759 + 184$</p> | <p>$891 \times 12 = 10,692$
 $\rightarrow 10,692 \div 12$
 or $10,692 \div 891$</p> | <p>$4,983 \div 14 = 355 \text{ R}13$
 $\rightarrow 355 \cdot 14 + 13$</p> |
| <p>⑦ Show two ways to check the product of $793 \times 85 = 67,405$
 Check: $67,405 \div 793 = 85$ or $67,405 \div 85 = 793$</p> | | |

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Mixed Multiplication and Division Practice

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Find the product or quotient.

$$\textcircled{1} \quad 279,227 \times 38,256 =$$

$$10,682,108,112$$

$$7,458,391 \div 5,659 = 1,317 \text{ R } 5,488$$

$$\textcircled{2} \quad 387,126 \times 29,439 =$$

$$11,396,602,314$$

$$6,458,372 \div 4,658 = 1,386 \text{ R } 2,384$$

$$\textcircled{3} \quad 45,025 \times 1,371 =$$

$$61,729,275$$

$$558,364 \div 357 = 1,564 \text{ R } 16$$

$$\textcircled{4} \quad 501,423 \times 25,173 =$$

$$12,622,321,179$$

$$4,458,353 \div 2,656 = 1,678 \text{ R } 1,585$$

$$\textcircled{5} \quad 61,824 \times 3,245 =$$

$$200,618,880$$

$$458,326 \div 155 = 2,956 \text{ R } 146$$

$$\textcircled{6} \quad 727,423 \times 46,542 =$$

$$33,855,721,266$$

$$3,457,315 \div 9,654 = 358 \text{ R } 1,183$$

$$\textcircled{7} \quad 83,622 \times 57,135 =$$

$$4,777,742,970$$

$$258,387 \div 853 = 302 \text{ R } 781$$

$$\textcircled{8} \quad 945,427 \times 68,192 =$$

$$64,470,557,984$$

$$1,458,395 \div 7,652 = 190 \text{ R } 4,515$$

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Mixed Multiplication and Division Practice

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Is the answer correct? Show your work.

① $9,765 \times 43 < 59,567 \times 34$
Correct

$3,275 \div 137 < 3,725 \div 371$
Incorrect

② $6,973 \times 89 > 6,794 \times 98$
Incorrect

$5,237 \div 267 > 5,327 \div 276$
Correct

③ $5,679 \times 32 < 5,976 \times 23$
Incorrect

$5,578 \div 731 < 4,758 \div 173$
Correct

④ $12,754 \times 58 > 12,457 \times 85$
Incorrect

$6,751 \div 137 > 6,571 \div 371$
Correct

⑤ $6,679 \times 46 < 6,769 \times 64$
Correct

$4,369 \div 458 < 4,963 \div 548$
Incorrect

⑥ $7,246 \times 79 > 5,462 \times 97$
Correct

$5,275 \div 137 > 3,725 \div 371$
Correct

⑦ Explain why division is used to check multiplication problems. Give an example.

Division and multiplication are inverse operations.

$$\frac{6}{3} = 2 \quad 6 = 2 \cdot 3$$

⑧ There are 3,487,215 registered voters in a state. To ensure a good turnout, the state had been divided into 2,555 sections. Each section will have a captain to make sure registered voters come to vote. How many voters are in each section? Show your work.

$$\frac{3,487,215 \text{ voters}}{2,555 \text{ sections}} = 1364 \text{ R } 2195$$

2,555 sections

∵ part of a voter is not possible
∴ 1364 or 1365 voters per section
depending on whether you round up or down