Solving Trig with a Table of Values

If you have a table with the values of each of the three trig ratios from 1˚ – 89˚, then you can use substitution to determine the value of any angle or side in a trigonometric problem. Simply look up the angle or value of the fraction that is closest to what you have, and substitute that value in the problem.

|  |  |  |
| --- | --- | --- |
| **EXAMPLE**  Determine | 1. Determine . | 2. Determine . |
| **EXAMPLE**  Determine | 3. Determine . | 4. Determine . |
| **EXAMPLE**  Determine  *First, write the fraction as a decimal.*    *Look down the trig table for the two tan decimals that 0.7778 is* ***between****.*    0.7778 is between 0.7536 & 0.7813…  *Figure out which one is closer (line up the last digit and ignore the decimal).*  **.7536**  *difference:* 7778-7536 = **242**  **.7778**  *difference:* 7813-7778 **= 35**  **.7813**  *7778 is closer to 7813, which means that is closer to 38˚ than 37˚.*  *So…* | 5. Determine | 6. Determine |
| **EXAMPLE**  Determine  *Write as a rounded decimal (4places).*  *0.2667 is between what cos values?*    0.2667 is between 0.2756 & 0.2588…  *Figure out which one is closer.*  **.2756**  *difference:* 2756-2667 = **89**  **.2667**  *difference:* 2667-2588 **= 79**  **.2588**  *2667 is closer to 2588, which means is closer to 75˚ than 74˚.*  *So…* | 7. Determine | 8. Determine |

Now that we know how to determine what the trig equals, it’s time to plug it into an equation and solve it.

|  |  |  |
| --- | --- | --- |
| **EXAMPLE**  Determine the value of *x*. Round to the nearest tenth.  *First, solve for x.*  *Now, look up what equals, and plug it in.* | 9. Determine the value of *x*. Round to the nearest tenth. | 10. Determine the value of *x*. Round to the nearest tenth. |
| **EXAMPLE**  Determine the value of *x*. Round to the nearest tenth. | 11. Determine the value of *x*. Round to the nearest tenth. | 12. Determine the value of *x*. Round to the nearest tenth. |
| **EXAMPLE**  Determine the value of *x*. Round to the nearest tenth. | 13. Determine the value of *x*. Round to the nearest tenth. | 14. Determine the value of *x*. Round to the nearest tenth. |
| **EXAMPLE**  Determine the value of *x*. Round to the nearest degree.  *Get x alone, and write the fraction as a decimal to 4 places.*  *Check the table.*    *Find the closer value…*  ***.6018***  *difference: 6018-6000 =* ***18***  ***.6000***  *difference: 6000-5878 =* ***122***  ***.5878***  *0.6018 is closer, so the angle is 53˚.* | 15. Determine the value of *x*. Round to the nearest degree. | 16. Determine the value of *x*. Round to the nearest degree. |
| **EXAMPLE**  Determine the value of *x*. Round to the nearest degree.  *Solve for x.*    ***.7431***  *difference: 7500-7431 =* ***69***  ***.7500***  *difference: 7547-7500 =* ***47***  ***.7547***  *0.7547 is closer, so the angle is 49˚.* | 17. Determine the value of *x*. Round to the nearest degree. | 18. Determine the value of *x*. Round to the nearest degree. |

Table of Trigonometric Values

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Angle*** | ***Fraction as a decimal*** | | |  | ***Angle*** | ***Fraction as a decimal*** | | |
|  | *sin* A | *cos* A | *tan* A |  |  | *sin* A | *cos* A | *tan* A |
| 1˚ | 0.0175 | 0.9998 | 0.0175 |  | 46˚ | 0.7193 | 0.6947 | 1.0355 |
| 2˚ | 0.0349 | 0.9994 | 0.0349 |  | 47˚ | 0.7314 | 0.6820 | 1.0724 |
| 3˚ | 0.0523 | 0.9986 | 0.0524 |  | 48˚ | 0.7431 | 0.6691 | 1.1106 |
| 4˚ | 0.0698 | 0.9976 | 0.0699 |  | 49˚ | 0.7547 | 0.6561 | 1.1504 |
| 5˚ | 0.0872 | 0.9962 | 0.0875 |  | 50˚ | 0.7660 | 0.6428 | 1.1918 |
|  |  |  |  |  |  |  |  |  |
| 6˚ | 0.1045 | 0.9945 | 0.1051 |  | 51˚ | 0.7771 | 0.6293 | 1.2349 |
| 7˚ | 0.1219 | 0.9925 | 0.1228 |  | 52˚ | 0.7880 | 0.6157 | 1.2799 |
| 8˚ | 0.1392 | 0.9903 | 0.1405 |  | 53˚ | 0.7986 | 0.6018 | 1.3270 |
| 9˚ | 0.1564 | 0.9877 | 0.1584 |  | 54˚ | 0.8090 | 0.5878 | 1.3764 |
| 10˚ | 0.1736 | 0.9848 | 0.1763 |  | 55˚ | 0.8192 | 0.5736 | 1.4281 |
|  |  |  |  |  |  |  |  |  |
| 11˚ | 0.1908 | 0.9816 | 0.1944 |  | 56˚ | 0.8290 | 0.5592 | 1.4826 |
| 12˚ | 0.2079 | 0.9781 | 0.2126 |  | 57˚ | 0.8387 | 0.5446 | 1.5399 |
| 13˚ | 0.2250 | 0.9744 | 0.2309 |  | 58˚ | 0.8480 | 0.5299 | 1.6003 |
| 14˚ | 0.2419 | 0.9703 | 0.2493 |  | 59˚ | 0.8572 | 0.5150 | 1.6643 |
| 15˚ | 0.2588 | 0.9659 | 0.2679 |  | 60˚ | 0.8660 | 0.5000 | 1.7321 |
|  |  |  |  |  |  |  |  |  |
| 16˚ | 0.2756 | 0.9613 | 0.2867 |  | 61˚ | 0.8746 | 0.4848 | 1.8040 |
| 17˚ | 0.2924 | 0.9563 | 0.3057 |  | 62˚ | 0.8829 | 0.4695 | 1.8807 |
| 18˚ | 0.3090 | 0.9511 | 0.3249 |  | 63˚ | 0.8910 | 0.4540 | 1.9626 |
| 19˚ | 0.3256 | 0.9455 | 0.3443 |  | 64˚ | 0.8988 | 0.4384 | 2.0503 |
| 20˚ | 0.3420 | 0.9397 | 0.3640 |  | 65˚ | 0.9063 | 0.4226 | 2.1445 |
|  |  |  |  |  |  |  |  |  |
| 21˚ | 0.3584 | 0.9336 | 0.3839 |  | 66˚ | 0.9135 | 0.4067 | 2.2460 |
| 22˚ | 0.3746 | 0.9272 | 0.4040 |  | 67˚ | 0.9205 | 0.3907 | 2.3559 |
| 23˚ | 0.3907 | 0.9205 | 0.4245 |  | 68˚ | 0.9272 | 0.3746 | 2.4751 |
| 24˚ | 0.4067 | 0.9135 | 0.4452 |  | 69˚ | 0.9336 | 0.3584 | 2.6051 |
| 25˚ | 0.4226 | 0.9063 | 0.4663 |  | 70˚ | 0.9397 | 0.3420 | 2.7475 |
|  |  |  |  |  |  |  |  |  |
| 26˚ | 0.4384 | 0.8988 | 0.4877 |  | 71˚ | 0.9455 | 0.3256 | 2.9042 |
| 27˚ | 0.4540 | 0.8910 | 0.5095 |  | 72˚ | 0.9511 | 0.3090 | 3.0777 |
| 28˚ | 0.4695 | 0.8829 | 0.5317 |  | 73˚ | 0.9563 | 0.2924 | 3.2709 |
| 29˚ | 0.4848 | 0.8746 | 0.5543 |  | 74˚ | 0.9613 | 0.2756 | 3.4874 |
| 30˚ | 0.5000 | 0.8660 | 0.5774 |  | 75˚ | 0.9659 | 0.2588 | 3.7321 |
|  |  |  |  |  |  |  |  |  |
| 31˚ | 0.5150 | 0.8572 | 0.6009 |  | 76˚ | 0.9703 | 0.2419 | 4.0108 |
| 32˚ | 0.5299 | 0.8480 | 0.6249 |  | 77˚ | 0.9744 | 0.2250 | 4.3315 |
| 33˚ | 0.5446 | 0.8387 | 0.6494 |  | 78˚ | 0.9781 | 0.2079 | 4.7046 |
| 34˚ | 0.5592 | 0.8290 | 0.6745 |  | 79˚ | 0.9816 | 0.1908 | 5.1446 |
| 35˚ | 0.5736 | 0.8192 | 0.7002 |  | 80˚ | 0.9848 | 0.1736 | 5.6713 |
|  |  |  |  |  |  |  |  |  |
| 36˚ | 0.5878 | 0.8090 | 0.7265 |  | 81˚ | 0.9877 | 0.1564 | 6.3138 |
| 37˚ | 0.6018 | 0.7986 | 0.7536 |  | 82˚ | 0.9903 | 0.1392 | 7.1154 |
| 38˚ | 0.6157 | 0.7880 | 0.7813 |  | 83˚ | 0.9925 | 0.1219 | 8.1443 |
| 39˚ | 0.6293 | 0.7771 | 0.8098 |  | 84˚ | 0.9945 | 0.1045 | 9.5144 |
| 40˚ | 0.6428 | 0.7660 | 0.8391 |  | 85˚ | 0.9962 | 0.0872 | 11.4301 |
|  |  |  |  |  |  |  |  |  |
| 41˚ | 0.6561 | 0.7547 | 0.8693 |  | 86˚ | 0.9976 | 0.0698 | 14.3007 |
| 42˚ | 0.6691 | 0.7431 | 0.9004 |  | 87˚ | 0.9986 | 0.0523 | 19.0811 |
| 43˚ | 0.6820 | 0.7314 | 0.9325 |  | 88˚ | 0.9994 | 0.0349 | 28.6363 |
| 44˚ | 0.6947 | 0.7193 | 0.9657 |  | 89˚ | 0.9998 | 0.0175 | 57.2900 |
| 45˚ | 0.7071 | 0.7071 | 1.0000 |  |  |  |  |  |