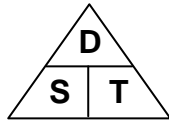


1a. $C = \pi D$ radius = 114,240
 so diameter is: $D = 2 \times 114\,240 = 228480$
 Hence $C = \pi \times 228480 = 717791.0895\dots$

b. To nearest whole kilometre:
 Circumference = 717, 791 km

2. Use: Speed = Distance \div Time
 (DST triangle)



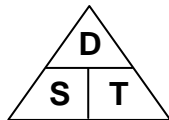
1 hour 40 minutes

must be changed to **decimal** time.

40 minutes : $40 \div 60 = 0.667$ hours
 So time = 1.667 hours.

Speed = $158 \div 1.667 = 94.781\dots$
 Average speed of train is: 94.8 km per hour.

3. Use: Distance = Speed \times Time
 (DST triangle)



3 hour 45 minutes

must be changed to **decimal** time.

45 minutes : $45 \div 60 = 0.75$ hours
 So time = 3.75 hours.

Distance = $76 \times 3.75 = 285$
 From Edinburgh to Inverness is: 285 km.

4. Overtime pay is time and a half.

Rate = $\pounds 6.50 \times 1.5 = \pounds 9.75$

She worked 4 hours overtime

Overtime pay was : $\pounds 9.75 \times 4 = \pounds 39$

Her total pay was $\pounds 136.50$ incl. the overtime.
 So her basic pay was $\pounds 136.50 - \pounds 39 = \pounds 97.50$

Her basic rate is $\pounds 6.50$

She must have worked:

$97.50 \div 6.50 = 15$ hours at the basic rate.

5 a) He will get $\pounds 500 \times 1.46 = \pounds 730$

b) For $\pounds 100$ he will get :

$100 \div 1.46 = \pounds 68.49$ (reversing part a)

Each pound will get 2.33 swiss francs

He will get:

$68.49 \times 2.33 = 159.58$ swiss francs.

6. To pick a coloured pencil he has 10 to choose from.

There are 3 green pencils

so there must be 7 coloured pencils that are not green.

$$P(\text{choose NOT green}) = \frac{7}{10}$$

7a) $5x - 2 = 2x + 19$

$5x = 2x + 21$ adding 2 to each side

$3x = 21$ subtract 3x from each side

$x = 7$ divide each side by 3

7b) $12 + 8p \rightarrow 4(3 + 2p)$

8a) $3(2w + 1) + 2(8 - w)$

$6w + 3 + 16 - 2w$

$4w + 19$

8b) $3x - 4 < 11$

$3x < 15$ add 4 to each side

$x < 5$ divide each side by 3

9a) $4(3x + 2) = 68$

$12x + 8 = 68$ remove brackets

$12x = 60$ subtract 8 from each side

$x = 5$ divide both sides by 12

9b) $15p + 20 \rightarrow 5(3p + 4)$

10a) $3(2x + 4) + 4(x - 2)$

$6x + 12 + 4x - 8$

$10x + 4$

10b) $6x + 2 \leq 20$

$6x \leq 18$ subtract 2 from each side

$x \leq 3$ divide both sides by 6

GENERAL Questions – 2 SOLUTIONS
CALCULATOR (continued)

11. Trek car for 4 days is: 5,560 pesetas per day.

Total cost: $4 \times 5,560 = 22,240$ pesetas.

Find 15% tax

$$22,240 \times \frac{15}{100} = 3,336 \text{ pesetas}$$

Add this on: $22,240 + 3,336 = 25,576$ pesetas

If £1 = 256 pesetas

Then cost in pounds sterling is:

$$25,576 \div 256 = \text{£}99.91$$

12. £1 = \$1.7

a) $\text{£}850 = 850 \times 1.7 = \1445

b) He spent \$ 963
He was left with $\$1445 - \$963 = \$482$

Change this back to £ at exchange rate of:
£1 = \$1.62.

$$482 \div 1.62 = \text{£}297.5308\dots$$

which is £ 297.50 to nearest 10p

13. Area of rectangle = $2.2 \times 1.5 = 3.3 \text{ m}^2$

A semi circle is half a circle.

Area of a circle is: $A = \pi r^2$

From the diagram, the DIAMETER is 2.2 m
So the radius is 1.1 m

Hence Area of circle is:

$$A = \pi \times 1.1^2 = 3.8013\dots \text{ m}^2$$

Take half of this for the semi circle.

Area of semi circle: 1.90 m^2

Add area of rectangle.

$$\text{Total area} = 1.90 + 3.3 = 5.2 \text{ m}^2$$

14. Use Pythagoras.

Let length of plastic strip on each tile be L.

Then: By Pythagoras:

$$L^2 = 30^2 + 20^2 \quad L^2 = 1300$$

$$\text{So, } L = \sqrt{1300} = 36.06 \text{ cm}$$

There are six of these tiles, so total length of plastic is: $6 \times 36.06 = 216.36 = 216.4 \text{ cm}$

15. Use Pythagoras.

$$BD^2 = 3.5^2 + 1.7^2 \quad BD^2 = 15.14$$

$$\text{So, } BD = \sqrt{15.14} = 3.89 \text{ m}$$

Length of diagonal BD = 3.89 m

16. Use Pythagoras.

Let diagonal length be D

$$D^2 = 5.5^2 + 3^2 \quad D^2 = 39.25$$

$$\text{So, } D = \sqrt{39.25} = 6.26 \text{ m}$$

Length of diagonal D = 6.26 m

17. a) 12 payments of £18 = £216

Payment in full is £195.

She pays: £21 extra.

b) This is:

$$\frac{21}{195} \times 100 = 10.769\dots = 10.8\%$$

18. a) Gross Pay: $270 + 8.50 = \text{£}278.50$

b) Total deductions: $42.39 + 21.15 = \text{£}63.54$

c) Net Pay: $\text{£}278.50 - \text{£}63.54 = \text{£}214.96$

Georges Basic Pay is £270 per week.

In a year he will earn $270 \times 52 = \text{£}14040$.

If he worked overtime every week
he would earn an extra: $8.50 \times 52 = \text{£}442$.

So in total he only earns: $14040 + 442 = \text{£}14482$

The new restaurant is offering him £893 more,
even if he is working overtime at his present job.

19. $C = \frac{P}{240}$

if P = 850

$$\text{then current is } C = \frac{850}{240} = 3.54 \text{ amps}$$

He should use a 5A fuse.

20. $E = \frac{1}{2}mv^2$ if m = 50 and v = 30

$$\text{then } E = \frac{1}{2} \times 50 \times 30^2 = 22,500 \text{ units}$$

GENERAL Questions – 2 SOLUTIONS
CALCULATOR (continued)

21. Enlargement scale factor is: $\frac{18}{12} \rightarrow 1.5$

Apply this scale factor to side AC

$$20 \times 1.5 = 30$$

So DF = 30 cm

22a. In triangle ABC:

$$65 + 35 = 100 \quad 180 - 100 = 80 \quad B \text{ is } 80^\circ$$

In triangle DEF:

$$35 + 80 = 115 \quad 180 - 115 = 65 \quad E = 65^\circ$$

The triangles have corresponding angles equal, so they are similar.

22b. DE is between 35° and 65° .

DE corresponds to AC (4.6 cm)

BC is between 35° and 80°

BC corresponds to DF

The enlargement scale factor is:

$$\frac{DF}{BC} = \frac{10.5}{4.2} = 2.5$$

Apply this scale factor to: AC (4.6 cm)

Then corresponding side DE is:

$$4.6 \times 2.5 = 11.5 \text{ cm}$$

23a Passengers travelling from Glasgow to Edinburgh by bus

1	2	4	7					
2	3	4	7	9	9			
3	1	2	4	6	6	8	8	9
4	1	2	5	8				

n = 20 1|2 represents 12 passengers

b) Median is between 10th and 11th items in list
 = 33 passengers

24a Credit card APR

14	9							
15	1	6						
16	2	2	2	5	6	7	8	
17	2	8	9	9				
18	0							

n = 15 14|9 represents 14.9%

- b) Median interest rate is 8th item in list
 = 16.6%
- c) modal is one occurring most
 = 16.2%
- d) fifth highest interest rate = 17.2%

25. Use trigonometry SOH-CAH-TOA

Let height be h. Mark up triangle opp, adj, hyp
 Tick what you have and what you want.
 SOH will have 2 ticks. Use sine ratio.

$$\sin 7^\circ = \frac{h}{5} \rightarrow h = 5 \sin 7^\circ \rightarrow h = 0.6093.. \text{ km}$$

To nearest metre this is 609 m

26. Arrange in order:

51, 59, 62, 62, 74, 77, 87, 93

- a) Range is Highest – Lowest $93 - 51 = 42$
- b) Mode: 62 (occurs most)
- c) Median (middle) - between 4th and 5th
 average of 62 and 74 = 68
- d) Mean ~ add up and divide by 8
 $= 565 \div 8 = 70.625 = \mathbf{70.6}$ (1 dp)

27. Use trigonometry SOH-CAH-TOA

Height of triangle = 2.8 cm
 Base of triangle = $9.8 - 3.5 = 6.3$ cm
 Mark up triangle opp, adj, hyp
 Tick what you have and what you want.
 TOA will have 2 ticks. Use tangent ratio.

$$\tan x^\circ = \frac{2.8}{6.3} \rightarrow x = \tan^{-1} \left(\frac{2.8}{6.3} \right) = 23.962..$$

To nearest degree, $x = 24^\circ$

28. Exactly the same as Qu. 27

Triangle sides are: 4 cm high. Base is 3 cm

$$\tan PSR^\circ = \frac{4}{3} \rightarrow x = \tan^{-1} \left(\frac{4}{3} \right) = 53.13..$$

Angle PSR = 53°