1. Level 3 Recap

1. Work out the following:

a) 3.5 + 8.12 b) 6.2 - 5.98 c) 303.19 × 4 d) 127.5 ÷ 3

2. Calculate:

a) 3.43 × 100 b) 17.24 × 10 c) 123.1 ÷ 100 d) 13.24 ÷ 1000

e) 3.21 × 400 f) 1.85 × 20 g) 5.6 ÷ 70 h) 63.42 ÷ 70

3. Round the following to **1 decimal place**:

a) 0.91 b) 5.92 c) 3.95 d) 5.561

4. Work out the following:

a) -10 - 5 b) 21 - 30 c) -8 + 5 d) -5 + 7

e) 14 + (-20) f) (-3) + (-5) g) 10 - (-11) h) (-14) - (-12)

i) 3 × (-7) j) (-8) × (-7) k) (-12) ÷ 6 l) (-36) ÷ (-9)

5. For the following pairs:
   (i) Write down any common factors,
   (ii) Underline the **Highest Common Factor**.

a) 2 and 8 b) 3 and 9 c) 4 and 6 d) 10 and 25

e) 6 and 15 f) 12 and 16 g) 32 and 48 h) 24 and 60

6. List all the prime numbers between 1 and 100.

7. Find the answer **without** using a calculator:

a) 2^2 b) 4^2 c) 7^2 d) 10^2 e) 12^2

f) 2^3 g) 4^3 h) 1^4 i) 9^1 j) 100^0

8. Work out the following, writing the answer in its simplest form:

a) $^1/_2 + {}^1/_3$ b) $^1/_4 + {}^1/_8$ c) $^1/_4 + {}^1/_5$ d) $^1/_{10} + {}^2/_5$

e) $^4/_5 - {}^1/_{25}$ f) $^9/_{10} - {}^1/_5$ g) $^5/_7 - {}^3/_8$ h) $^{17}/_{20} - {}^{14}/_{25}$

9. Convert the following into **improper fractions**:

a) $1^1/_2$ b) $3^1/_3$ c) $7^1/_2$ d) $1^2/_3$ e) $5^1/_4$

10. Convert the following into **mixed numbers**:

a) $^9/_2$ b) $^{14}/_3$ c) $^{17}/_2$ d) $^{22}/_3$ e) $^{19}/_4$

11. Find the cost per item:

(a) 5 bars of chocolate cost £2.50.
(b) 3 pens cost 66 pence.
(c) 8 donuts cost £6.40

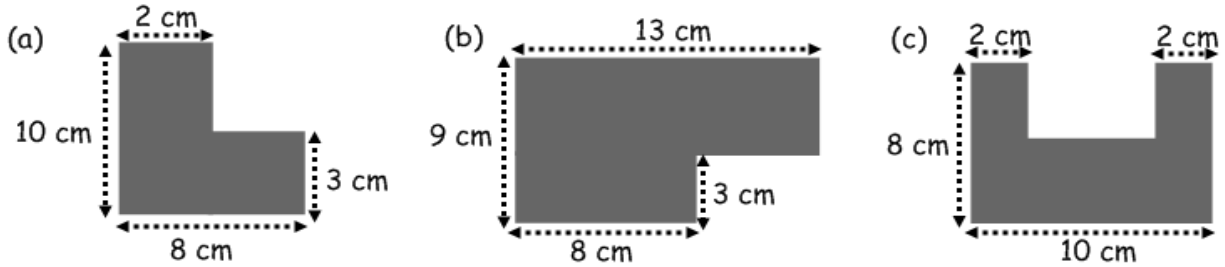
12. 6 soldiers have rations for 8 days.
How many days will the same rations last a squad of 8 soldiers?

13. Usain Bolt ran the 100 metres race in approximately 10 seconds.
Calculate his approximate average speed.

14. The train from Motherwell to London takes approximately 4 hours. The average speed of the train is 83 miles per hour.
Calculate the approximate distance between Motherwell and London.

15. The school bus from Shotts to St Aidan's travels 8 kilometres each morning. It has an average speed of 16 kilometres per hour.
How long does the journey take. Give your answer **minutes**.

16. Calculate the **area** of the following shapes:



17. Find the **n^{th} term** in each of the following sequences:

a) 2, 4, 6, 8, ... b) 5, 10, 15, 20, ... c) 5, 9, 13, 17, ... d) 2, 5, 8, 11, ...

18. Simplify the following expressions:

a) $x + y + x$ b) $7x + 2y - 5x$ c) $21x - 30 + 9x$ d) $18x + 10y - 5y$

19. If a = 3, b = 7 and c = 4, evaluate:

a) a + 2b b) 4c + 2b c) b - a d) 5c - 5a e) ab f) $a^2 + c^2$

20. Solve for x:

a) $2x + 9 = 19$ b) $3x + 5 = 20$ c) $4x + 7 = 35$ d) $10x + 6 = 96$

e) $4x - 3 = 29$ f) $6x - 5 = 55$ g) $12x - 7 = 29$ h) $7x - 4 = 38$

4. Order of Operations (MTH 4-03b)

1. Work out the answers to the following:

(a) $2 + 7 \times 3$ (b) $3 \times 3 - 6$ (c) $4 - 1 \times 3$ (d) $7 \times 7 - 20$

(e) $2 \times 5 + 2 \times 3$ (f) $6 \times 3 - 9 \times 2$ (g) $12 \times 3 - 8 \times 3$ (h) $5 \times 9 - 19 \times 2$

2. Work out the answers to the following:

(a) $3 + 18 \div 3$ (b) $18 \div 3 - 5$ (c) $7 - 21 \div 7$ (d) $50 \div 5 - 8$

(e) $32 \div 8 + 10 \times 3$ (f) $8 \times 3 - 100 \div 10$ (g) $200 \div 10 - 100 \div 50$

3. Work out the answers to the following:

(a) $(7 + 20) \div 9$ (b) $50 \div (27 - 2)$ (c) $(17 - 2) \div 5$ (d) $2 \times (25 - 10)$

(e) $(7 + 4) \times 3$ (f) $9 \times (3 - 1)$ (g) $(40 - 10) \times (3 + 2)$

4. Carry out the following calculations:

(a) $3.4 + 9 \times 2$ (b) $1.3 \times 2 - 2.05$ (c) $14.7 - 2.1 \times 3$ (d) $3 \times 7.1 - 20.5$

(e) $5.9 + 1.12 \times 3$ (f) $6.7 \times 2 - 11.9$ (g) $6.4 \div 8 - 0.35$ (h) $5.7 - 9.1 \div 7$

5. Work out the answers to the following:

(a) $(15 - 9)^2 - 30$ (b) $11 + (3 - 1)^3$ (c) $(12 - 2)^2 - 95$ (d) $2 \times (13 - 11)^2$

(e) $(25 - 22)^3 - (35 - 30)^2$ (f) $(4 + 5)^2 + (19 - 16)^2$

6. Scientific Notation (MTH 4-06b)

1. Convert the following into scientific notation (standard form):

a) 100 b) 20 c) 4500 d) 9100

e) 72 000 f) 125 000 g) 1600 h) 13 500

i) $2^1/_2$ million j) 5 billion k) $3^3/_4$ million l) $10^1/_4$ million

2. Convert the following into scientific notation (standard form):

a) 0.1 b) 0.005 c) 0.03 d) 0.0012

e) 0.00067 f) 0.88 g) 0.0000265 h) 0.0000109

3. Convert the following into normal floating point form:

a) 1×10^3 b) 4×10^1 c) 6.4×10^3 d) 9.99×10^4

e) 4.81×10^2 f) 3.125×10^3 g) 3.01×10^4 h) 7.95×10^6

i) 2.11×10^8 j) 6×10^9 k) 8.76×10^5 l) 1.56×10^9

4. Convert the following into normal floating point form:

a) 1×10^{-3} b) 3×10^{-1} c) 2.45×10^{-3} d) 3.71×10^{-4}

e) 1.16×10^{-2} f) 3.14×10^{-3} g) 7.91×10^{-4} h) 3.33×10^{-5}

i) 6.44×10^{-8} j) 2.16×10^{-9} k) 1.99×10^{-5} l) 2.34×10^{-9}

Now try Scientific Notation!

9. Fraction Operations (MTH 4-07b)

1. Work out the following, writing the answer in its simplest form:

a) $2^1/_3 + 3^1/_2$ b) $4^1/_5 + 1^2/_3$ c) $3^3/_4 + 6^1/_3$ d) $2^7/_{10} + 1^2/_5$

e) $3^4/_5 - 1^1/_{10}$ f) $4^2/_3 - 2^1/_4$ g) $7^5/_6 - 3^2/_3$ h) $5^7/_9 - 3^1/_5$

2. Work out the following, writing the answer in its simplest form:

a) $^1/_3 \times {}^1/_2$ b) $^1/_5 \times {}^1/_3$ c) $^3/_4 \times {}^1/_2$ d) $^2/_5 \times {}^2/_3$

e) $^4/_5 \times {}^3/_4$ f) $^2/_3 \times {}^1/_{10}$ g) $^1/_7 \times {}^4/_5$ h) $^6/_{11} \times {}^9/_{10}$

i) $3^1/_2 \times 3^1/_2$ j) $2^1/_2 \times 2^1/_3$ k) $1^2/_3 \times 2^1/_3$ l) $3^1/_5 \times 1^1/_4$

m) $2^1/_2 \times 4^1/_3$ n) $1^1/_2 \times 10^2/_3$ o) $2^4/_5 \times {}^9/_{10}$ p) $2^1/_7 \times 3^1/_2$

3. Work out the following, writing the answer in its simplest form:

a) $^1/_3 \div {}^1/_2$ b) $^1/_5 \div {}^1/_3$ c) $^3/_4 \div {}^1/_2$ d) $^2/_5 \div {}^2/_3$

e) $^4/_5 \div {}^3/_4$ f) $^2/_3 \div {}^1/_{10}$ g) $^1/_7 \div {}^4/_5$ h) $^6/_{11} \div {}^9/_{10}$

i) $1^1/_3 \div 2^1/_4$ j) $5^1/_2 \div 2^2/_3$ k) $7^1/_4 \div 2^3/_4$ l) $1^3/_5 \div 2^1/_3$

m) $3^1/_5 \div 2^1/_2$ n) $1^1/_5 \div 3^2/_3$ o) $1^4/_5 \div 2^1/_3$ p) $3^1/_2 \div 2^3/_4$

Now try STAR WARS Episode II$^2/_3$: The Fractions Strike Back!

13. Decimal Time (MNU 4-10b)

1. Change the following into **decimal hours**:

(a) 30 minutes	(b) 15 minutes	(c) 20 minutes
(d) 45 minutes	(e) 18 minutes	(f) 54 minutes
(g) 1 hour 5 minutes	(h) 1 hour 35 minutes	(i) 1 hour 50 minutes
(j) 2 hours 24 minutes	(k) 2 hours 45 minutes	(l) 3 hours 10 minutes
(m) 5 hours 6 minutes	(n) 7 hours 15 minutes	(o) 2 hours 40 minutes

2. Change the following into **hours and minutes**:

(a) 0.25 hours	(b) 0.75 hours	(c) 0.33 hours
(d) 0.5 hours	(e) 0.15 hours	(f) 0.4 hours
(g) 1.1 hours	(h) 1.6 hours	(i) 1.67 hours
(j) 2.5 hours	(k) 3.9 hours	(l) 5.35 hours
(m) 10.75 hours	(n) 20.24 hours	(o) 15.8 hours

14. Speed, Distance & Time Calculations (MNU 4-10b)

1. Calculate missing component: Distance, Speed or Time?

(a) **Distance** = ? km
Average Speed = 50 km/hr
Time = 2 hours 30 minutes

(b) **Distance** = 122 km
Average Speed = 45 km/hr
Time = ? hours ? minutes

(c) **Distance** = 255 km
Average Speed = ? km/hr
Time = 3 hours 40 minutes

(d) **Distance** = ? miles
Average Speed = 60 mph
Time = 4 hours 19 minutes

(e) **Distance** = 55 miles
Average Speed = 45 mph
Time = ? hours ? minutes

(f) **Distance** = 520 miles
Average Speed = ? mph
Time = 7 hours 35 minutes

(g) **Distance** = 200 metres
Average Speed = 8 ms^{-1}
Time = ? seconds

(h) **Distance** = ? km
Average Speed = 90 km/hr
Time = 3 hours 14 minutes

(i) **Distance** = ? metres
Average Speed = 10 ms^{-1}
Time = 11.5 seconds

(j) **Distance** = 94 miles
Average Speed = ? mph
Time = 1 hour 50 minutes

(k) **Distance** = 149 miles
Average Speed = 55 mph
Time = ? hours ? minutes

(l) **Distance** = 475 km
Average Speed = ? km/hr
Time = 3 hours 21 minutes

(m) **Distance** = ? miles
Average Speed = 75 mph
Time = 1 hour 45 minutes

(n) **Distance** = ? km
Average Speed = 35 km/hr
Time = 39 minutes

(o) **Distance** = 78 miles
Average Speed = ? mph
Time = 1 hour 3 minutes

(p) **Distance** = 270 miles
Average Speed = 48 mph
Time = ? hours ? minutes

14. Speed, Distance & Time Calculations (MNU 4-10b)

2. A train is travelling across Europe.
It is travelling at an average speed of 91 miles per hour.
The train terminates after a journey time of 7 hours and 51 minutes.
How far has the train travelled?

3. The Flash runs 39 miles in 14 minutes.
What is the Flash's average speed?

4. A footballer covers a distance of 10 720 metres in a 94 minutes football match.
What is his average speed in metres per second?

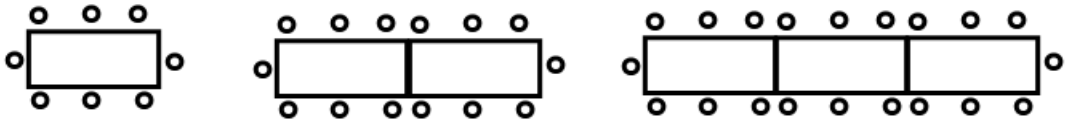
5. A hurdler in the Olympics is travelling at an average speed of 12 metres per second. How long does it take her to complete a 200 metre race?

6. A tennis player delivers his serve. It travels at 110 kilometres per hour over 24 metres. How many seconds does his opponent have to return the ball?

7. A car is driven for 3 hours and 35 minutes at an average speed of 44 miles per hour.
How far has the car travelled?

Now try **Speed, Distance or Time?**

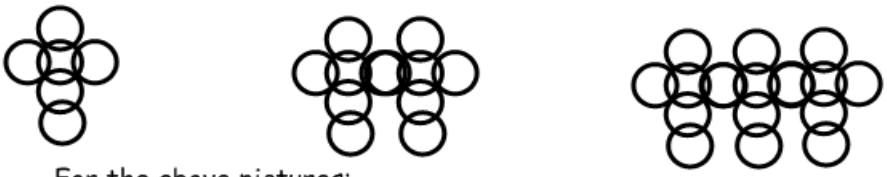
19. Linear Patterns from Pictures (MTH 4-13a)



1. For the above pictures:
   (a) Complete the table

Number of Rectangles (R)	1	2	3	4	5	6
Number of Circles (C)	8	14				

   (b) Write down a formula connecting the number of rectangles (R) and the number of circles (C).
   (c) If there were 20 rectangles, how many circles would there be?
   (d) If there were 62 circles, how many rectangles would there be?



2. For the above pictures:
   (a) Complete the table

Number of Crosses (C)	1	2	3	4	5	6
Number of Hoops (H)	6	11				

   (b) Write down a formula connecting the number of crosses (C) and the number of hoops (H).
   (c) If there were 9 crosses, how many hoops would there be?
   (d) If there were 56 hoops, how many crosses would there be?

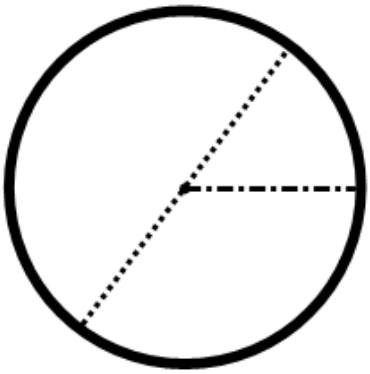
3. For the above pictures:
   (a) Complete the table

Number of Stars (S)	1	2	3	4	5	6
Number of Circles (C)	5	7				

   (b) Write down a formula connecting the number of Star (S) and the number of circles (C).
   (c) If there were 10 stars, how many circles would there be?
   (d) If there were 33 circles, how many stars would there be?

29. The Circle (MTH 4-16b)

1. Name each part of the circle:

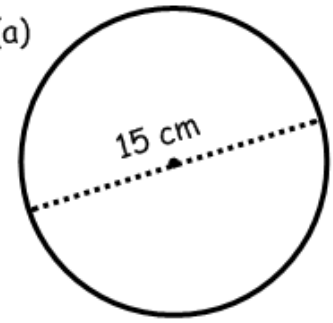


2. What is the radius of a circle with diameter 48 centimetres?

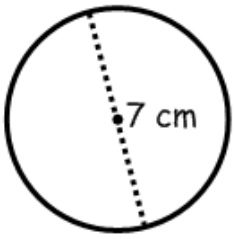
3. What is the diameter of a circle with radius 13 centimetres?

4. Calculate the **circumference** of each circle:

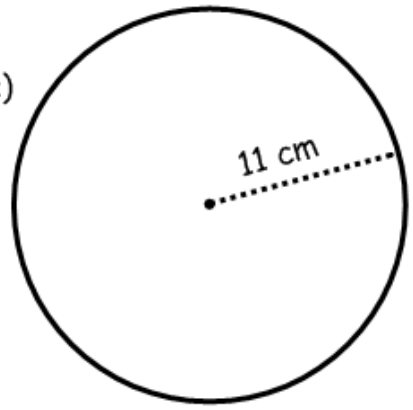
(a)



(b)



(c)

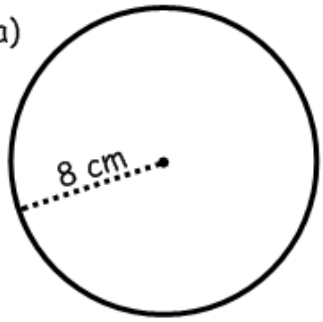


5. A circle has a circumference of 46 centimetres. What is its diameter?

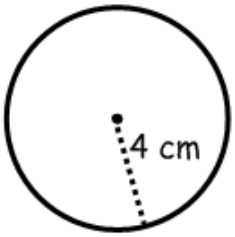
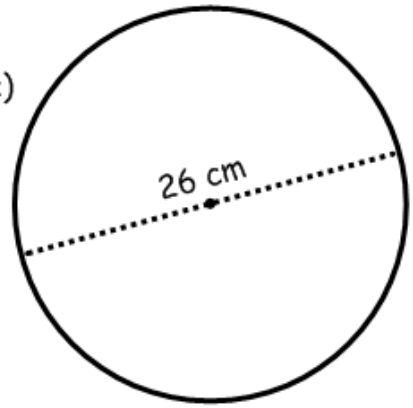
6. A circle has a circumference of 62 centimetres. What is its radius?

7. Calculate the **area** of each circle:

(a)



(b)



(c)