# State Assessment Essential Skills

## 1. Geometry

Special angles - Complementary angles are 2 angles that add up to be $90^o$
- Supplementary angles are 2 angles that add up to be $180^o$

**Polygons**

8 sided (Octa) 6 sided (Hexa) 5 sided (Penta)

**4 sided (Quadrilateral)** - *sum of the interior angles is $360^o$*

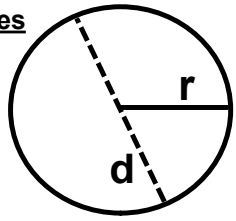
**-Trapezoid** - 1 pair of parallel sides, CAN NOT have all congruent sides or angles

**-Parallelogram** - 2 pairs of parallel sides which are also congruent (opposite angles are congruent)

1. Rhombus – 4 congruent sides
2. Rectange – 4 right angles (4 congruent angles)
3. Square – 4 congruent sides and 4 right angles

**Area = bh**

**Circles**




**Area = $r^2\pi$**

Circumference = $\pi d$

Area = $\frac{bh}{2}$

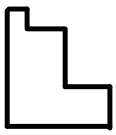
3 sided (Triangle) – sum of the interior angles is $180^o$

| By SIDES | By ANGLES |
|---|---|
| Scalene = NO congruent sides | Acute = All acute angles (angle less than $90^o$) |
| Isosceles = 2 congruent sides | Right = 1 right angle ($90^o$) |
| Equilateral = 3 congruent sides and 3 congruent angles | Obtuse = 1 obtuse angle (angle greater than $90^o$) |

**Compound shapes/Irregular Figures**

Perimeter - 1. Find missing sides 2. Mark a corner 3. Add all sides

Area - 1. Cut the figure into shapes you know 2. Use Ls or Ts to identify bases and heights
3. Use given measurements to find unknown measurements 4. Find area of each shape
5. Add the areas of all the shape pieces.

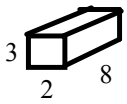


**3 dimensional solids**

**Surface area of cubes = $6s^2$**


SA = $6(3)^2$ or 54 $u^2$

**Volume of rectangular prisms = lwh**




V = (3)(8)(2) or 8 $u^3$

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## 2. Algebra

**Words to expressions**

3 more than the product of 5 and g

(+) (switch) (x)

5g + 3

**X** (of, product, times as many, for each, by, twice) ÷ ( quotient, half, separated equally)

**+** (more, sum, total, increase, plus, add) **–** ( less, difference, minus)

****Switch the order (than, from)

**Substitution** 1. Replace variables with numbers 2. Put the replaced numbers in parenthesis 3. Order of operations

3bp - 5/7p if b = 10 and p = 14 ⟶ 3(10)(14) - 5/7(14) ⟶ 420 - 10 = 410

**Nth Term** 1. Put the 1,2,3... 2. Find out what you are adding 3. Put it with the n 4. Find what needs to be + or -

**1 2 3** *****If you are not adding the same thing...look for special patterns $n^2$ = 1, 4, 9, 16... $n^3$ = 1, 8, 27, 64...

9, 13, 17... ⟶ adding 4 so... ⟶ 4n...need to add 5 to get to 9 so... ⟶ 4n + 5 Check to see if it works every time.

## 3. Number Sense

| Fraction | Decimal | Percent |
|---|---|---|
| Divide (top number goes in) → | Move decimal 2 to the right → | |
| ← Read it (Don't use "point") | ← Move decimal 2 to the left | |
| Add/Subtract - 1.Common Denominator<br>2. + or - tops<br>3. leave the bottoms<br>Multiply 1, Improper Fraction<br>2. Cross Simplify<br>3. Multiply tops and bottoms<br>Divide 1. Improper Fraction<br>2. Flip the 2nd and change to multiplication<br>3. Follow Multiplication Rules. | Add/Subtract - 1.Line Up Decimals<br>2. + or -<br>3. bring decimal straight down into answer<br>Multiply 1, Multiply<br>2. Count # of digits to the right of the decimal in the problem<br>3. Move it left that same # of places in your answer<br>Divide 1. Make Outside number whole<br>2. Move decimal Inside the same # of times<br>3. Divide<br>4. Bring decimal straight up into your answer (move the decimal this many times)<br>*Scientific Notation $2.7 \times 10^4$ ($\geq 1$ and $< 10$)<br>* x 10 moves the decimal to the right<br>÷ 10 moves the decimal to the left | Means divide by 100 $\frac{47}{100}$<br>Example: 47% =0.47 or<br>Of means X<br>$\frac{\text{is}}{\text{of}} = \frac{\%}{100}$<br>Example: what is 45% of 70?<br>0.45 X 70<br>or<br>$\frac{\text{is}}{\text{of (70)}} = \frac{\% 45}{100}$ |

$a\frac{b}{c}$ **Fraction Calculator Button**

## 4. Proportion (2 equal ratios) AND Scale (changed/actual)

**Proportion**

$\frac{35}{22} = \frac{?}{56}$

1. To solve: Multiply the diagonals and divide by the diagonal that is alone. $\frac{32 \times 56}{22}$
2. To set up...use labels
3. To check to see if a proportion is set up correctly. Set it up yourself. The diagonals should be the same NO MATTER the order the rest of the proportion. (35 and 56 have to remain diagonal.)

**Scale**

**1 in = 40 mi**

$\frac{\text{1 in}}{\text{40 mi}} = \frac{\text{? in}}{\text{340 mi}}$

1. Changed to actual shows that 40 miles has been shrunk to 1 inch.
2. To solve for more changed or actual measurements...set up a proportion. The scale is one of the ratios.

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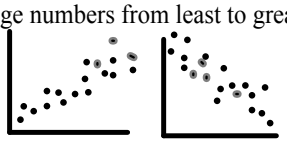
## 5. Graphs/Data

Mean - add all, divide by the number of numbers  Mode - data value that happens the most  Range - subtract low from high

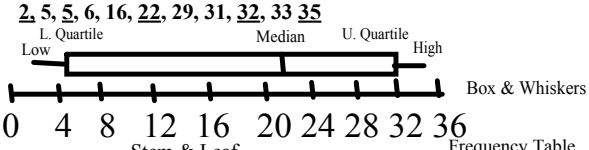
Median - arrange numbers from least to greatest, find the middle (if 2 numbers in middle, add the 2 and divide by 2)

As one goes **up** the other goes **up**
As one goes **down** the other goes **down**



As one goes **up** the other goes **down**
As one goes **down** the other goes **up**

**2, 5, 5, 6, 16, 22, 29, 31, 32, 33 35**





**Misleading Data/Statistics**

Changes to scale/interval will affect the appearance of the graph.
- -Increase in scale will decrease the differences in the graph.
- -Decreases in scale will increase the differences in the graph.
- -Bigger intervals make it more difficult to determine exact measurements of the bars/lines.
- -Broken scales make graph differences misleading.

Stem & Leaf

| Stem | Leaf |
|---|---|
| 0 | 2 5 5 6 |
| 1 | 6 |
| 2 | 2 9 |
| 3 | 1 2 3 5 |

Represents 32

The same number can't be on 2 lines.

Frequency Table

| | |
|---|---|
| 0-9 | 5 |
| 10-19 | 1 |
| 20-29 | 2 |
| 30-39 | 4 |