Year 7 NAPLAN Numeracy (Calculator) Worksheet

This practice test is a great way to boost your confidence before sitting your NAPLAN Numeracy assessment. This test allows the use of a calculator.

40 questions



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1. Which diagram shows the letter **F** rotated through 180° about its bottom left corner?



2. A packet of jellybeans has more red than black jellybeans and just as many blue as white jellybeans.

There are no green jellybeans.

Sheila dips her hand in and takes a jellybean at random.

Which statement is true?

- a) Sheila is more likely to pick a green jellybean than a blue jellybean.
- b) Sheila will most likely pick a black jellybean.
- c) Sheila has the same chance of picking a red as picking a black jellybean.
- d) Sheila has the same chance of picking a blue as picking a white jellybean.

Answer: _____

3. Year 7 students leave school and walk east or south to the sports ground for soccer training.

Duncan, and Heather's routes are marked on the map.



Altogether, including the two shown, how many different routes are possible?

- a) 6
- b) 2
- c) 4
- d) 8





- 5. How many years were there between Columbus discovering America in 1492 and the first man landing on the Moon in 1969?
 - a) 477 years
 - b) 77 years
 - c) 577 years
 - d) 523 years

Answer: _____

6. ξ stands for a whole number.

Which expression is equal to

$$\frac{6 \times \xi + 9}{3}$$

Hint: Think of 6 x ξ + 9 as a product of two factors and then simplify the algebraic fraction.

a) $6 \times \xi + 3$ b) $6 \times \xi + 6$ c) $2 \times \xi + 3$ d) $2 \times \xi + 9$

7. A car used 45 litres of petrol in 5 days.

What was the average number of litres of petrol used per day?

- a) 7
- b) 9
- c) 225
- d) 5

Answer: _____

8. A job is advertised with a salary from \$40k to \$55k per annum.

Ms Habid applies for the job.

Which yearly salary might she expect?

- a) \$47 500
- b) \$5400
- c) \$410 000
- d) \$39 125

9. Heidi will catch a bus from the railway station to her new school if the distance is more than 1 km.



Heidi measures the distance on the map as 6.8 cm.

Will she walk or catch the bus?

- a) catch the bus
- b) walk

10. Jumps are marked on a number line.



Which number sentence is **NOT** shown by these jumps?

- a) 25 13 = 12
- b) 58-45=13
- c) 38 25 = 13
- d) 13 + 25 + 20 = 58

Answer: _____

11. What is the smallest number that has factors 2, 3, 4, and 6 as well as itself and 1?

- a) 24
- b) 12
- c) 6
- d) 144

12. One cubic centimetre of water weighs one gram.

Which container has the heaviest amount of water?



13. First use the angle sum of a quadrilateral to find *z*.



What does (x + y) equal?

- a) 73
- b) 107
- c) 24
- d) 25



14.



What is the size of the obtuse angle in this diagram?

- a) 180°
- b) 110°
- c) 70°
- d) 250°



15. Barangaroo Precinct is 170 m x 1240 m.

Barangaroo

Hyde Park is 220 m x 740 m.

Not drawn to scale.

Which statement is correct?

(Hint: 1 hectare = $10\ 000\ m^2$.)

- a) Barangaroo is about 2 ha smaller than Hyde Park.
- b) Barangaroo is 21 ha larger than Hyde Park.
- c) Barangaroo and Hyde Park are both about 16 ha in area.
- d) Barangaroo is about 5 ha larger than Hyde Park.

Answer: _____

16. Enter the number missing from this sentence:

88.99 - 59.99 = 90 - ?

17. A cone is cut through the apex by a plane perpendicular to the base.



What shape will the cross-section always be?

- a) an isosceles triangle
- b) a right-angled triangle
- c) a scalene triangle
- d) an equilateral triangle

18. The table shows the water usage per day for four households and the number of occupants in each house.

House Street No.	Number of occupants	Water used in L
1	4	3000
3	6	4800
5	2	1700
7	3	2500

Which household was most economical (used the least water per person)?

- a) No. 3
- b) No. 7
- c) No. 5
- d) No.1
- Answer: _____

19. In a shopping mall, Amira comes up the escalator beside food kiosk K7.

Amira walks to the coffee bar, kiosk K6.

She then goes south-west to a restaurant for lunch.



In which restaurant does she have lunch?

- a) 79
- b) 76
- c) 82
- d) 74

20. Jason's clock shows 24-hour time.

What time is it in 12-hour time when his clock shows:



21. Joshua drew two arcs with radius 6 cm and centres at the ends of a 6 cm line.

He drew lines from the ends of the line to where the arcs cross.



What 2D shape has Joshua drawn?

- a) an equilateral triangle
- b) an isosceles triangle
- c) a scalene triangle
- d) a triangular pyramid

22. Which number is missing from this number sentence?

 $79 - 5 \times (20 - 4) = ?$

Answer: _____

23. When Amelia dropped a ball from a balcony 16 metres above the

ground she noticed that it rose half as high again on each bounce.

Drop	After 1st bounce and fall	After 2nd bounce and fall	After 3rd bounce and fall
16 m	8 m + 8 m	4 m + 4 m	2 m + 2 m
Total	32 m	40 m	44 m

How far in total had the ball travelled when it reached the ground again **after** the 5th bounce?

a) 31 m

b) 46 m

c) 48 m

d) 47 m

24. Four jumps, all of length 2.3 units, start at 6 on the number line and go to the left.



Which number sentence is shown by these jumps?

- a) $(4-6) \times 2.3 = -4.6$
- b) 4 x 2.3 + 6 = 15.2
- c) $4 \times (2.3 6) = -14.8$
- d) $6 4 \times 2.3 = -3.2$

Answer: _____

25.

$$\frac{1}{\blacksquare^2} = 0.04$$

Susie is using her calculator to find which number \blacksquare represents.

First she finds the square root of 0.04 and then the reciprocal of that square root.

What does her calculator display?

- a) 16
- b) 25
- c) 0.2
- d) 5

26. Sheena scored 33 out of 40 for Science and 65 out of 90 for Mathematics. Use the graphs to convert Sheena's scores to percentages.



CONVERSION GRAPHS – SCORE to %

In which subject did Sheena get the higher percentage?

Answer: _____

27. The highest and lowest temperatures for a week were recorded.

DAY	HIGHEST	LOWEST
Mon.	27°C	18°C
Tues.	25°C	19°C
Wed.	26°C	19°C
Thurs.	28°C	21°C
Fri.	28°C	21°C
Sat.	30°C	18°C
Sun.	26°C	18°C

What is the average of the differences between highest and lowest daily temperatures?

a) 8°C

b) 9°C

c) 7°C

d) 10°C

28. The fractions of the whole tangram are written on six of the seven pieces.



What fraction is missing from the seventh piece?

- a) 1/16
- b) 1/8
- c) 3/8
- d) 1/4

Answer: _____

29. Eddie has \$2, \$1, 50c, 20c, 10c and 5c coins.

What is the smallest number of coins that Eddie can use to pay exactly for a \$3.65 thick shake?

- a) 7
- b) 6
- c) 5
- d) 4

30. Which angle of rotation about the point C will make triangle (a) coincide with triangle (b)?



31. The area of one face of a cube is 5 cm^2 .



Use your calculator to find the volume of the cube to the nearest $\rm cm^3$.

- a) 25 cm³
- b) 11 cm³
- c) 11 cm^2
- d) 25 cm²

32. One step in a flight of stairs rises 145 mm for each horizontal 224 mm.



A carpenter has to construct a flight of stairs from the Ground Floor to the First Floor 2755 mm above.



What will the horizontal length of the flight of stairs be?

- a) 4.256 m
- b) 42.56 mm
- c) 1.783 m
- d) 1783 mm

33. Φ is a positive number.

 $9 \times \Phi = 4 \div \Phi$

What is the value of Φ ?

- a) 2/3
- b) 3/2
- c) 6
- d) 1/6

Answer: _____

34. The recommended retail price for an MP3/4 music and video player is \$120.

The store sells it to Shari for \$96.

What percentage discount has the store given Shari?

- a) 75%
- b) 20%
- c) 25%
- d) 24%

35. Sammy observed that a snail took 120 minutes to move along a measuring tape from the 205.3 cm position to the 221.8 cm position.

Sammy calculated ...

What was the snail's pace (speed) in metres per hour?

Answer: _____

36. Black and white keys on a piano are grouped in 12s as shown.



Consider how many groups of 12 there are on an 88-key piano.

How many keys are left over in incomplete groups at the ends of the keyboard?

- a) 12 groups with 7 left over
- b) 7 groups with 4 left over
- c) 7 groups with 0 left over
- d) 12 groups with 4 left over

37. Four cones are made from the sectors, A, B and C, D.



38. The population of Australia increases by one person every **71** seconds.

The number of days for an increase of one million people is ...



39. A calculator display shows that ...

 $1\ 320\ 000\ x\ 980\ 000 = 1.2936\ x\ 10^{12}$

What will the calculator display for 13 200 000 x 98 000?

- a) 1.2936 x 10¹³
- b) 1.2936 x 10¹²
- c) 12936 x 10⁴
- d) 1293.60000

Answer: _____

40. If Dobie started from zero and counted by 18s,

0, 18, 36, 54, ... ,

never making a mistake and without stopping, which number would Dobie **not** reach?

- a) 180 027 364 590
- b) 180 000 721 863
- c) 180 000 007 236
- d) 180 000 007 218

The Answers.

Hey! No peeking until you've finished...



Answer: a

Start by identifying the starting position and the shape's "bottom left corner". This would be:

Now, keep that red dot still and turn the shape around this point. If we turn it clockwise, after 90 degrees it will look like this:

η.

Rotate this through a further 90 degrees clockwise. It will now look like this:

Now, line up this image with the original one by superimposing the red dots. Your diagram will resemble this answer:



Question 2

Answer: d

Sheila will most likely pick a black jellybean: This is false. There are more red jellybeans than black ones, so it is more likely that we would pick a red one than a black one. We also have no information about how many red or black jellybeans there are compared to blue and white jelly beans.

Sheila is more likely to pick a green jellybean than a blue jelly bean: This is false. There are no green jellybeans. **Sheila has the same chance of picking a red as picking a black jellybean:** This is false, because there are more red than black jellybeans. Therefore there is more chance of picking a red than a black.

Sheila has the same chance of picking a blue as picking a white jellybean: This is true, because there are just as many blue as white jellybeans.

Question 3

Answer: a

There are **six** possible routes, which are illustrated in the diagram.



Answer: c

We know that:



So, we can substitute the cross + 5 from the second equation for the triangle in the first equation, giving us:



Then, if we subtract the cross from both sides, we would have:



Answer: a

To find the amount of time between these two events, we need to do a subtraction:

	1	816
-	1	492
		477

There were 477 years between the two events.

Question 6

Answer: c

We can factorise the numerator in this fraction:

$$\frac{6 \times \xi + 9}{3}$$

The numerator has two terms:

$6 \times \xi_{and} + 9$

These two terms have a common factor of 3, so we can "factorise" the numerator like this:

Now, our whole fraction looks like this:

We can divide the numerator and the denominator by 3, leaving:

Question 7

Answer: b

We calculate the average (or "mean") by totalling all the scores and dividing by the number of scores:

Average = ^{Sum of scores}/number of scores

In this case, we don't know the individual amounts of petrol used each day, but we do know that 45 L were used altogether over the 5 days, so we can write:

Average = $45 L/_{5 days}$

Average = 9 L /day

Question 8

Answer: a

In metric measurement, "k" means one thousand, so 1 kg is 1000 grams, and 1km is 1000 metres.

When we use this symbol with money, it still means thousand, so Ms Habid could expect a salary between \$40 000 and \$55 000.

The answer that lies between these two numbers is \$47 500.

Answer: walk

If 1 cm represents 100 m, then:

6.8 cm will represent 6.8 x 100 = 680 m

There are 1000m in 1 km, so 680 m is LESS than 1km.

Therefore, Heidi will WALK to school.

Question 10

Answer: a

Let's check each of the choices:

58 - 45 = 13: This one is shown by the hop of 45 back from 58 to the point half way between 8 and 18 (13).

38 - 25 = 13: This one is shown by the hop of 25 back from 38 to 13.

13 + 25 + 20 = 58: This one is shown by the hop of 25 from 13 to 38, followed by the hop of 20 from 38 to 58.

25 - 13 = 12: This number sentence is NOT illustrated on this number line. There are no hops from 25 back to 12 shown, so this is the correct answer.

Answer: b

2 is itself a factor of 4 and 6, and 3 is a factor of 6, so we only need to worry about finding the lowest common multiple of 4 and 6.

One method is to list the first few multiples of one, and then find the lowest of those which is also a multiple of the other.

The first four multiple of 4 are: 4, 8, 12, 16.

The first four multiples of 6 are 6, 12, 18, 24.

The lowest common multiple is **12**.

Question 12

Answer: b

The container with the heaviest amount of water will be the one with the largest amount of water, which might be measured in milliltres or litres.

The containers are different shapes, but the amount of water in each is shown by the markings on the side. (These containers have markings that show lots of 50L, with marks inbetween these that would indicate increments of 25L.)

In three of the containers, the water level is at 100L. In the other one, it is at 150L, so this is the container with the heaviest amount of water:

F	\neg
12	150 L-
	100 L -
	50 L-
L	-

Answer: d

In a quadrilateral, the sum of angles is 360°. Therefore,

z° = 360° - 145° - 60° - 48°

z° = 360° - 253°

z° = 107°

Now, we can use the supplementary rule for parallel lines. If a single line crosses two parallel lines, the sum of the internal angles equal 180°.

This means that:

$$x + y + 48^{\circ} + z^{\circ} = 180^{\circ}$$

x + y + 48° + 107° = 180°

$$x + y = 180^{\circ} - 48^{\circ} - 107^{\circ}$$

x + y = 180° - 155°

 $x + y = 25^{\circ}$

Answer: b

The obtuse angle is shown below by the blue and red lines. To measure the angle, use the inside numbers on the protractor, starting at the 0 on the red line, and go anti-clockwise around to the blue line, which you will see is at **110 degrees**:



Question 15

Answer: d

Barangaroo Precinct is 170m x 1240m.

Remember that the area of a rectangle is given by:

Area = Length x width

Barangaroo Precinct is 170m x 1240m.

So, the area of Barangaroo Precinct will be:

Area (Barangaroo Precinct) = 170m x 1240m

= 210 800 m²

Hyde Park is 220 m x 740m, so its area is:

Area (Hyde Park) = 220m x 740m

= 162 800 m²

Now, we need to change these areas into hectares:

 $1 \text{ hectare} = 10 000 \text{ m}^2$

So, we need to divide our areas by 10 000 to change from m²to ha:

Area (Barangaroo Precinct) = 210 800 ÷ 10 000 = 21.08 ha

Area (Hyde Park) = 162 800 ÷ 10 000 = 16.28 ha

The difference between these two areas is:

21.08 - 16.28

= 4.8 ha, or approximately 5 ha.

So, the correct statement is:

"Barangaroo is about 5 ha larger than Hyde Park".

Question 16

Answer: 61

To change 88.99 to 90, we add 1.01, so we need to add the same amount to 59.99, which will make it **61**.

So on the right side we would have 90 - 61.

Answer: a

When we slice through a cone in a plane perpendicular to its base, the face we create will be a triangle.

Because the cone is symmetrical along this plane, then the two sides that meet at the apex of the cone will always be equal to each other, as shown below:



So, the triangle formed will ALWAYS be isosceles. In some cases, it MAY be equilateral (ie the base may be equal to the other sides), but in this question we can only be sure of it being isosceles.)

Question 18

Answer: d

To find the amount that each person in each household uses (on average), we need to split up the total amount evenly amongst the number of people.

That means we will need to divide.

At house number 1, 4 people used 3000L.

So, each person used:

3000 ÷ 4 = 750L

At house number 3, 6 people used 4800L.

So, each person used:

4800 ÷ 6 = 800L

At house number 5, 2 people used 1700L.

So, each person used:

1700 ÷ 2 = 850L.

Finally, at house number 7, 3 people used 2500L.

So, each person used:

 $2500 \div 3 = 833L$ (rounded to the nearest L).

Therefore, the most economical household was house number 1, with 750L per person.

(In Australia, most local governments have imposed long term water restrictions of about 200L per person per day, so everyone in this street needs to be using a lot less water!)

Question 19

Answer: d

South west is down and to the right in direction (at an angle or 45 degrees).

From kiosk K6, this will take Amira to restaurant 74.

Answer: b

Digital clocks displaying 24 hour time show midnight, which is 12:00am as 00:00.

Then, the hours are counted up all the way to 23:00 which is the same as 11:00pm at night.

The minutes are displayed in the same way as they are on a 12 hour am/pm digital clock.

"am" and "pm" are NOT shown on a 24 hour clock because we can tell from the number of hours whether the time is before or after midday.

So, 01:25 is the same as 1:25am (very early in the morning).

Question 21

Answer: a

We know that the bottom side of the triangle is 6cm long.

To draw the arcs, we have set our compass legs to a distance of 6cm. The arc that we draw from the blue corner of the triangle below is part of a circle of radius 6 cm, so that means the blue line drawn to the arc is also 6 cm: this side of the triangle is a radius of the circle/arc.

Likewise, the arc drawn from the red corner has a radius of 6cm, making the red side of the triangle a radius of that circle/arc, with a length of 6cm.

As all three sides of the triangle are 6cm, the triangle is **equilateral**.



Answer: -1

79 – 5 x (20 – 4) = ?

According to the BOMDAS order of operations, we must solve the brackets first. 20 - 4 = 16, so we have:

79 – 5 x 16 = ?

Multiplication comes before subtraction in the order of operations, so we do $5 \times 16 = 80$, so we have:

79 - 80 = ?

Solving, **? = -1**.

Question 23

Answer: d

Looking at the table, we can see that the number of metres added to the total travelled is half the previous amount:

After the 1st bounce: 16m is added;

After the 2nd bounce: 8m is added;

After the 3rd bounce: 4m is added.

So, we can predict that after the 4th bounce, 2m would be added, bringing the total distance travelled to 46m, and **after the 5th bounce, 1m would be added, bringing the total distance travelled to 47m**.

Answer: d

Consider each of the choices.

4 x (2.3 - 6) = -14.8: We can see immediately from the number line that this one cannot be correct, because the answer is smaller than -6. Also, the Order of Operations convention (which you might have learnt as "BOMDAS" is "BIMDAS" or something similar) requires that the brackets are done first, followed by the multiplication, so this does not match the diagram.

 $4 \times 2.3 + 6 = 15.2$: Once again, we can see that this answer is not correct because 15.2 is higher than the answer shown on the number line. In this one, Order of Operations would require that the multiplication of 4×2.3 is performed first, and then this is added to 6, whereas we want the 4 lots of 2.3 to be subtracted from 6.

 $(4 - 6) \ge 2.3 = -4.6$: Looking at the number line, this one COULD be correct as -4.6 is between 0 and -6. However, Order of Operations here requires that we do the brackets first, so we would have -2 $\ge 2.3 = -4.6$

 $6 - 4 \ge 2.3 = -3.2$: This option appears to be correct from looking at the number line as -3.2 lies between -6 and 0. Order of operations tells us to do the multiplication first, so we would calculate the 4 ≥ 2.3 and subtract it from the 6, as described in the question.

So, the correct answer is: $6 - 4 \times 2.3 = -3.2$

Answer: d

Susie has realised that to find the missing number, she needs to take the square root of both sides of the equation:

Therefore:

$$\frac{1}{2} = 0.04$$

So, from her calculator, Susie will know that:

$$\frac{1}{2} = 0.2$$

The square root of 0.04 is 0.2, and the square root of the left side cancels out the power of 2 in the denominator. So we are left with:

$$\frac{1}{2} = 0.2$$

Therefore, taking the reciprocal of both sides:



At the end of the steps Susie does on her calculator, it will display the answer 5.

Note: "taking the reciprocal" just means to write the number as a fraction and flip it upside down.

Question 26

Answer: science

By looking at the axes, we can see that each mark represents 10% (on the vertical axis) or 10 marks (on the horizontal axis).

The dotted lines show where Sheena's scores in the two tests intersect with the graphs for the two subjects.

For science in which Sheena achieved 33/40, read across from the Science graph to the vertical axis. This is about halfway between 80% and 90%, so say 85%.

For Maths, Sheena's score of 65 equates to 70% on the vertical axis.

So, Sheena did quite a lot better in Science.

Question 27

Answer: a

First, find the differences between the highest and lowest temperatures for each day. Write these in a new column on the table, headed "Differences".

Remember that an average is calculated by dividing the total of the scores by the number of scores.

DAY	HIGHEST	LOWEST	Differences
Mon.	27°C	18°C	9°C
Tues.	25°C	19°C	6°C
Wed.	26°C	19°C	7°C
Thurs.	28°C	21°C	7°C
Fri.	28°C	21°C	7°C
Sat.	30°C	18°C	12°C
Sun.	26°C	18°C	8°C

We now need to find the sum of the differences. This comes to 56.

Average = sum of scores / number of scores

= 56 / 7

= 8°C

So, the average difference between the highest and lowest daily temperatures is 8°C.

Question 28

Answer: b

We could work this out by looking at the diagram, or by adding the fractions and find what is needed to make one whole or one half of the whole.

Looking at the diagram, we can see that the missing section could be covered by two of the 1/16 triangles. So, the missing square is 2/16 which is the same as 1/8.

We could also consider just the one half of the diagram in which the missing square is found:



In the red triangle, which is one half of the whole or 8/16, we already have:

? + 1/8 + 1/8 + 1/16 + 1/16 = 8/16

? + 2/16 + 2/16 + 1/16 + 1/16= 8/16

? = 8/16 - 6/16

? = 2/16

So, the missing square is the remaining 2/16 or 1/8

Question 29

Answer: c

Start with the \$3.

This could be made up of one \$2 coin and one \$1 coin.

The 65 cents could be made up of: 50c + 10c+ 5c

So, the smallest number of coins he could use would be 5.

Answer: c

If we rotate this figure about point C, then by the time Triangle (a) corresponds with the starting position of Triangle (b), we have rotated it through 180 degrees. You can see this on the diagram below, remembering that a straight line is **180 degrees**:



Question 31

Answer: b

The volume of the cube is given by the area of its base (which is side x side), multiplied by its height (which is of course the same as the other dimensions), so:

Volume (cube) = $(S \times S) \times S$

As the area of the base is 5 cm^2 , (which is SxS or S^2 , then the side of this square will be the square root of 5.

So, the volume of the cube will be:

V (cube) = $5 \text{ cm}^2 x$ (V5) cm

On your calculator, type in:

5 x √5

Your answer should read:

11.18033989

The question asks for the volume to the nearest ;cm³, so we would round this to: 11 cm³

Question 32

Answer: a

If we work out how many steps are needed to go from the ground floor to the first floor, which is a height of 2755mm, we can then multiply that by the width of each step to find the horizontal distance.

The riser on each step is 145mm, so we would need:

2755 ÷ 145 = 19 steps.

Each step is 224mm wide, so 19 steps will be:

224 x 19 = 4 256mm.

There are 1000mm in 1m, so to change this to metres, we need to divide by 1000:

4 256 ÷ 1000 = 4.256m.

The horizontal length of the flight of stairs will be 4.256m.

Answer: a

To find the value of the unknown (Φ), we need to get it by itself on one side of the equation.

At the moment, we have the unknown on both sides of the equation. If we multiply the right hand side by Φ , that will "get rid" of it from there, but to keep the equation balanced, we must always do the same thing to both sides. This will give us:

 $9 \times \Phi = 4 \div \Phi$

 $9 \times \Phi \times \Phi = 4 \times \Phi \div \Phi$

The two Φ on the right side cancel out to leave us with:

 $9 \times \Phi^2 = 4$

Now, we can divide both sides by 9 to get the Φ^2 by itself:

 $\Phi^2 = 4 / 9$

To find Φ , we take the square root of both sides:

 $\Phi = \sqrt{4} / \sqrt{9}$

 $\Phi = 2 / 3$

Answer: b

The amount of the discount is the original price, less the selling price:

\$120 - \$96 = \$24

The percentage discount is this amount as a fraction of the original price, changed to a percentage. To change any fraction to a percentage, we simply multiply by 100%:

²⁴/₁₂₀ x 100%

24 goes evenly into 120, so we can simplify this to:

¹/₅ x 100%

= 100% ÷ 5

= 20%

So, Shari was given a 20% discount.

Question 35

Answer: 0.0825 metres per hour

From the information given, we could first of all work out the snail's speed in metres per minute, as the distances are given in metres and the time is in minutes.

The distance travelled is the difference between the starting and finishing positions on the measuring tape:

(2.218 - 2.053) metres

The time taken was 120 minutes.

So, in metres per minute, the snail's speed was:

Speed = (2.218 - 2.053) / 120 = 0.001375

This means the snail travels 0.001375 metres per 1 minute

In Sammy's calculations, he has then multiplied this by 60 to find the speed in metres per hour because there are 60 minutes in 1 hour.

So 0.001375 x 60 = 0.0825

This is in metres per hour, so the correct answer is:

0.0825 metres per hour

Question 36

Answer: b

To work out how many groups or lots of 12 there are in 88, we need to do a division:

From the x 12 table, we know that 7 x 12 is 84, so there will be 7 lots of 12, and there will be a remainder of 4.

$$12) 88 \\ \underline{-84} \\ 4$$

So, there will be **7 groups of 12 keys, with 4 keys not in groups** of 12. (On a piano, 3 of these are at the left end and 1 at the right end.)

Answer: d

A cone is made up of a circular base and a curved surface that comes to a point.

The curved surface has an edge that follows the circumference of the circular base, so this edge is an arc. The other two edges are straight lines that are brought together to form the curved side of the cone.

Try to imagine the three different circle sectors (A and B are identical) being curved around so that their straight edges meet. Notice that the radii of the circles used to make the sectors are all the same so the slant height of all the cones is the same.

The smaller the distance around the arc, the smaller the circumference of the cone's base, but the slant height for all the sectors is the same, so the resulting cone becomes taller.

So, the tallest cone is the one with the smallest sector.

The diagram below compares the cone made using the semi-circular arc and the cone made using the smallest arc. (The purple line shows the relative height of the resulting cones.)



Although these drawings are not exactly accurate, they demonstrate what happens as we reduce the circumference of the base of the cone whilst keeping the slant height constant.

So, the cone made using Sector C will be the tallest.

Question 38

Answer: b

The rate of population growth is being given as:

71 seconds per 1 person.

First, we need to find out how many seconds there are in 1 day?

We begin by looking at the number of hours in a day. There are 24 hours in a day, we multiply this by 60 to find how many minutes within a day, we multiply the result of that by another 60 to find out how many seconds there are in a day. So $24 \times 60 \times 60 = 86400$ seconds in 1 day.

We know that every 71 seconds there is an increase in 1 person. So for a 1 000 000 increase in population, it would be 71 seconds x = 1000 000 = 71000 000.

So it would take **71 000 000 seconds for a population increase of 1 000 000 people**. However, we want to know how many days it takes, not how many seconds. We have already found out that there are 86 400 seconds in 1 day.

Therefore, if we divide 71 000 000 by 86 400, we will get how many days it takes for this increase. So:

71 000 000 / 86 400 = 821.759 days

Which can be rounded off to 822, so it takes **822 days for a population increase of 1 000 000 people**.

Answer: b

Write the factors for both equations in scientific notation.

The original equation was

1 320 000 x 980 000

To write this in scientific notation, we use a number with a digit in the ones (units) column, followed by other digits as required in the decimal places (this is called the "mantissa") and multiply this by the required power of ten (called the "order").

So, 1 320 000 = 1.32 x 10⁶ and 980 000 = 9.8 x 10⁵

We can rearrange this as:

1.32 x 9.8 x 10⁶ x 10⁵

= 12.936 x 10¹¹

= 1.2936×10^{12} in scientific notation.

Our second equation is:

13 200 000 x 98 000, which in scientific notation is:

1.32 x 10⁷ x 9.8 x 10⁴ = 1.32 x 9.8 x 10⁷ x 10⁴ = 12.936 x 10¹¹ = **1.2936 x 10¹²**

So, the calculator will display exactly the same answer for the second equation as the first number is just a factor of 10 greater and the second number a factor of 10 smaller than they were in the first equation.

Answer: b

Multiplies of even numbers are ALWAYS even, as they are all also multiples of 2.

So, when counting in 18s, Dobie will never reach an odd number, such as:

180 000 721 863.

We can check the other (even) numbers to see if they are divisible by 18. To be divisible by 18, the number must be divisible by 2 and 9. As all the other numbers are even, we know they are divisible by 2.

To check for divisibility by 9, we ADD the digits in the number, and if THAT number is divisible by 9, then so is the original number.

In 180 027 364 590, the digits add to 45, which is divisible by 9, so this number is a multiple of 18.

This also applies to the other two choices. Try it for yourself, and then do the division by long division.