

8<sup>th</sup>  
8 Grade/  
Pre  
algebra  
placement  
test



## Welcome!

Thank you for your interest in Thinkwell. We know the curriculum selection process for your homeschool student can be challenging. This Placement Test was created to provide you with a tool to place your student in the appropriate level of math.

Please keep in mind, no placement test is perfect. If you have questions or concerns about the results of your student's placement test, reach out to us at Thinkwell support: [support@thinkwell.com](mailto:support@thinkwell.com).

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## Instructions and Overview

This placement test consists of 25 free-response questions. There is no time-limit for the test, but it shouldn't take your student longer than an hour to an hour and a half to complete. Your student should work each problem to the best of their ability. If they are unable to answer an item, tell them to move on to the next item and leave the question unanswered.

The 8<sup>th</sup> Grade Math placement test will assess your student's aptitude for the following skill areas:

- Using the order of operations.
- Writing the prime factorization of numbers.
- Finding percents of numbers.
- Finding the measures of central tendency (mean, median, and mode) of data sets.
- Solving one-step and multi-step equations.
- Determining whether two triangles are similar.
- Using the Pythagorean Theorem.
- Identifying the location of points on a coordinate plane.
- Graphing linear functions.
- Identifying and classifying lines, rays, angles, and triangles.
- Using a dilation to enlarge figures.
- Finding the perimeter and area of polygons.
- Finding the volume of cylinders.
- Finding the surface area of pyramids.
- Finding theoretical and experimental probabilities.
- Using a list to find permutations.
- Reading line graphs.
- Using the simple interest formula to calculate interest.

We recommend you **print the question portion of this document (pages 5–7)** so your student can work out the problems with pencil and paper.

Please be aware that **the answer key for this test starts on page 9**. We advise you to share the answer key with your student only after they've completed the test in its entirety.

Instructional videos for all the question items on this test are available by clicking the solution link in the answer key.

Questions? Concerns? Please reach out to us at [support@thinkwell.com](mailto:support@thinkwell.com).

# Thinkwell Placement Test: Grade 8

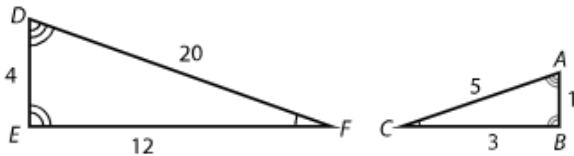
1. Simplify the expression.  
 $12 - 20 \div (5 \cdot 2)$

2. Solve the equation.  
 $\frac{d}{-4} = 3$

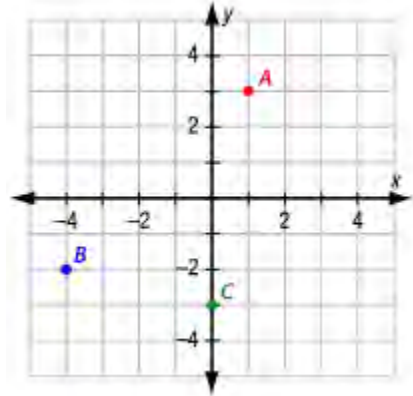
3. Write the prime factorization of 140.

4. Solve the equation.  
 $y - \frac{1}{3} = \frac{7}{12}$

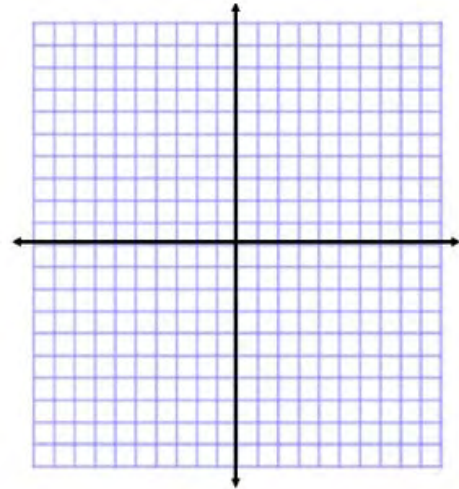
5. Use ratios to determine whether the triangles are similar.



6. Identify the quadrant that contains each point, A, B, and C.



7. Graph the linear function.  
 $y = 3x - 2$

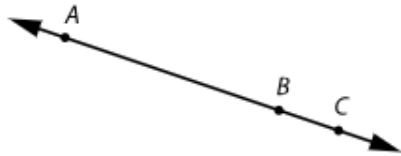


# Thinkwell Placement Test: Grade 8

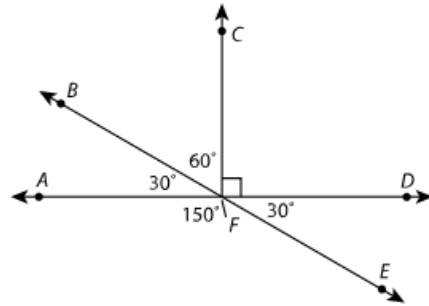
8. Approximately what part of 162 is 90?

9. Find the mean, median, mode, and range of the data set.  
10, 6, 2, 3, 1, 2

10. Use the diagram to give another name for ray  $\overrightarrow{AB}$ .

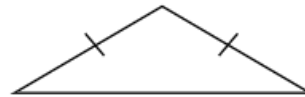


11. Classify each angle as acute, right, obtuse, or straight.



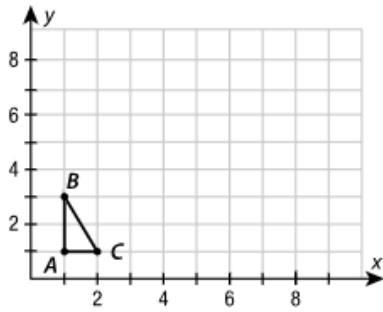
$\angle AFE$	
$\angle BFC$	
$\angle CFD$	
$\angle AFD$	
$\angle AFB$	

12. Classify the triangle according to its sides and angles.

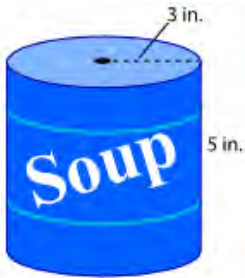


# Thinkwell Placement Test: Grade 8

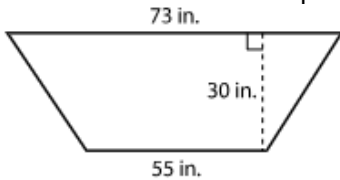
13. Find the vertices of  $\triangle ABC$  after it is dilated by a scale factor of 3.



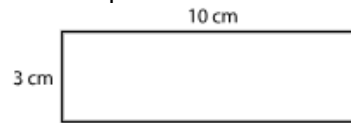
14. A can of soup is shaped like a cylinder. Find its volume to the nearest tenth. Use 3.14 for  $\pi$ .



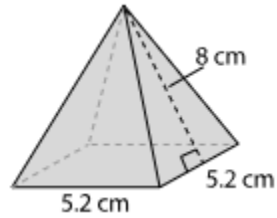
15. What is the area of the trapezoid?



16. Find the perimeter.



17. Find the surface area of the pyramid.



18. Find the probability of the event.  
Write your answer as a fraction, as a decimal, and as a percent.  
Event: drawing one of the 4 L's from a bag of 100 letter tiles

# Thinkwell Placement Test: Grade 8

19. For the past three weeks, Karl has been recording daily high temperatures for a science project. His results are shown in the table.

	Week 1 Temp (°F)	Week 2 Temp (°F)	Week 3 Temp (°F)
Sun	76	72	78
Mon	74	79	76
Tue	79	78	77
Wed	80	79	75
Thu	77	77	79
Fri	76	74	77
Sat	71	73	75

What is the experimental probability that the temperature will be below 74°F on the next day?

20. Olivia needs to complete three chores. She has to clean her room, take out the garbage, and feed the dog. All chores must be completed before she goes to the movies. In how many different orders can she complete her chores?

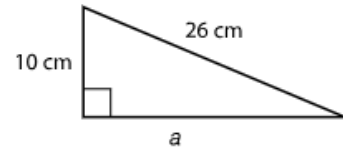
21. Solve the inequality.

$$\frac{x}{2} + 7 < 27$$

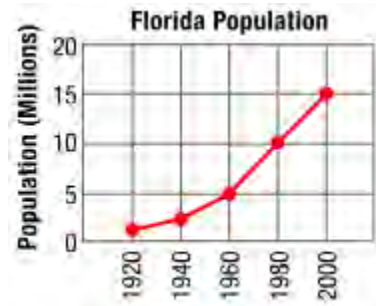
22. Solve the equation.

$$8n + 2 - n = 16$$

23. Use the Pythagorean Theorem to find the missing measure.



24. Use the graph to estimate the population of Florida in 1970.



25. Thurston borrowed \$5,500 from his sister-in-law for 3 years at an annual simple interest rate of 3.5% to buy a car. How much interest will he pay if he pays the entire loan off at the end of the third year?

## Scoring Guide

Use the scoring rubric below to help determine if 8<sup>th</sup> Grade Math is the appropriate course for your student.

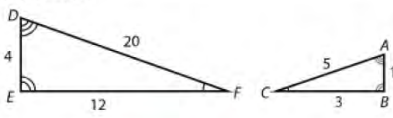
Your placement test score and corresponding course recommendation should not be the only determining factor when deciding the appropriate course for your student. Your student's grade-level experience in previously completed math courses should also be considered.

Please feel free to contact a Thinkwell representative at [support@thinkwell.com](mailto:support@thinkwell.com) if you'd like to discuss your student's course placement in greater detail.

<u>Number of questions correct</u>	<u>Course recommendation</u>
7 or less	7 <sup>th</sup> Grade Math
8 – 20	8 <sup>th</sup> Grade Math
21 or more	Honors 8 <sup>th</sup> Grade Math

See the Answer Key for explanations of all placement test questions. Click the blue video link to view instructional video explanations for all question items.

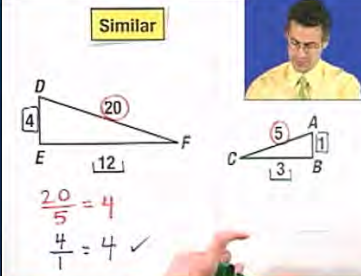
5. Use ratios to determine whether the triangles are similar.



Answer: similar

[View Video Explanation: Similar Figures and Proportions](#)

**Similar**



English Professor Edward Burger

again. Therefore, since all of these ratios are equal, we know that these two triangles are, in fact, similar. They are, in fact, similar.

**Key Objectives**

- Learn to use ratios to determine if two figures are similar.

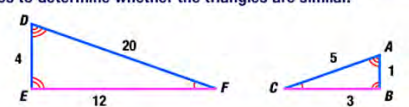
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**Grade 7 Math**

thinkwell

**Determining Whether Two Triangles Are Similar**

Identify the corresponding sides in the pair of triangles. Then use ratios to determine whether the triangles are similar.



$\overline{DF}$  corresponds to  $\overline{AC}$ .  
 $\overline{DE}$  corresponds to  $\overline{AB}$ .  
 $\overline{EF}$  corresponds to  $\overline{BC}$ .

Identify the corresponding sides.

Write ratios using corresponding sides, then substitute the length of the sides and simplify.

$$\frac{DF}{AC} = \frac{20}{5} = 4$$

$$\frac{DE}{AB} = \frac{4}{1} = 4 \checkmark$$

$$\frac{EF}{BC} = \frac{12}{3} = 4 \checkmark$$

**Corresponding angles** are angles of two different polygons that are in the same relative position. Corresponding angles of similar figures are congruent.

**Corresponding sides** are sides of two different polygons that are in the same relative position. Corresponding sides of similar figures have lengths that are proportional.

Wondering about the difference between 8<sup>th</sup> Grade Math and Honors 8<sup>th</sup> Grade Math? Read on to learn more.



## Regular 8<sup>th</sup> Grade Math vs Honors 8<sup>th</sup> Grade Math

Honors 8<sup>th</sup> Grade Math is a faster-paced, more rigorous course than our standard 8<sup>th</sup> Grade Math course. Both courses will prepare your student for success in Algebra 1 and beyond; however, if you anticipate your student going on to higher level mathematics, like Precalculus or Calculus, the Honors sequence will benefit your student. In brief:

- The content in Honors 8<sup>th</sup> Grade Math covers a greater scope and includes more advanced concepts than the standard 8<sup>th</sup> Grade Math.
- Each of the 114 daily lessons in Honors 8<sup>th</sup> Grade Math includes an average of 8 minutes of video content, while each of the 93 daily lessons in the standard 8<sup>th</sup> Grade Math includes an average of 6 minutes of video content.
- The assessments in Honors 8<sup>th</sup> Grade Math provide students with questions that are a higher level of difficulty than those in the standard 8<sup>th</sup> Grade Math.

answer  
key



# Thinkwell Placement Test Answer Key: Grade 8

1. Simplify the expression.  
 $12 - 20 \div (5 \cdot 2)$

Answer: 10

View Video Explanation: [Order of Operations](#)

2. Solve the equation.

$$\frac{d}{-4} = 3$$

Answer: -12

View Video Explanation: [Solving Equations Containing Integers](#)

3. Write the prime factorization of 140.

Answer:  $2^2 \cdot 5 \cdot 7$

View Video Explanation: [Prime Factorization](#)

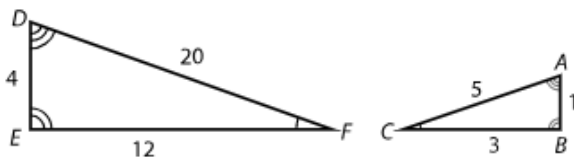
4. Solve the equation.

$$y - \frac{1}{3} = \frac{7}{12}$$

Answer: 11/12

View Video Explanation: [Solving Equations with Rational Numbers](#)

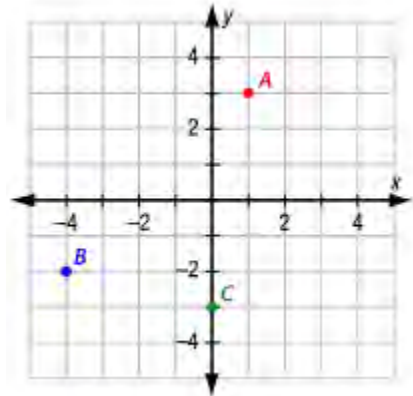
5. Use ratios to determine whether the triangles are similar.



Answer: similar

View Video Explanation: [Similar Figures and Proportions](#)

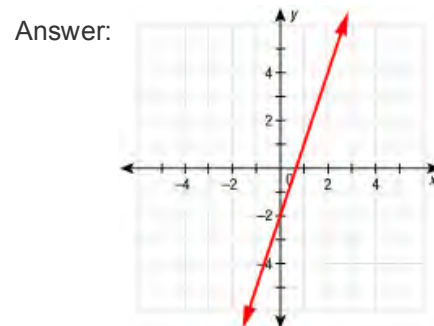
6. Identify the quadrant that contains each point, A, B, and C.



Answer: A lies in Quadrant I.  
B lies in Quadrant III.  
C lies on the y-axis.

View Video Explanation: [The Coordinate Plane](#)

7. Graph the linear function.  
 $y = 3x - 2$



View Video Explanation: [Graphing Linear Functions](#)

8. Approximately what part of 162 is 90?

Answer: 56%

View Video Explanation: [Finding Percents](#)

# Thinkwell Placement Test Answer Key: Grade 8

9. Find the mean, median, mode, and range of the data set.  
10, 6, 2, 3, 1, 2

Answer: mean = 4  
median = 2.5  
mode = 2  
range = 9

View Video Explanation: [Mean, Median, Mode, and Range](#)

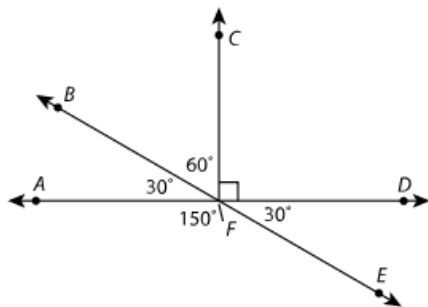
10. Use the diagram to give another name for ray  $\overrightarrow{AB}$ .



Answer:  $\overrightarrow{AC}$

View Video Explanation: [Points, Lines, and Planes](#)

11. Classify each angle as acute, right, obtuse, or straight.

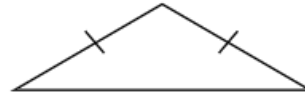


Answer:

$\angle AFE$	obtuse
$\angle BFC$	acute
$\angle CFD$	right
$\angle AFD$	straight
$\angle AFB$	acute

View Video Explanation: [Angles and Their Relationships](#)

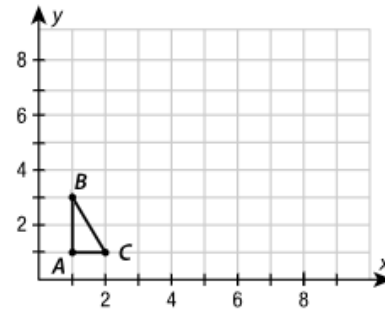
12. Classify the triangle according to its sides and angles.



Answer: isosceles obtuse triangle

View Video Explanation: [Classifying Triangles](#)

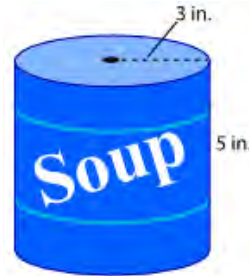
13. Find the vertices of  $\triangle ABC$  after it is dilated by a scale factor of 3.



Answer:  $A'(3, 3)$ ,  $B'(3, 9)$ ,  $C'(6, 3)$

View Video Explanation: [Dilations](#)

14. A can of soup is shaped like a cylinder. Find its volume to the nearest tenth. Use 3.14 for  $\pi$ .

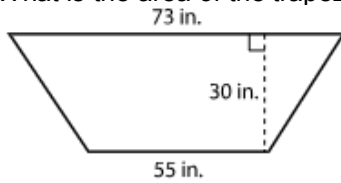


Answer:  $141.3 \text{ in}^3$

View Video Explanation: [Volume of Prisms and Cylinders](#)

# Thinkwell Placement Test Answer Key: Grade 8

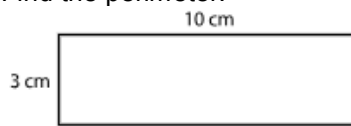
15. What is the area of the trapezoid?



Answer: 1,920 in<sup>2</sup>

View Video Explanation: [Area of Triangles and Trapezoids](#)

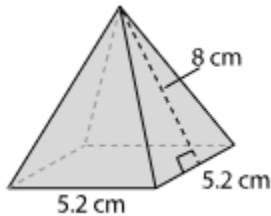
16. Find the perimeter.



Answer: 26 cm

View Video Explanation: [Perimeter and Circumference](#)

17. Find the surface area of the pyramid.



Answer: 110.24 cm<sup>2</sup>

View Video Explanation: [Surface Area of Pyramids and Cones](#)

18. Find the probability of the event.  
Write your answer as a fraction, as a decimal, and as a percent.  
Event: drawing one of the 4 L's from a bag of 100 letter tiles

Answer: 1/25, 0.04, 4%

View Video Explanation: [Theoretical Probability](#)

19. For the past three weeks, Karl has been recording daily high temperatures for a science project. His results are shown in the table.

	Week 1 Temp (°F)	Week 2 Temp (°F)	Week 3 Temp (°F)
Sun	76	72	78
Mon	74	79	76
Tue	79	78	77
Wed	80	79	75
Thu	77	77	79
Fri	76	74	77
Sat	71	73	75

What is the experimental probability that the temperature will be below 74°F on the next day?

Answer: 1/7

View Video Explanation: [Experimental Probability](#)

20. Olivia needs to complete three chores. She has to clean her room, take out the garbage, and feed the dog. All chores must be completed before she goes to the movies. In how many different orders can she complete her chores?

Answer: 6

View Video Explanation: [Permutations](#)

21. Solve the inequality.

$$\frac{x}{2} + 7 < 27$$

Answer:  $x < 40$

View Video Explanation: [Solving Two-Step Inequalities](#)

# Thinkwell Placement Test Answer Key: Grade 8

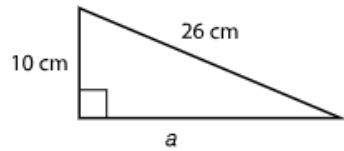
22. Solve the equation.

$$8n + 2 - n = 16$$

Answer: 2

View Video Explanation: [Solving Multi-Step Equations](#)

23. Use the Pythagorean Theorem to find the missing measure.



Answer: 24 cm

View Video Explanation: [The Pythagorean Theorem](#)

24. Use the graph to estimate the population of Florida in 1970.



Answer: 7.5 million

View Video Explanation: [Line Graphs](#)

25. Thurston borrowed \$5,500 from his sister-in-law for 3 years at an annual simple interest rate of 3.5% to buy a car. How much interest will he pay if he pays the entire loan off at the end of the third year?

Answer: \$577.50

View Video Explanation: [Simple Interest](#)

## About Thinkwell Courses

Thinkwell offers the following core courses in our Homeschool Math series:

- 6th Grade Math
- 7th Grade Math
- 8th Grade Math
- Algebra 1
- Geometry
- Algebra 2
- Precalculus
- Trigonometry
- Calculus
- Honors 6th Grade Math
- Honors 7th Grade Math
- Honors 8th Grade Math
- Honors Algebra 1
- Honors Geometry
- Honors Algebra 2
- AP Calculus AB
- AP Calculus BC

*What's the difference between the standard Thinkwell courses and the honors courses?* In general, the Thinkwell Honors courses will be faster-paced and more rigorous than our standard courses. Our Honors courses will cover more material than the standard courses and the assessments will be more challenging. Unless you need the Honors recognition for your student's transcript, or unless your student is aiming to pursue a science or math-related course of study, we recommend sticking with the standard course sequence.

### Typical Sequence of Secondary Math Courses

A typical sequence of secondary math courses completed by a college-bound student is listed below. Most college-bound students will take seven or eight years of math between 6<sup>th</sup> and 12<sup>th</sup> grades, beginning with 6<sup>th</sup> Grade Math and ending with Precalculus or Calculus.

#### Standard Sequence:

##### Middle school:

<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
6 <sup>th</sup> Grade Math	7 <sup>th</sup> Grade Math	8 <sup>th</sup> Grade Math

##### High School:

<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
Algebra 1	Geometry	Algebra 2	Precal or Trig

### Accelerated Sequence:

#### Middle school:

Year 1	Year 2	Year 3
7 <sup>th</sup> Grade Math	8 <sup>th</sup> Grade Math	Algebra 1

#### High School:

Year 1	Year 2	Year 3	Year 4
Geometry	Algebra 2	Precal or Trig	Calculus

### Where Do You Begin?

If you wondering about where to start your student with the Thinkwell math course sequence, we recommend that you **begin with the end in mind**.

In other words, where do you want your student to be at the end of their course of study in high school? If your student is college-bound, and you want them to take Calculus before they go to college, then work backwards from the ‘accelerated sequence’ above to see where you need to be right now.

Unless your student is planning to pursue a science or math-related degree, Calculus doesn’t necessarily need to be the terminal course for your high school student.

Questions? Please reach out to us at [support@thinkwell.com](mailto:support@thinkwell.com). We’re here and happy to help.