Indices Test

1) $6h^2 \times 4h^4 = 24h^6$

2) $3p^3 \times 5p^5 = 15p^8$

3) $12q^5 \div 3q^4 = 4q$

4) $10x^{10} \div 2x^2 = 5x^8$

5) $(3p^3)^3 = 27p^9$

6) $(2q^2)^5 = 32q^{10}$

7) $8^1 = 8$

8) $7^0 = 1$

9) $6^{-2} = \frac{1}{6^2} = \frac{1}{36}$

10) $49^{\frac{1}{2}} = \sqrt{49} = 7$

11) $25^{3/2} = (\sqrt{25})^3 = 5^3 = 125$

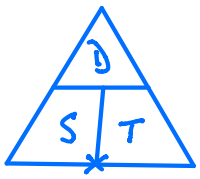
12) $9^{-\frac{1}{2}} = \frac{1}{9^{1/2}} = \frac{1}{\sqrt{9}} = \frac{1}{3}$

13) $16^{-\frac{3}{4}} = \frac{1}{16^{3/4}} = \frac{1}{(\sqrt[4]{16})^3} = \frac{1}{2^3} = \frac{1}{8}$

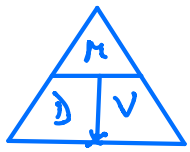
14) $4p^2q^2r^2 \times 2pq^2r^3 = 8p^3q^4r^5$

15) $20h^5q^2 \div 4hq^2 = 5h^4$

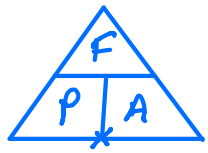
Speed



Density



Pressure



$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$\text{distance} = \text{speed} \times \text{time}$$

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

$$\text{volume} = \frac{\text{mass}}{\text{density}}$$

$$\text{mass} = \text{density} \times \text{volume}$$

$$\text{pressure} = \frac{\text{Force}}{\text{Area}}$$

$$\text{Area} = \frac{\text{Force}}{\text{Pressure}}$$

$$\text{Force} = \text{Pressure} \times \text{Area}$$

Need to know Formulae

Calculating Average Speed

$$\text{Average Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

Ex 1 John drives 40 miles from Gloucester to Oxford at 20 mph. He then drives 80 miles from Oxford to Nottingham at 60 mph. What was his average speed?

	Speed	Time	distance
G → O	20 mph	$\frac{40}{20} = 2$ hrs	40 miles
O → N	60 mph	$\frac{80}{60} = \frac{4}{3}$ hrs	80 miles
		$\frac{10}{3}$ hrs	120 miles

$$\text{Avge speed} = \frac{\text{total dist}}{\text{total time}} = \frac{120}{10/3}$$

$$= 120 \times \frac{3}{10}$$

$$= 36 \text{ mph}$$

Ex 2 We travel from A to B a distance of 100 km at 50 kmph. We travel from B to C a distance of 60 km in 3 hrs. We travel from C to D at 40 kmph for 2 hours.

Find average speed for journey A to D

	Speed	Time	Distance
A → B	50 kph	$\frac{100}{50} = 2$ hrs	100 km
B → C		3 hrs	60 km
C → D	40 kph	2 hrs	40×2 = 80 km
	Totals	7 hrs	240 km

$$\text{Avge Speed} = \frac{\text{Total Dist}}{\text{Total Time}} = \frac{240}{7} = 34.3 \text{ km/hr}$$

Ex 3 20 g of substance A with a density of 5 g/cm³ is mixed with 50 cm³ of substance B which has density 10 g/cm³. What is the density of the new compound?

	Density	Vol	Mass
A	5 g/cm³	4 cm³	20 g
B	10 g/cm³	50 cm³	500 g
		54 cm³	520 g

$$\text{Density of Compound} = \frac{\text{Total Mass}}{\text{Total Vol}} = \frac{520}{54} = 9.63$$

$$\text{Density} = 9.63 \text{ g/cm}^3$$
