**Substitution into Mathematical Formulae**

**Year 10 Work**

Remember: ab means a x b in algebra

 BIDMAS Brackets first, then powers, then multiplication and division, then addition and subtraction.

There are 20 formulas to work out. Green is the easiest set and Red is the hardest and the formulas get harder as you go along. Try to do at least 10 and challenge yourself as much as you can. Don’t be afraid to get the wrong answer. Good luck and be safe

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|  |  |  | **Green** | **Amber** | **Red** |
| **1** | Area of a rectangle is given by: | $$A=bh$$ | b = 7 h = 9 | b = 2.5 h = 10 | b = 1.2 h = 2.5 |
| **2** | Area of a triangle is given by: | $$A=\frac{bh}{2}$$ | b = 8 h = 6 | b = 7 h = 3 | b = 5.6 h = 10 |
| **3** | Area of a trapezium is given by: | $$A=\frac{\left(a+b\right)h}{2}$$ | a = 3 b = 7 h = 4 | a = 6 b = 14 h = 5 | a = 3.7 b = 6.3 h = 7 |
| **4** | Perimeter of a rectangle is given by: | $$P=2(l+w)$$ | l = 13 w = 9 | l = 7.2 w = 5.3 | l = 5.6 w = 6.2 |
| **5** | Surface area of a cuboid is given by: | $$S=2(lw+lh+wh)$$ | l = 2w = 3h = 4 | l = 7w = 3h = 8 | l = 10w = 5h = 3.5 |
| **6** | Surface area of a cube is given by: | $$SA=6x^{2}$$ | *x* = 4 | *x* = 7 | *x* = 9 |
| **7** | Volume of a cuboid is given by: | $$V=lwh$$ | l = 2w = 3h = 4 | l = 7w = 3h = 8 | l = 10w = 5h = 3.5 |
| **8** | Speed is given by: | $$S=\frac{D}{T}$$ | D = 65 S = 5 | D = 96 S = 4 | D = 8.7 S = 3 |
| **9** | Density is given by: | $$D=\frac{M}{V}$$ | M = 120 V = 6 | M = 72 V = 3 | M = 84 V = 4.2 |
| **10** | Velocity of an object is given by: | $$v=u+at$$ | u = 7a = 10t = 3 | u = 15a = 9.8t = 10 | u = 3.7a = 5t = 3.2 |
| **11** | Distance travelled by a car is given by: | $$s=ut+\frac{at^{2}}{2}$$ | u = 3a = 5t = 2 | u = 8a = 2t = 3 | u = 6a = 4t = 5 |
| **12** | Interior angles in an n sided polygon is | $$A=180(n-2)$$ | n = 7 | n = 12 | n = 32 |
| **13** | The length of a side in a right angled triangle is: | $$c=\sqrt{a^{2}+ b^{2}}$$ | a = 3 b = 4 | a = 8 b = 6 | a = 5 b = 12 |
| **14** | Surface area of a cone is given by: | $$SA=πrl$$ | π = 3r = 9l = 7 | π = 3r = 10l = 6.5 | π = 3r = 25l = 5.5 |
| **15** | Area of a circle is given by: | $$A=πr^{2}$$ | π = 3r = 6 | π = 3r = 9 | π = 3r = 30 |
| **16** | Circumference of a circle is given by: | $$C=πd$$ | π = 3d = 8 | π = 3d = 28 | π = 3d = 15.4 |
| **17** | Surface area of a sphere is given by: | $$SA=4πr^{2}$$ | π = 3r = 5 | π = 3r = 7 | π = 3r = 40 |
| **18** | Volume of a cylinder is given by: | $$V=πr^{2}h$$ | π = 3r = 4h = 2 | π = 3r = 6h = 4 | π = 3r = 12h = 5 |
| **19** | Surface area of a sphere is given by: | $$SA=4πr^{2}$$ | π = 3r = 7 | π = 3r = 9 | π = 3r = 50 |
| **20** | Volume of a sphere is given by: | $$V=\frac{4πr^{3}}{3}$$ | π = 3r = 2 | π = 3r = 3 | π = 3r = 5 |