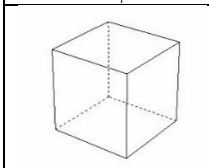
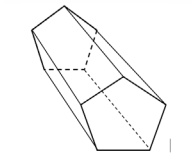
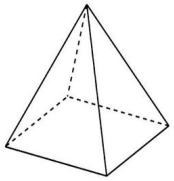
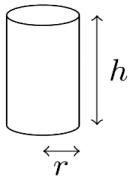
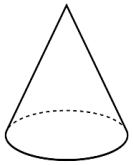
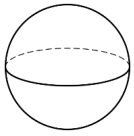
# Formula Sheet: Math Grade 10 Placement Test to enter Math 181

**Metric and Imperial Conversions**

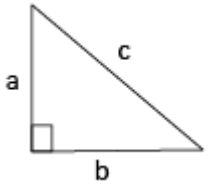
| Relationships between Imperial Units | Approximate Relationships between Imperial Units and Metric Units | Relationships between Metric Units |
|---|---|---|
| 1 mile = 1760 yards<br>1 mile = 5280 feet | 1 mile = 1.609 km<br>1 km = 0.6214 miles | 1 km = 1000 m |
| 1 yard = 3 feet<br>1 yard = 36 inches | 1 yard = 0.9144 m<br>1 m = 1.094 yd | 1 m = 100 cm |
| 1 foot = 12 inches | 1 foot = 0.3048 m = 30.48 cm<br>1 m = 3.281 ft | 1 cm = 10 mm |
| | 1 inch = 2.54 cm<br>1 cm = 0.3937 in | |

**Area, Surface Area and Volume for standard shapes**

| Shape | Shape | Volume | Surface Area |
|---|---|---|---|
|  | Rectangular prism | $V = lwh$ | $SA = 2(lw + lh + wh)$<br>or $SA = 2lw + 2lh + 2wh$ |
|  | Right prism of any base | $V = Bh; B = area\ of\ base$ | $SA = ph + 2B; p = perimeter\ of\ base$ |
|  | Right pyramid | $V = \frac{1}{3}lwh$ | $SA = \frac{1}{2}(slant\ hgt)(perimeter\ of\ base) + (area\ of\ base)$ |
|  | Cylinder | $V = \pi r^2 h$ | $SA = 2\pi rh + 2\pi r^2$ |
|  | Cone | $V = \frac{1}{3}\pi r^2 h$ | $SA = \pi rs + \pi r^2$ |
|  | Sphere | $V = \frac{4}{3}\pi r^3$ or $V = \frac{1}{6}\pi d^3$ | $SA = 4\pi r^2$ or $SA = \pi d^2$ |

Area: Rectangle $A = lw$ Triangle $A = \frac{1}{2}bh$ Circle $A = \pi r^2$

**Pythagorean Theorem**




$c^2 = a^2 + b^2$

**Trigonometric Ratios**

$$\sin A = \frac{opposite}{hypotenuse} \qquad \cos A = \frac{adjacent}{hypotenuse} \qquad \tan A = \frac{opposite}{adjacent}$$

**Exponent Laws**

| Exponent Law | Rule |
|---|---|
| Product of Powers | $x^m \times x^n = x^{m+n}$ |
| Quotient of Powers | $\frac{x^m}{x^n} = x^{m-n}$ |
| Power of a Power | $(x^m)^n = x^{m \times n}$ |
| Power of a Product | $(xy)^m = x^m y^m$ |
| Power of a Quotient | $\left(\frac{x}{y}\right)^m = \frac{x^m}{y^m}$ |
| Zero Exponent | $x^0 = 1$ |
| Negative Exponent | $x^{-m} = \frac{1}{x^m}$ |
| Fractional Exponent | $x^{\frac{m}{n}} = \sqrt[n]{x^m}$ or $\left(\sqrt[n]{x}\right)^m$ |

**Linear Functions**

$$slope = \frac{rise}{run} \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad slope = \frac{\Delta y}{\Delta x}$$

slope-intercept form $y = mx + b$

general form $Ax + By + C = 0$

standard form $Ax + By = C$

slope-point form $(y - y_1) = m(x - x_1)$