

Fractions to decimals and percentages

Denominators 1 to 12

Sports Application

| Numerator (HITS)->       | <b>0</b> | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> | <b>8</b> | <b>9</b> | <b>10</b> | <b>11</b> | <b>12</b> |
|--------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|
| Denominator<br>(AT BATS) |          |          |          |          |          |          |          |          |          |          |           |           |           |
| <b>1</b>                 | .000     | 1.000    |          |          |          |          |          |          |          |          |           |           |           |
| <b>2</b>                 | .000     | .500     | 1.000    |          |          |          |          |          |          |          |           |           |           |
| <b>3</b>                 | .000     | .333     | .667     | 1.000    |          |          |          |          |          |          |           |           |           |
| <b>4</b>                 | .000     | .250     | .500     | .750     | 1.000    |          |          |          |          |          |           |           |           |
| <b>5</b>                 | .000     | .200     | .400     | .600     | .800     | 1.000    |          |          |          |          |           |           |           |
| <b>6</b>                 | .000     | .167     | .333     | .500     | .667     | .833     | 1.000    |          |          |          |           |           |           |
| <b>7</b>                 | .000     | .143     | .286     | .429     | .571     | .714     | .857     | 1.000    |          |          |           |           |           |
| <b>8</b>                 | .000     | .125     | .250     | .375     | .500     | .625     | .750     | .875     | 1.000    |          |           |           |           |
| <b>9</b>                 | .000     | .111     | .222     | .333     | .444     | .556     | .667     | .778     | .889     | 1.000    |           |           |           |
| <b>10</b>                | .000     | .100     | .200     | .300     | .400     | .500     | .600     | .700     | .800     | .900     | 1.000     |           |           |
| <b>11</b>                | .000     | .091     | .182     | .273     | .364     | .455     | .545     | .636     | .727     | .818     | .909      | 1.000     |           |
| <b>12</b>                | .000     | .083     | .167     | .250     | .333     | .417     | .500     | .583     | .667     | .750     | .833      | .916      | 1.000     |

FRACTIONS TO DECIMALS, SHOWING REPEATING DECIMALS.

| Num.->    | 0    | 1  | 2              | 3              | 4              | 5              | 6              | 7           | 8          | 9          | 10         | 11          | 12    |
|-----------|------|--|----------------|----------------|----------------|----------------|----------------|-------------|------------|------------|------------|-------------|-------|
| Denom.    |      |  |                |                |                |                |                |             |            |            |            |             |       |
|           |      | <i>Examples: <math>\underline{.3} = .333333</math> etc.    <math>\underline{.16} = .166666</math> etc.    <math>\underline{.09} = .090909</math> etc.    <math>\underline{.142857} = .142857142857142857</math> etc.</i> |                |                |                |                |                |             |            |            |            |             |       |
| <b>1</b>  | .000 | 1.000  |                |                |                |                |                |             |            |            |            |             |       |
| <b>2</b>  | .000 | .500   | 1.000          |                |                |                |                |             |            |            |            |             |       |
| <b>3</b>  | .000 | <u>.3</u>  | <u>.6</u>      | 1.000          |                |                |                |             |            |            |            |             |       |
| <b>4</b>  | .000 | .250   | .500           | .750           | 1.000          |                |                |             |            |            |            |             |       |
| <b>5</b>  | .000 | .200   | .400           | .600           | .800           | 1.000          |                |             |            |            |            |             |       |
| <b>6</b>  | .000 | <u>.16</u>   | <u>.3</u>      | .500           | <u>.6</u>      | <u>.83</u>     | 1.000          |             |            |            |            |             |       |
| <b>7</b>  | .000 | <u>.142857</u>   | <u>.285714</u> | <u>.428571</u> | <u>.571428</u> | <u>.714285</u> | <u>.857142</u> | 1.000       |            |            |            |             |       |
| <b>8</b>  | .000 | .125   | .250           | .375           | .500           | .625           | .750           | .875        | 1.000      |            |            |             |       |
| <b>9</b>  | .000 | <u>.1</u>  | <u>.2</u>      | <u>.3</u>      | <u>.4</u>      | <u>.5</u>      | <u>.6</u>      | <u>.7</u>   | <u>.8</u>  | 1.000      |            |             |       |
| <b>10</b> | .000 | .100   | .200           | .300           | .400           | .500           | .600           | .700        | .800       | .900       | 1.000      |             |       |
| <b>11</b> | .000 | <u>.09</u>   | <u>.18</u>     | <u>.27</u>     | <u>.36</u>     | <u>.45</u>     | <u>.54</u>     | <u>.63</u>  | <u>.72</u> | <u>.81</u> | <u>.90</u> | 1.000       |       |
| <b>12</b> | .000 | <u>.083</u>  | <u>.16</u>     | .250           | <u>.3</u>      | <u>.416</u>    | .500           | <u>.583</u> | <u>.6</u>  | .750       | <u>.83</u> | <u>.916</u> | 1.000 |

**BASEBALL BATTING AVERAGES**

Batting average = hits/"at bats"

BASEBALL USES A THREE PLACE DECIMAL SYSTEM. "THOUSANDTHS" IS UNDERSTOOD. Ex. ".333" means 0.333

Example: 6 at bats

|  |          |       |
|--|----------|-------|
| A baseball player gets a hit at his very first at bat. Now he's batting? | Fraction | 1.000 |
| At his next at bat, he makes an out. Now's he's batting?                 | $1/2 =$  | .500  |
| At his next at bat, he makes an out. Now's he's batting?                 | $1/3 =$  | .333  |
| At his next at bat, he makes an out. Now's he's batting?                 | $1/4 =$  | .250  |
| At his next at bat, he makes an out. Now's he's batting?                 | $1/5 =$  | .200  |
| At his next at bat, he makes an out. Now's he's batting?                 | $1/6 =$  | .167  |

Try this again with 7 - 12 other at bats, changing what happens at the plate.

**EARNED RUN AVERAGES**

BASEBALL PITCHERS ARE COMPARED BY THEIR EARNED RUN AVERAGES, or ERA, expressed as a decimal.

The average is based on how many earned runs a pitcher gives up per 9 innings pitched.

ERA = number of earned runs allowed times 9 divided by total innings pitched.

ERAs are usually rounded to either the nearest hundredth or the nearest tenth.

Examples:

Clay pitches 6 innings and allows 3 earned runs. What is his ERA?

$$\text{ERA} = \text{E.R.} \times 9 / \text{I.P.}$$

$$\text{ERA} = 3 \times 9 / 6$$

$$\text{ERA} = 4.5$$

Pedro pitches 45 innings, allows 11 earned runs. What is his ERA to the nearest hundredth?

$$\text{ERA} = \text{E.R.} \times 9 / \text{I.P.}$$

$$\text{ERA} = 11 \times 9 / 45$$

$$\text{ERA} = 2 \frac{1}{9}$$

$$\text{ERA} = 2.11$$

**BASKETBALL** USES PERCENTAGES, sometimes rounded to the nearest tenth of one percent.

|   |           |        |
|---|-----------|--------|
| A basketball player makes her first three foul shots ("free throws"). What is her " <b>free throw percentage</b> "? |           | 100%   |
| At her next trip to the foul line, she misses. Now what is her free throw % ?                                       | $3/4 =$   | 75%    |
| At her next trip to the foul line, she misses. Now what is her free throw % ?                                       | $3/5 =$   | 60%    |
| At her next trip to the foul line, she makes it. Now what is her free throw % ?                                     | $4/6 =$   | 66.7%  |
| At her next trip to the foul line, she makes it. Now what is her free throw % ?                                     | $5/7 =$   | 71.4%  |
| At her next trip to the foul line, she misses. Now what is her free throw % ?                                       | $5/8 =$   | 62.5%  |
| At her next trip to the foul line, she misses. Now what is her free throw % ?                                       | $5/9 =$   | 55.6%  |
| At her next trip to the foul line, she makes it. Now what is her free throw % ?                                     | $6/10 =$  | 60%    |
| At her next trip to the foul line, she makes it. Now what is her free throw % ?                                     | $7/11 =$  | 63.6%  |
| At her next trip to the foul line, she misses. Now what is her free throw % ?                                       | $7/12 =$  | 58.3 % |
| She makes all of her next 8 attempts. Now what is her free throw % ?  | $15/20 =$ | 75%    |

Try this again, changing what happens at the free throw line.

**FOOTBALL** USES PERCENTAGES, sometimes rounded to the nearest tenth of one percent.

|  |           |     |
|--|-----------|-----|
| A <b>QUARTERBACK</b> completes 2 of his first 5 pass attempts? What is his pass completion percentage? | $2/5 =$   | 40% |
| He completes 3 of his next 5 passes. Now what is his passing percentage?                               | $5/10 =$  | 50% |
| He completes 1 of his next 5 passes. Now what is his passing percentage?                               | $6/15 =$  | 40% |
| He completes all of his next 5 passes. Now what is his passing percentage?                             | $11/20 =$ | 55% |

Try this again, changing what happens on the field.

A **RUNNING BACK** runs ("rushes") the ball 12 times and gains 50 yards. What is his rushing average?

Rushing Average = total yards/times carrying the ball

$$\begin{aligned}
 \text{Rushing Average} &= \text{Yds/Carry} \\
 &= 50 / 12 \\
 &= 4 \frac{1}{6} \\
 &= 4.167 \text{ yards per carry}
 \end{aligned}$$