FAST/B.E.S.T./FSA Mathematics Reference Sheets Packet

- Grade 4 FAST Mathematics Reference Sheet
- Grade 5 FAST Mathematics Reference Sheet
- Grade 6 FAST Mathematics Reference Sheet
- Grade 7 FAST Mathematics Reference Sheet (2 pages)
- Grade 8 FAST Mathematics Reference Sheet (2 pages)
- B.E.S.T. Algebra 1 EOC Mathematics Reference Sheet
- B.E.S.T. Geometry EOC Mathematics Reference Sheet (2 pages)
- FSA Algebra 1 EOC Mathematics Reference Sheet
- FSA Geometry EOC Mathematics Reference Sheet (2 pages)

2022–2023
Grade 4 FAST Mathematics Reference Sheet

**Customary Conversions**

1 foot = 12 inches  
1 yard = 3 feet

1 pint = 2 cups  
1 quart = 2 pints  
1 gallon = 4 quarts

1 pound = 16 ounces

**Metric Conversions**

1 meter = 100 centimeters  
1 meter = 1000 millimeters  
1 kilometer = 1000 meters

1 liter = 1000 milliliters  
1 gram = 1000 milligrams  
1 kilogram = 1000 grams

**Time Conversions**

1 minute = 60 seconds  
1 hour = 60 minutes

**Formulas**

**Rectangle**

\[ P = l + l + w + w \]
\[ A = l \times w \]

| Key |  
|-----|---|
| \( l = \text{length} \) | \( P = \text{perimeter} \) |
| \( w = \text{width} \) | \( A = \text{area} \) |
Grade 5 FAST Mathematics Reference Sheet

Customary Conversions
1 foot = 12 inches
1 yard = 3 feet
1 mile = 5,280 feet
1 mile = 1,760 yards

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

1 pound = 16 ounces
1 ton = 2,000 pounds

Metric Conversions
1 centimeter = 10 millimeters
1 meter = 100 centimeters
1 meter = 1000 millimeters
1 kilometer = 1000 meters

1 liter = 1000 milliliters
1 gram = 1000 milligrams
1 kilogram = 1000 grams

Time Conversions
1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours
1 week = 7 days

Formulas

**Rectangle**
- \( P = l + l + w + w \)
- \( P = 2l + 2w \)
- \( A = l \times w \)

**Rectangular Prism**
- \( V = l \times w \times h \)
- or
- \( V = B \times h \)

**Key**

<table>
<thead>
<tr>
<th>( l )</th>
<th>( w )</th>
<th>( h )</th>
<th>( B )</th>
<th>( V )</th>
</tr>
</thead>
<tbody>
<tr>
<td>length</td>
<td>width</td>
<td>height</td>
<td>area of the base</td>
<td>volume</td>
</tr>
<tr>
<td>( P )</td>
<td>( A )</td>
<td>( V )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Grade 6 FAST Mathematics Reference Sheet

Customary Conversions
1 foot = 12 inches
1 yard = 3 feet
1 mile = 5,280 feet
1 mile = 1,760 yards

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

1 pound = 16 ounces
1 ton = 2,000 pounds

Metric Conversions
1 meter = 100 centimeters
1 meter = 1000 millimeters
1 kilometer = 1000 meters

1 liter = 1000 milliliters
1 gram = 1000 milligrams
1 kilogram = 1000 grams

Time Conversions
1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours
1 week = 7 days
1 year = 365 days
1 year = 52 weeks

Formulas

Rectangular Prism

\[ V = lwh \]

or

\[ V = Bh \]

<table>
<thead>
<tr>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>( l ) = length</td>
</tr>
<tr>
<td>( w ) = width</td>
</tr>
<tr>
<td>( h ) = height</td>
</tr>
</tbody>
</table>
### Grade 7 FAST Mathematics Reference Sheet

#### Conversions within a System of Measure

<table>
<thead>
<tr>
<th>Customary Conversions</th>
<th>Metric Conversions</th>
<th>Time Conversions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 foot = 12 inches</td>
<td>1 meter = 100 centimeters</td>
<td>1 minute = 60 seconds</td>
</tr>
<tr>
<td>1 yard = 3 feet</td>
<td>1 meter = 1000 millimeters</td>
<td>1 hour = 60 minutes</td>
</tr>
<tr>
<td>1 mile = 5,280 feet</td>
<td>1 kilometer = 1000 meters</td>
<td>1 day = 24 hours</td>
</tr>
<tr>
<td>1 mile = 1,760 yards</td>
<td>1 liter = 1000 milliliters</td>
<td>1 week = 7 days</td>
</tr>
<tr>
<td>1 cup = 8 fluid ounces</td>
<td>1 gram = 1000 milligrams</td>
<td>1 year = 365 days</td>
</tr>
<tr>
<td>1 pint = 2 cups</td>
<td></td>
<td>1 year = 52 weeks</td>
</tr>
<tr>
<td>1 quart = 2 pints</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 gallon = 4 quarts</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 pound = 16 ounces
1 ton = 2,000 pounds

#### Conversions between Systems of Measure

<table>
<thead>
<tr>
<th>Customary to Metric Conversion Approximations</th>
<th>Metric to Customary Conversion Approximations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch = 2.54 centimeters</td>
<td>1 centimeter = 0.39 inches</td>
</tr>
<tr>
<td>1 foot = 0.305 meters</td>
<td>1 meter = 3.28 feet</td>
</tr>
<tr>
<td>1 mile = 1.61 kilometers</td>
<td>1 kilometer = 0.62 miles</td>
</tr>
<tr>
<td>1 cup = 0.24 liters</td>
<td>1 liter = 4.23 cups</td>
</tr>
<tr>
<td>1 gallon = 3.785 liters</td>
<td>1 liter = 0.264 gallons</td>
</tr>
<tr>
<td>1 ounce = 28.35 grams</td>
<td>1 gram = 0.0352 ounces</td>
</tr>
<tr>
<td>1 pound = 0.454 kilograms</td>
<td>1 kilogram = 2.204 pounds</td>
</tr>
</tbody>
</table>
# Grade 7 FAST Mathematics Reference Sheet

## Formulas

<table>
<thead>
<tr>
<th>Shape</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallelogram</td>
<td>( A = bh )</td>
</tr>
<tr>
<td>Or Rhombus</td>
<td>( A = lw )</td>
</tr>
<tr>
<td>Trapezoid</td>
<td>( A = \frac{1}{2}h(b_1 + b_2) )</td>
</tr>
</tbody>
</table>
| Circle              | \( C = 2\pi r \) or \( C = \pi d \)  
\( A = \pi r^2 \)  |
| Right Circular Cylinder | \( V = Bh \) or \( V = \pi r^2h \) |

<table>
<thead>
<tr>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>( b ) = base</td>
</tr>
<tr>
<td>( h ) = height</td>
</tr>
<tr>
<td>( l ) = length</td>
</tr>
<tr>
<td>( w ) = width</td>
</tr>
<tr>
<td>( r ) = radius</td>
</tr>
<tr>
<td>( d ) = diameter</td>
</tr>
<tr>
<td>( B ) = area of base</td>
</tr>
<tr>
<td>( A ) = area</td>
</tr>
<tr>
<td>( C ) = circumference</td>
</tr>
<tr>
<td>( V ) = volume</td>
</tr>
</tbody>
</table>

### Simple Interest Formula

\[
I = prt
\]

where \( I \) = interest, \( p \) = principal, \( r \) = rate, \( t \) = time

### Percent Error Formula

\[
\left|\frac{\text{Estimate} - \text{Actual}}{\text{Actual}}\right| \times 100
\]

### Percent of Change

\[
\left(\frac{\text{final value} - \text{initial value}}{\text{initial value}}\right) \times 100
\]
Grade 8 FAST Mathematics Reference Sheet

Conversions within a System of Measure

**Customary Conversions**
- 1 foot = 12 inches
- 1 yard = 3 feet
- 1 mile = 5,280 feet
- 1 mile = 1,760 yards
- 1 cup = 8 fluid ounces
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- 1 ton = 2,000 pounds

**Metric Conversions**
- 1 meter = 100 centimeters
- 1 meter = 1000 millimeters
- 1 kilometer = 1000 meters
- 1 liter = 1000 milliliters
- 1 gram = 1000 milligrams
- 1 kilogram = 1000 grams

**Time Conversions**
- 1 minute = 60 seconds
- 1 hour = 60 minutes
- 1 day = 24 hours
- 1 week = 7 days
- 1 year = 365 days
- 1 year = 52 weeks

Conversions between Systems of Measure

**Customary to Metric Conversion Approximations**
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- 1 kilometer = 0.62 miles
- 1 liter = 4.23 cups
- 1 liter = 0.264 gallons
- 1 gram = 0.0352 ounces
- 1 kilogram = 2.204 pounds

**Formula**

**Slope Formula**

\[ m = \frac{y_2 - y_1}{x_2 - x_1} \]

where \( m \) = slope
Grade 8 FAST Mathematics Reference Sheet

Theorems

<table>
<thead>
<tr>
<th>Triangle Inequality Theorem</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a + b &gt; c)</td>
</tr>
<tr>
<td>(a + c &gt; b)</td>
</tr>
<tr>
<td>(b + c &gt; a)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Triangle Sum Theorem</th>
</tr>
</thead>
<tbody>
<tr>
<td>(m\angle A + m\angle B + m\angle C = 180^\circ)</td>
</tr>
</tbody>
</table>
B.E.S.T. Algebra 1 EOC Mathematics Reference Sheet

**Customary Conversions**
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**Formulas**

<table>
<thead>
<tr>
<th>Forms of Linear Equations</th>
<th>Forms of Quadratic Functions</th>
<th>Forms of Exponential Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y = mx + b$</td>
<td>$f(x) = ax^2 + bx + c$</td>
<td>$f(x) = ab^x$</td>
</tr>
<tr>
<td>$Ax + By = C$</td>
<td>$f(x) = a(x - h)^2 + k$</td>
<td>$f(x) = a(1 + r)^x$</td>
</tr>
<tr>
<td>$y - y_1 = m(x - x_1)$</td>
<td>$f(x) = a(x - p)(x - q)$</td>
<td></td>
</tr>
</tbody>
</table>

**Quadratic Formula**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

where $ax^2 + bx + c = 0$ and $a \neq 0$

**Final Amounts under Simple Interest**

$$A = P(1 + rt)$$

where $P =$ principal, $r =$ rate, and $t =$ time

**Final Amounts under Compound Interest**

$$A = P \left(1 + \frac{r}{n}\right)^{nt}$$

where $P =$ principal, $r =$ rate, $n =$ number of times compounded, and $t =$ time
B.E.S.T. Geometry EOC Mathematics Reference Sheet

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<table>
<thead>
<tr>
<th>Distance Formula</th>
<th>Midpoint Formula</th>
<th>Slope Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>( d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} )</td>
<td>((x_M, y_M) = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right))</td>
<td>( m = \frac{y_2 - y_1}{x_2 - x_1} )</td>
</tr>
</tbody>
</table>

**Special Right Triangles**

- **45°-45°-90° Triangle**
  - Hypotenuse: \( x\sqrt{2} \)
  - Legs: \( x \), \( x \)

- **30°-60°-90° Triangle**
  - Hypotenuse: \( 2x \)
  - Longer Leg: \( x\sqrt{3} \)
  - Shorter Leg: \( x \)
# B.E.S.T. Geometry EOC Mathematics Reference Sheet

## Formulas

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<thead>
<tr>
<th>Geometric Shape</th>
<th>Formula</th>
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</thead>
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<tr>
<td>Parallelogram</td>
<td>$A = bh$</td>
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<td>$A = \frac{1}{2} h(b_1 + b_2)$</td>
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<tr>
<td>Circle</td>
<td>$C = 2\pi r$ or $C = \pi d$</td>
</tr>
<tr>
<td></td>
<td>$A = \pi r^2$</td>
</tr>
<tr>
<td>Regular Polygon</td>
<td>$A = \frac{1}{2} Pa$</td>
</tr>
<tr>
<td>Prism/Cylinder</td>
<td>$SA = 2B + Ph$</td>
</tr>
<tr>
<td></td>
<td>$V = Bh$</td>
</tr>
<tr>
<td>Cone</td>
<td>$SA = B + \pi rh_s$ or $SA = B + \pi rl$</td>
</tr>
<tr>
<td></td>
<td>$V = \frac{1}{3} Bh$</td>
</tr>
<tr>
<td>Regular Pyramid</td>
<td>$SA = B + \frac{1}{2} Ph_s$ or $SA = B + \frac{1}{2} Pl$</td>
</tr>
<tr>
<td></td>
<td>$V = \frac{1}{3} Bh$</td>
</tr>
<tr>
<td>Sphere</td>
<td>$SA = 4\pi r^2$</td>
</tr>
<tr>
<td></td>
<td>$V = \frac{4}{3} \pi r^3$</td>
</tr>
</tbody>
</table>

## Key

- $P =$ perimeter
- $a =$ apothem
- $h =$ height
- $r =$ radius
- $h_s =$ slant height
- $l =$ slant height
- $b =$ base
- $d =$ diameter
- $B =$ area of base
- $A =$ area
- $C =$ circumference
- $SA =$ surface area
- $V =$ volume

## Trigonometric Ratios

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\sin \theta =$</td>
<td>opposite \over hypotenuse</td>
</tr>
<tr>
<td>$\cos \theta =$</td>
<td>adjacent \over hypotenuse</td>
</tr>
<tr>
<td>$\tan \theta =$</td>
<td>opposite \over adjacent</td>
</tr>
</tbody>
</table>
FSA Algebra 1 EOC Mathematics Reference Sheet

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FSA Geometry EOC Mathematics Reference Sheet

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FSA Geometry EOC Mathematics Reference Sheet

Formulas

\[ \sin A^\circ = \frac{\text{opposite}}{\text{hypotenuse}} \]

\[ \cos A^\circ = \frac{\text{adjacent}}{\text{hypotenuse}} \]

\[ \tan A^\circ = \frac{\text{opposite}}{\text{adjacent}} \]

\[ V = Bh \]

\[ V = \frac{1}{3} Bh \]

\[ V = \frac{4}{3} \pi r^3 \]

\[ y = mx + b, \text{ where } m = \text{slope and } b = \text{y-intercept} \]

\[ y - y_1 = m(x - x_1), \text{ where } m = \text{slope and } (x_1, y_1) \text{ is a point on the line} \]