Finding Distance with the Pythagorean Theorem

Models and mappings

Name _____ **Date** _____ **Score** _____ / 6

QUICK REVIEW

Between (x_1, y_1) and (x_2, y_2), horizontal and vertical changes are $\Delta x = x_2 - x_1$ and $\Delta y = y_2 - y_1$. These form perpendicular legs, so $d = \sqrt{(\Delta x)^2 + (\Delta y)^2}$. Subtract negative coordinates carefully. A horizontal or vertical segment needs only one absolute difference. Multiply the final grid distance by the map scale, and round only the final length.

Worked example

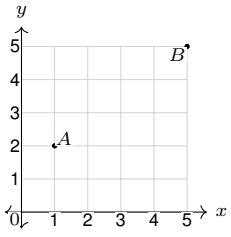
Find the distance from $E(-2, 1)$ to $F(3, 4)$. Give an exact value; round nonintegers to the nearest tenth.

1. The coordinate changes are $\Delta x = 3 - (-2) = 5$ and $\Delta y = 4 - (1) = 3$. They form perpendicular legs on the grid.
2. At 1 units per grid step, $d^2 = 1^2[(5)^2 + (3)^2] = 34$ square units. This scales both perpendicular lengths before squaring.
3. Take the positive root: $d = \sqrt{34} \approx 5.8$ units. Negative coordinate changes do not make the distance negative; round only this final length.
Answer: $\sqrt{34} \approx 5.8$ units

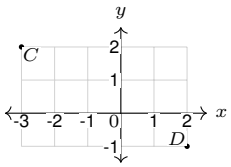
Practice Problems

Show your thinking.

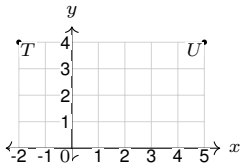
1. Find the length from $A(1, 2)$ to $B(5, 5)$. Give an exact value; round nonintegers to the nearest tenth.



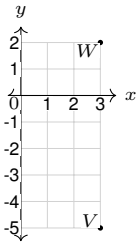
2. Find the distance from $C(-3, 2)$ to $D(2, -1)$. Give an exact value; round nonintegers to the nearest tenth.



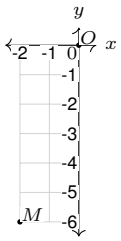
3. Find the distance between $T(-2, 4)$ and $U(5, 4)$. Give an exact value; round nonintegers to the nearest tenth.



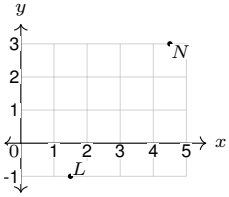
4. Find VW when $V(3, -5), W(3, 2)$. Give an exact value; round nonintegers to the nearest tenth.



5. Find the distance from the origin to $M(-2, -6)$. Give an exact value; round nonintegers to the nearest tenth.



6. Find the straight-line distance from $L(1.5, -1)$ to $N(4.5, 3)$. Give an exact value; round nonintegers to the nearest tenth.



Answer Key

1. 5 units
2. $\sqrt{34} \approx 5.8$ units
3. 7 units
4. 7 units
5. $\sqrt{40} \approx 6.3$ units
6. 5 units

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The coordinate changes are $\Delta x = 5 - (1) = 4$ and $\Delta y = 5 - (2) = 3$. They form perpendicular legs on the grid.
2. At 1 units per grid step, $d^2 = 1^2[(4)^2 + (3)^2] = 25$ square units. This scales both perpendicular lengths before squaring.
3. Take the positive root: $d = 5$ units. Negative coordinate changes do not make the distance negative; round only this final length.

Problem 2

1. The coordinate changes are $\Delta x = 2 - (-3) = 5$ and $\Delta y = -1 - (2) = -3$. They form perpendicular legs on the grid.
2. At 1 units per grid step, $d^2 = 1^2[(5)^2 + (-3)^2] = 34$ square units. This scales both perpendicular lengths before squaring.
3. Take the positive root: $d = \sqrt{34} \approx 5.8$ units. Negative coordinate changes do not make the distance negative; round only this final length.

Problem 3

1. The coordinate changes are $\Delta x = 5 - (-2) = 7$ and $\Delta y = 4 - (4) = 0$. They form perpendicular legs on the grid.
2. At 1 units per grid step, $d^2 = 1^2[(7)^2 + (0)^2] = 49$ square units. This scales both perpendicular lengths before squaring.
3. Take the positive root: $d = 7$ units. Negative coordinate changes do not make the distance negative; round only this final length.

Problem 4

1. The coordinate changes are $\Delta x = 3 - (3) = 0$ and $\Delta y = 2 - (-5) = 7$. They form perpendicular legs on the grid.
2. At 1 units per grid step, $d^2 = 1^2[(0)^2 + (7)^2] = 49$ square units. This scales both perpendicular lengths before squaring.
3. Take the positive root: $d = 7$ units. Negative coordinate changes do not make the distance negative; round only this final length.

Problem 5

1. The coordinate changes are $\Delta x = -2 - (0) = -2$ and $\Delta y = -6 - (0) = -6$. They form perpendicular legs on the grid.
2. At 1 units per grid step, $d^2 = 1^2[(-2)^2 + (-6)^2] = 40$ square units. This scales both perpendicular lengths before squaring.
3. Take the positive root: $d = \sqrt{40} \approx 6.3$ units. Negative coordinate changes do not make the distance negative; round only this final length.

Problem 6

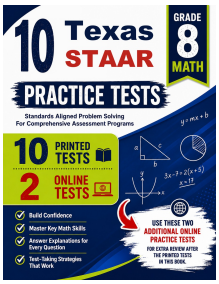
1. The coordinate changes are $\Delta x = 4.5 - (1.5) = 3.0$ and $\Delta y = 3 - (-1) = 4$. They form perpendicular legs on the grid.
2. At 1 units per grid step, $d^2 = 1^2[(3.0)^2 + (4)^2] = 25$ square units. This scales both perpendicular lengths before squaring.
3. Take the positive root: $d = 5$ units. Negative coordinate changes do not make the distance negative; round only this final length.

TESTINAR

Keep Building Grade 8 Math Skills

Choose the practice book matched to your state assessment and turn worksheet practice into a complete test-prep plan.

All Grade 8 books



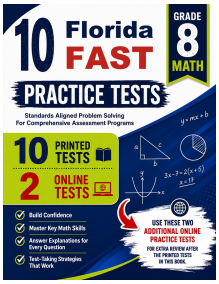
TEXAS STAAR

10 Full-Length Math Practice Tests

Build Grade 8 accuracy, confidence, and test stamina with 10 printable practice tests.

Printable eBook • Instant PDF access

View eBook



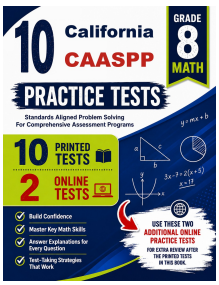
FLORIDA FAST

10 Full-Length Math Practice Tests

Build Grade 8 accuracy, confidence, and test stamina with 10 printable practice tests.

Printable eBook • Instant PDF access

View eBook



CALIFORNIA CAASPP

10 Full-Length Math Practice Tests

Build Grade 8 accuracy, confidence, and test stamina with 10 printable practice tests.

Printable eBook • Instant PDF access

View eBook

Need a different state?
Testinar has Grade 8 math practice books for state assessments across the country.

TESTINAR.COM/GRADES/8