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Basic skills: answers to revision questions

This revision pack for **Mathematical Literacy Grade 12** provides valuable support for the Basic Skills section of the CAPS Curriculum to help learners with exam preparation. These basic skills are required to work out problems in other sections of the Curriculum, and should therefore be revised before studying other topics. A set of 50 revision questions and their answers is also provided.

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Basic skills: answers to revision questions

1. **a)** Convert 375 g (recommended intake) to 0,375 kg.
   Protein: 400 × 0,375 = 150 g
   Fibre: 50 × 0,375 = 18,75 g ≈ 19 g
   Moisture: 120 × 0,375 = 45 g
   Calcium: 32 × 0,375 = 12 g
   Phosphorus: 16 × 0,375 = 6 g
   Sulphur: 7,5 × 0,375 = 2,8125 g ≈ 3 g
   Cobalt: 2,5 × 0,375 = 0,9375 mg ≈ 1 mg
   Copper: 50 × 0,375 = 18,75 mg ≈ 19 mg
   Iodine: 2,6 × 0,375 = 0,97 mg ≈ 1 mg
   Iron: 220 × 0,375 = 82,5 mg
   Manganese: 400 × 0,375 = 150 mg
   Zinc: 350 × 0,375 = 131,25 g ≈ 131 mg
   Magnesium: 250 × 0,375 = 93,75 mg ≈ 94 mg
   Selenium: 0,6 × 0,375 = 0,225 mg ≈ 0,2 mg

   b) **i)** 150 g protein : 150 mg manganese
   First convert both values to the same unit.
   150 000 : 150 (both in mg) = 1 000 : 1
   ii) 1 mg cobalt : 1 mg iodine = 1 : 1
   iii) 150 mg manganese : 94 mg magnesium = 75 : 47

2. girl : boy = 5 : 2
   39,10 × 2 = 78,20   (195,50 ÷ 5 = 39,10)
   195,50 : 78,20
   A boy will spend R78,20 on skin care.

3. **a)** Botswana: approximately $\frac{170}{1\,000} = \frac{17}{100} = 17\%$

   Kenya: approximately $\frac{105}{1\,000} = \frac{21}{200} = 10,5\%$

   Malawi: approximately $\frac{200}{1\,000} = \frac{1}{5} = 20\%$

   Tanzania: approximately $\frac{110}{1\,000} = \frac{11}{100} = 11\%$

   Zambia: approximately $\frac{140}{1\,000} = \frac{7}{50} = 14\%$

   Zimbabwe: approximately $\frac{150}{1\,000} = \frac{3}{20} = 15\%$

   b) Malawi: 0,2 : 0,13; simplify to 20 : 13
   Zimbabwe: 0,15 : 0,03; simplify to 15 : 3

4. **a)** **i)** Standard-rate time applies; so R1,00 per minute
   3 minutes: 2 × R1,00 = R3,00
   0,5 minutes: 0,5 × R1,00 = R0,50
   Total cost of call: R3,50

   ii) Talkmore time applies; so, R0,50 per minute
   2 seconds: $\frac{2}{60}$ × R0,50 = R0,02
   Total cost of call: R0,72
   The minimum charge applies to this call.
   b) i) Standard-rate time applies; so, R0,79 per minute
   5 minutes: 5 × R0,79 = R3,95
   20 seconds: $\frac{20}{60}$ × R0,79 = R0,26
   Total cost of call: R4,21
   ii) Talkmore time applies; so, R0,42 per minute
   5 minutes: 5 × R0,42 = R2,10
   20 seconds: $\frac{20}{60}$ × R,42 = R0,14
   Total cost of call: R2,24
   c) Standard time: R0,82
   Talkmore time: R0,41
   So, R0,82 – R0,41 = R0,41/min.
   Thus Standard time cost is double the cost of Talkmore time.
   Standard time : Talkmore time = 2 : 1

5. a) R2 184 ÷ 3 = R728
   Employer's contribution: 2 × R728 = R1 456/month
   Shafiek's contribution: 1 × R728 = R728/month
   b) Tax deductions allowed per month:
   Principal member and first registered dependant: 2 × R310 = R620
   For other registered dependants: 2 × R209 = R418
   Total Shafiek may deduct from tax: (R620 + R418) = R1 038 per month

6. a) R52,50 for first kilogram, then 32 kg × R7,05 = R225,60
   (Use 32 kg as charged fully for part of a kg.)
   Total cost of sending the parcel: R52,50 + R225,60 = R278,10
   b) R52,50 for first kilogram, then 12 kg × R7,05 = R84,60
   (Use 12 kg as charged fully for part of a kg.)
   Insurance: 3% of R150,00 = R4,50
   Total cost of sending parcel: R52,50 + R84,60 + R4,50 = R141,60
   c) R52,50 for first kilogram, then 19 kg × R7,05 = R133,95
   (Use 19 kg as charged fully for part of a kg.)
   Insurance: 3% of R1 500,00 = R45,00
   COD charge: R28,20
   Total cost of sending parcel: R52,50 + R133,95 + R45,00 + R28,20 = R259,65

7. a) The maximum mass should be 5,1 kg.
   b) 10% of 41 kg = 4,1 kg
   750 g = 0,75 kg
   0,75 kg × 7 = 5,25 kg
   The school bag will not adhere to the unofficial rule, but exceed it by 1,15 kg (5,25 – 4,1).

8. 1 : 1,618   1x = 1,618 × 4,5
   4,5 : x x = 7,281
   The length of the rectangle should be 7,281 cm.

9. Concrete more than 75 mm thick
   The ratio of cement, river sand and washed aggregate should be 1 : 2,5 : 4.
   1 : 2,5 : 4
   50 : x : y (Use cross-multiplication)

$x = 50 \times 2,5$ $y = 50 \times 4$

   $= 125$ $= 200$

For the mixture, 125 buckets of river sand and 200 buckets of washed aggregate are needed.

Concrete that is less than 75 mm thick

The ratio of cement, river sand and washed aggregate should be 1 : 2 : 3.

1 : 2 : 3

50 : x : y (Use cross-multiplication)

$x = 50 \times 2$ $y = 50 \times 3$

   $= 100$ $= 150$

For the mixture, 100 buckets of river sand and 150 buckets of washed aggregate are needed.

Rough bedding concrete

The ratio of cement, river sand and washed aggregate should be 1 : 3 : 6.

1 : 3 : 6

50 : x : y (Use cross-multiplication)

$x = 50 \times 3$ $y = 50 \times 6$

   $= 150$ $= 300$

For the mixture, 150 buckets of river sand and 300 buckets of washed aggregate are needed.

10. a) Inflation is usually expressed as a percentage. This percentage indicates the rate at which the cost of goods (basic goods used in all households) changes over a certain period of time.

    b) Rate of increase in inflation $= \frac{5\,000 - 1\,043}{1\,043} \times 100 = 379,4\%$

    c) It is an abnormal inflation rate.

    d) The inflation rate shows that the country is in serious financial trouble.

11. $\frac{930\,000}{2,4 \times 10^6} = 38,8\%$

12. a) $800 : 132 : 120 = 20 : 6,6 : 3$ (in its simplest form)

    b) $20 : 6,6 : 3$

        $690 : x : y$ (Use cross-multiplication)

        $20x = 6,6 \times 690$

          $x = \frac{6,6 \times 690}{20}$

            $= 227,7$

        The salmon would contain 227,7 g of nitrogen.

        $20y = 3 \times 690$

          $y = \frac{3 \times 690}{20}$

            $= 103,5$

        The salmon would contain 103,5 g of fat (lipids).

    c) 1 calorie = 4,186 kJ

        $4,186x = 1 \times 20\,000$

           $x = 20\,000 \div 4,186$

             $= 4\,777,8$

             $\approx 4\,778$

        20 000 kilojoules is approximately 4 778 calories.

13. $4 + 2 + 5 + 1 = 12$

     8:00 to 17:00 = 9 h

     $\frac{9}{12} = 0,75$

     $4 \times 0,75 = 3$ h in class

     $2 \times 0,75 = 1$ h 30 min. having lunch

     $5 \times 0,75 = 3$ h 45 min. socialising

     $1 \times 0,75 = (0,75 \times 60) = 45$ min. in gym

14. a) $\frac{8\ 900}{50\ 570} = \frac{890}{5\ 057} \div \frac{890}{890} = \frac{1}{5,7}$

Yes, one out of every six first-year students will graduate.

b) $\frac{8\ 900}{50\ 570} \times 100 = 17\%$

15. a) 1972: 100 000 people

1997: 60 000 people

$\frac{60\ 000 - 100\ 000}{100\ 000} \times 100 = -40\%$

The population decreased by 40% over the 25 years.

b) 40% ÷ 25 years = 1,6% per year

16. a) A 100% rebate means that they receive 100% discount – they do not have to pay any tax on land value.

b) Household A had to pay R31,73 more: R125,94 – R94,21 = R31,73

Household B had to pay R381,70 more: R3 447,91 – R3 066,21 = R381,70

c) Household A: $\frac{125,94 - 94,21}{94,21} \times 100 = 33,7\%$

Household B: $\frac{3\ 447,91 - 3\ 066,21}{3\ 066,21} \times 100 = 12,4\%$

17. R100 ÷ 6,09 = R16,42

The price for a litre of fuel is R16,42.

18. a) First R900 000 no transfer duty.

b) First R900 000 no transfer duty,

R10 500 + 6% on the balance above R1 250 000

= R10 500 + R3 000 = R13 500

c) First R900 000 no transfer duty,

R40 500 + 8% on the balance above R1 750 000

= R40 500 + R36 000 = R76 500

19. a) 50 000 : 18 000 = 25 : 9   (Simplify)

25 ÷ 25 = 1 and 9 ÷ 25 = 0,36

They will produce 0,36 t of ash.

b) 0,36 t × 1 000 = 360 kg

20. a)

Items	Household A		Household B	
Land value (R)	10 000,00		190 000,00	
Change in tariffs	**Old**	**New**	**Old**	**New**
Property rates/taxes (R)	–	–	1 387,32	1 484,43
Electricity (kWh)	100,00	106,00	945,00	1 001,70
Water (kl)	35,00	37,45	611,10	653,88
Sanitation (kl)	21,60	23,11	73,28	78,10
Waste services (R)	18,40	19,69	52,16	55,81
Totals	**175,00**	**186,25**	**3 068,86**	**3 273,92**

b) Household A: R186,25 – R175,00 = R11,25 more

Household B: R3 23,92 – R3 068,86 = R205,06 more

c) Household A:

Percentage increase = $\frac{186,25 - 175,00}{175,00} \times 100 = 6,43\%$

Household B:

Percentage increase = $\frac{3\ 273,92 - 3\ 068,86}{3\ 068,86} \times 100 = 6,68\%$

d) The rebate means that they are exempt from paying rates and taxes – as long as the value of their property is R10 000 or less.

e) Percentage increase in petrol: $\frac{17,10 - 16,91}{16,91} \times 100 = 1,12\%$

21. a) R126,55 × 0,95 = R120,22

b) $\frac{245{,}89 - 191{,}79}{245{,}89} \times 100\% = 22\%$

c) $\frac{90\%}{40{,}94} = \frac{100\%}{x}$

$x = \frac{100\% \times 40{,}94}{40\%}$

$= 45{,}49$

d) $\frac{39{,}95 - 17{,}98}{39{,}95} \times 100\%$

$= 55\%$

e) R16 × 0,75

$= R12$

f) $\frac{40\%}{179{,}82} = \frac{100\%}{x}$

$x = \frac{100\% \times 179{,}82}{40\%}$

$= 449{,}55$

g) $\frac{288{,}64 - 184{,}73}{288{,}64} \times 100\%$

$= 36\%$

h) $\frac{85\%}{756{,}92} = \frac{100\%}{x}$

$x = \frac{100\% \times 756{,}92}{85\%}$

$= 890{,}49$

i) R59,99 × 88% = R52,79

22. a)

Flour		
Mass (kg)	**Price (R)**	**Cost per $\frac{1}{2}$ kg (R)**
0,5	9,49	9,49
1,0	14,99	$\frac{14{,}99}{2} = 7{,}49$
2,5	39,99	$\frac{39{,}99}{5} = 7{,}99$
5,0	60,90	$\frac{60{,}90}{10} = 6{,}09$

The table shows that the 5-kg bag is the cheapest option. (Maybe you can persuade mother to bake two cakes.) If you buy two 1-kg bags and one 0,5-kg bag it will cost R39,47, only slightly cheaper than buying one 2,5-kg bag at R39,99.

b)

Sugar		
Mass (kg)	**Price (R)**	**Cost per $\frac{1}{2}$ kg (R)**
0,5	10,99	10,99
1,0	17,99	$\frac{17{,}99}{2} = 8{,}99$
2,5	33,99	$\frac{33{,}99}{5} = 6{,}79$
5,0	77,99	$\frac{77{,}99}{10} = 7{,}79$

The 0,5-kg bag is the most expensive option. It would be most economical to buy one 2,5-kg bag of sugar.

23. Total number of parts: 7(5 + 2)

Amount per part: R430 899 ÷ 7 parts = R61 557

Earnings of director: 5 × R61 577 = R307 785

Earnings of each employee: $\frac{2 \times R61\ 557}{6} = R20\ 519$

24. Number of losses: 31 – 18 = 13

Wins : Losses = 18 : 13

25. a) $\frac{boys}{girls} = \frac{9}{7}$

$\frac{9}{7} = \frac{x}{14}$

$x = 9 \times \frac{14}{7}$

$= 18$ boys

b) 14 + 18 = 32

There are 32 learners in the class.

26. (8 + 14) : 11 = 22 : 11 = 2 : 1

27. a) Number of parts: 5 + 3 = 8

Green sweets: $\frac{40}{8} \times 5 = 25$

Yellow sweets: $\frac{40}{8} \times 3 = 15$

b) $\frac{3}{8} \times 300$ g = 112,5 g

The mass of the yellow sweets would be 112,5 g.

28. Mr Smith: $\frac{R52\ 000}{5\ parts} \times 3$ parts = R31 200

Mrs Smith: R52 000 – R31 200 = R20 800

29. a) 30 : 90 = 1 : 3　　　　　**b)** 90 : 30 = 3 : 1

c) $\frac{90}{30} = \frac{300}{x}$

$x = \frac{300 \times 30}{91}$

$= 100$

You need 100 g of butter.

d) $\frac{90}{30} = \frac{x}{45}$

$x = \frac{390 \times 45}{30}$

$= 135$

You need 135 g of flour.

e) $\frac{90}{30} = \frac{78}{x}$

$x = \frac{30 \times 78}{90}$

$= 26$

You need 26 g of butter.

f) $\frac{30}{90} = \frac{1}{3}$

30. a) Ratios (teachers : learners) at the different schools:

School 1: $\frac{76}{1\ 254} = 0,06$

School 2: $\frac{54}{1\ 389} = 0,04$

School 3: $\frac{63}{987} = 0,06$

School 4: $\frac{59}{1\ 008} = 0,06$

School 5: $\frac{45}{574} = 0,08$

b) $\frac{63}{987} = \frac{70}{x}$

$x = \frac{\frac{70}{987}}{63}$

$= 1\ 096,6\ldots$

$\approx 1\ 096$

The school would have 1 096 learners (round your answer down, as it is not possible to get a fraction of a person).

c) $\frac{45}{574} = \frac{x}{1\ 148}$

$x = \frac{45 \times 1\ 148}{574}$

$= 90$

There would be 90 teachers at the school.

d) The school with the best teacher-to-learner ratio is school 5, as the ratio is the largest. This means there are more teachers per learner than at the other schools.

31. a)

Item	Cost price (R)	Selling price (R)	Profit (R)
Car	3 549,00	3 999,00	450,00
Petrol (per litre)	17,78	18,60	0,82
Car magazine	42,99	44,90	1,91
Spare parts	57,64	70,50	12,86

b) $\frac{450}{3\,549} = 0{,}13$

c) $\frac{12{,}86}{0{,}82} = 15{,}682\ldots$

    The owner must sell 16 ℓ of petrol to make the same profit as on one set of spare parts.

32. Ratio of grey to white blocks:

    Square 1: 1 : 8

    Square 2: 9 : 16

    Square 3: 25 : 24

    The ratio does not remain the same.

33. a) Ratio of grey to white circles in the diagrams

    Diagram 1: 1 : 4

    Diagram 2: 2 : 7

    Diagram 3: 3 : 10

    The ratio does not remain the same.

b) Ratio of grey circles to lines in the diagram:

    Diagram 1: 1 : 4

    Diagram 2: 2 : 8

    Diagram 3: 3 : 12

    The ratio remains the same. All the ratios can be simplified to 1 : 4.

34. a) Butter, roast chicken and full-cream milk

b) $\frac{100\text{ g}}{1{,}1\text{ g}} = 90{,}91$

    You would have to eat 91 bananas per day to meet your protein requirement.

c)

Food type	Fat (g)		Protein (g)		Carbohydrates (g)	
Roast	**100**	**200**	**100**	**200**	**100**	**200**
chicken	5,4	10,8	24,8	49,6	0	0
Boiled	**100**	**50**	**100**	**50**	**100**	**50**
potato	0	0	1,4	0,7	19,7	9,85
Glass of	**100**	**250**	**100**	**250**	**100**	**250**
milk	3,8	9,5	3,3	8,25	4,8	12
Totals		**20,3**		**58,55**		**21,85**

d) Banana: carbohydrates : protein

    $19{,}2 : 1{,}1 = \frac{19{,}2}{1{,}1} = 17{,}45$

    Boiled potato: carbohydrates : protein

    $19{,}7 : 1{,}4 = \frac{1}{3} = 14{,}0714\ldots$

    The banana has a higher carbohydrates to protein ratio.

35. a) There are 50 parts to the alloy $(1 + 3 + 46 = 50)$.

    1 kg = 1 000 g

    Copper: $\frac{1\,000}{50} \times 46 = 920$ g

    Tin: $\frac{1\,000}{50} \times 3 = 60$ g

    Zinc: $\frac{1\,000}{50} \times 1 = 20$ g

b) Tin: $\frac{23}{50} \times 3 = 1{,}38$ g

36. a) $\frac{60 \text{ g}}{5 \text{ fish}} = \frac{x}{16 \text{ fish}}$

$x = \frac{60 \text{ g} \times 16 \text{ fish}}{5 \text{ fish}}$

$= 192$ g

16 fish would need 192 g of fish food per day.

b) $\frac{500 \text{ g}}{60 \text{ g}} = 8\frac{1}{3}$

The fish would survive for eight days.

c) $\frac{60 \text{ g}}{5 \text{ fish}} = \frac{x}{12 \text{ fish}}$

$x = \frac{60 \text{ g} \times 12 \text{ fish}}{5 \text{ fish}}$

$= 144$ g

Twelve fish would need 144 g of fish food per day.

For seven days, they would need:

144 g × 7 = 1 008 g of food

37. a) 750-ml bottle (cost per ml):

$\frac{1\ 494 \text{c}}{750 \text{ ml}} = 1{,}9933\ldots$ c/ml

800-ml bottle (cost per ml):

$\frac{1\ 500 \text{c}}{800 \text{ ml}} = 1{,}875$ c/ml

The 800-ml bottle gives better value for money.

b) 5 × R4,50 = R22,50

profit: R22,50 – R15,00 = R7,50

c) Volume of smaller bottles:

$\frac{800 \text{ ml}}{5} = 160$ ml

Cost per millilitre: $\frac{450 \text{c}}{160 \text{ ml}} = 2{,}8125$ c/ml $\approx 2{,}81$ c/ml

38. a) $\frac{84 \text{ km}}{3 \text{ h}} = 28$ km/h

b) $\frac{84 \text{ km}}{3 \text{ h}} = \frac{x}{2 \text{ h}}$

$x = \frac{84 \text{ km} \times 2 \text{ h}}{3 \text{ h}}$

$= 56$ km

c) $\frac{84 \text{ km}}{3 \text{ h}} = \frac{x}{\frac{3}{4} \text{ h}}$

$x = \frac{84 \text{ km} \times \frac{3}{4} \text{ h}}{3 \text{ h}}$

$= 21$ km

(Remember that 45 minutes is $\frac{3}{4}$ of an hour and that you can only compare units that are the same!)

d) $\frac{84 \text{ km}}{3 \text{ h}} = \frac{74\frac{2}{3} \text{ km}}{x}$

$x = \frac{74\frac{2}{3} \text{ km} \times 3 \text{ h}}{84 \text{ km}}$

$= 2\frac{2}{3}$ h

It would take her $2\frac{2}{3}$ hours.

$\frac{1 \text{ h}}{60 \text{ min.}} = \frac{\frac{2}{3} \text{ h}}{x}$

$x = \frac{\frac{2}{3} \text{ h} \times 60 \text{ min.}}{1 \text{ h}}$

$= 40$ min.

It would take her 2 hours 40 minutes to travel the distance.

39. a) Crime increased during this time. The bars that represent total violent crimes increase in length in later years.

b) Your estimate should be between 31% and 33%.

c) Percentage increase = $\frac{839\ 639 - 630\ 108}{630\ 108} \times 100\% = 33{,}25\%$

d) Answers will differ.

40. a)

Electrical appliance	kW used per hour	Cost per hour (c)
Iron	0,50	80,50
Microwave oven	1,30	209,30
Kettle	2,00	322,00
Electric frying pan	1,50	241,00
Oven at about 200 °C	2,00	322,00
Large plate on hob at lowest setting	0,50	80,50
Slow cooker	0,15	24,15
Television set	0,30	48,30
Tumble dryer	3,00	483,00

b) i) 322,00 – 209,30 = 112,70

ii) 241,50 – 24,15 = 217,35

iii) 483,00 – 0 = 483,00

c) i) Microwave and oven:

Percentage saving

$= \frac{(322,00 - 209,30)}{209,30} \times 100$

= 53,85% (rounded off to two decimal places)

You will save 53,85% electricity when you use a microwave rather than an oven.

ii) Electric frying pan and slow cooker:

Percentage saving

$= \frac{(241,50 - 24,15)}{24,15} \times 100$

= 900% (rounded off to two decimal places)

You will save 900% electricity if you use a slow cooker instead of an electric frying pan.

d) i) 5 min. ⟍⟋ 88,1
3 min. ⟋⟍ x (Use cross-multiplication.)

$x = \frac{3 \times 88,1}{5}$

$x = 52{,}86$

The cost of showering for three minutes is 52,86c.

ii) 5 min. ⟍⟋ 88,1
15 min. ⟋⟍ x (Use cross-multiplication.)

$x = \frac{15 \times 88,1}{5}$

$x = 264{,}3$

The cost of showering for 15 minutes is 264,3c or (264,3 ÷ 100 =) R2,64.

iii) 12 cm ⟍⟋ 176,10
15 cm ⟋⟍ x (Use cross-multiplication.)

$x = \frac{176,10 \times 15}{12}$

$x = 220{,}125$

The cost of having a bath in 15 cm warm water is 220,125c or 220,125 ÷ 100 = R2,20.

iv) Multiply the previous answer by 2, or use cross-multiplication:

12 cm ⟍ ⟋ 176,10

30 cm ⟋ ⟍ x (Use cross-multiplication.)

$x = \frac{176,10 \times 30}{12}$

$x = 440,25$

The cost of having a bath in 30 cm warm water is 440,25c or
440,25 ÷ 100 = R4,40.

41. a) 13% of $62,4 \times 10^9$

= 8 112 000 000

= $R8,112 \times 10^9$

= R8,112 billion

b) percentage increase = $\frac{\text{difference between two values}}{\text{original value}} \times 100$

$= \frac{870 - 820}{820} \times 100$

$= 6,1\%$

Old-age pension: 6,1%

Child support grant: 5,3%

Disability grant: 6,1%

Foster care grant: 5,1%

Care dependency grant: 6,1%

42. a) 157 000 × 365 days = 57 305 000

$= 5,7 \times 10^7$ vehicles

b) 7% of $5,7 \times 10^7$ vehicles = 3 990 000

$= R5,7 \times 10^7 + 3,99 \times 10^6$

= 60 990 000

$= R6,1 \times 10^7$ vehicles

43. a) 173 800 km – 165 800 km = 8 000 km

The width of Saturn's G-ring: 8 000 km

b) Circumference

= π × diameter   Outer radius = 173 800 km

= π × 2(173 800)   so, diameter = 2(173 800)

= 1 092 017,606

$= 1,0^9 \times 106$ km

44. a) $7,53 \times 10^{-10}$ **b)** $1,0 \times 10^{-6}$

c) $3,0 \times 10^8$ **d)** $2,0 \times 10^{11}$

e) $6,65 \times 10^{-27}$

45. a)

Year	Volume stored (m^3)	Volume in scientific notation
1990	398 500	$3,99 \times 10^5$
1991	396 500	$3,97 \times 10^5$
1992	398 300	$3,98 \times 10^5$
1993	403 500	$4,04 \times 10^5$
1994	378 400	$3,78 \times 10^5$

b) Add the exponents:

$(3,99 + 3,97 + 3,98 + 4,04 + 3,78) \times 10^5$

$= 19,76 \times 10^5$

$= 1,976 \times 10^6$

46. a) Imports have increased by R13 969 million (R89 890 – R75 921)

Thus,

$\frac{13\,969}{75\,921} = 0,18399$

$0,18399 \times 100 = 18,4\%$ (rounded off to one decimal place)

b) 24% of R89 890

$= \frac{24}{100} \times 89\,890$

$= R21\,573,60$

47. Convert the estimated 600 kg to milligram or 0,01 mg to kilogram before subtracting.

600 kg = 600 000 g

600 000 g = 600 000 000 mg

$\qquad\quad = 6 \times 10^8$ mg

So, $6,0 \times 10^8 - 1,0 \times 10^{-2} = 6,0 \times 10^8$

or $\qquad$ 0,01 mg $= 1 \times 10^{-5}$ g

$\qquad\quad 1 \times 10^{-5}$ g $= 1 \times 10^{-8}$ kg

600 kg $- 1 \times 10^{-8} = 600$ kg

48. a) Average distance of moon from earth: 384 400 km $= 3,84 \times 10^5$ km

Mass of the moon: 73 483 000 000 000 000 000 000 kg $= 7,35 \times 10^{22}$ kg

Surface area of the moon: 37 932 330 km^2 $= 3,79 \times 10^7$ km^2

Orbital eccentricity: $0,05490 = 5,49 \times 10^{-2}$

Orbital circumference: 2 290 000 km $= 2,29 \times 10^6$ km

b) Minimum temperature:

Degrees Celsius (°C)

= temperature in Kelvin – 273,15

= 40 K – 273,15

= –233,15 °C $\qquad\qquad\qquad\qquad$ (This is very cold!)

Maximum temperature:

Degrees Celsius (°C)

= temperature in Kelvin – 273,15

= 396 K – 273,15 = 122,85 °C $\quad$ (This is very hot!)

49. a) $\frac{75}{10,7} = \frac{1,2 \times 1\,000}{x}$

$x = \frac{1\,200}{10,7}$

$\quad = 112,149\dots$

$\quad = 1,12 \times 10^2$

b) $\frac{75 \text{ kg}}{161,25 \text{ kg}} = \frac{x}{67 \text{ kg}}$

$\qquad x = \frac{75 \text{ kg} \times 67 \text{ kg}}{161,25 \text{ kg}}$

$\qquad\quad = 31,1627907$ kg

$\qquad\quad = 31\,163$ g

c) There is no direct conversion between the weight on the moon and the weight on Jupiter. So, start by converting 0,2 kg to a weight on Earth. Then convert the answer to a weight on Jupiter.

50. a) Flour: $1,0 \times 10^6$ kg $\qquad\qquad\qquad$ **b)** 2×10^6 pizzas: $3,7 \times 10^6$ calories $\quad$ (Simplify.)

Olive oil: $9,0 \times 10^4$ ℓ $\qquad\qquad\qquad\qquad$ 2 pizzas: 3,6 calories

Water: $6,8 \times 10^5$ ℓ $\qquad\qquad\qquad\qquad\quad$ 1 pizza: 1,85 calories

Mozzarella: $4,6 \times 10^5$ kg

Tomato paste: $1,0 \times 10^5$ ℓ