

## May 2022 – Foundation Tier Solutions

1<sup>st</sup>

$$M = 2(10) - 3(-4)^2 = 20 - 3(16) = 20 - 48 = -28$$

2<sup>nd</sup>

$$p = \frac{3r^2 - n}{5}$$

$$5p = 3r^2 - n$$

$$5p + n = 3r^2$$

$$\frac{5p + n}{3} = r^2$$

$$r = \pm \sqrt{\frac{5p + n}{3}}$$

3<sup>rd</sup>

There are 6234 people at a music concert.

2107 are men, 2522 are women.

$\frac{2}{5}$  of the children at the concert are boys.

What percentage of those at the concert are girls?

$$\text{Children} = 6234 - 2107 - 2522 = 1605$$

$$\text{Girls} = \frac{3}{5} \times 1605 = 963$$

$$\% \text{ girls} = \frac{963}{6234} \times 100 = 15.44\%$$

4<sup>th</sup>

$$\text{LCM} = 72$$

$$\text{HCF} = 12$$

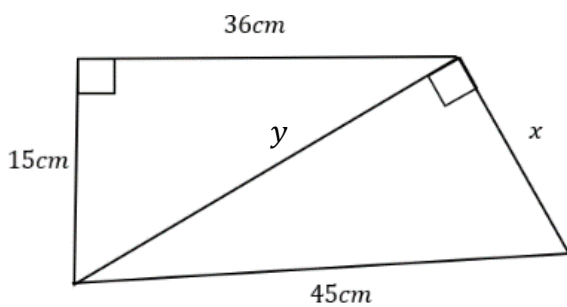
5<sup>th</sup>

$$\text{Height} = 2 \times 30 \div 8 = 7.5\text{cm}$$

6<sup>th</sup>

$$\frac{3}{8} = \frac{12}{32} = \frac{27}{72} = \frac{45}{120}$$

7<sup>th</sup> / 8<sup>th</sup>



$$15^2 + 36^2 = y^2$$

$$225 + 1296 = y^2$$

$$1521 = y^2$$

$$y = 39\text{cm}$$

$$x^2 + 39^2 = 45^2$$

$$x^2 = 504$$

$$x = 6\sqrt{14}\text{cm} \text{ or } 22.45\text{cm}$$

9th

(a) 65 : 180

$$1 : \frac{36}{13} \quad (1 : 2.769)$$

(b) Length =  $90 \times \frac{36}{13} = \frac{3240}{13} \text{ cm}$  or 249.23cm

10th

(a) 1.9713925      (b) 1.97

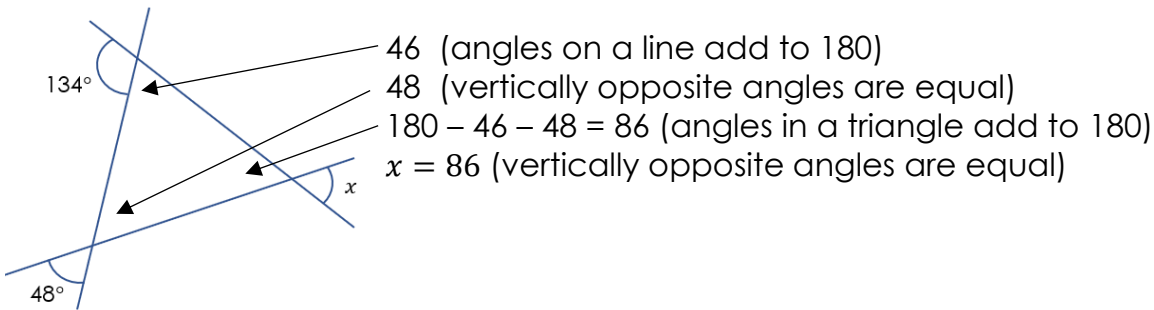
11th

$$P(\text{prime}) = \frac{4}{10} = \frac{2}{5}$$

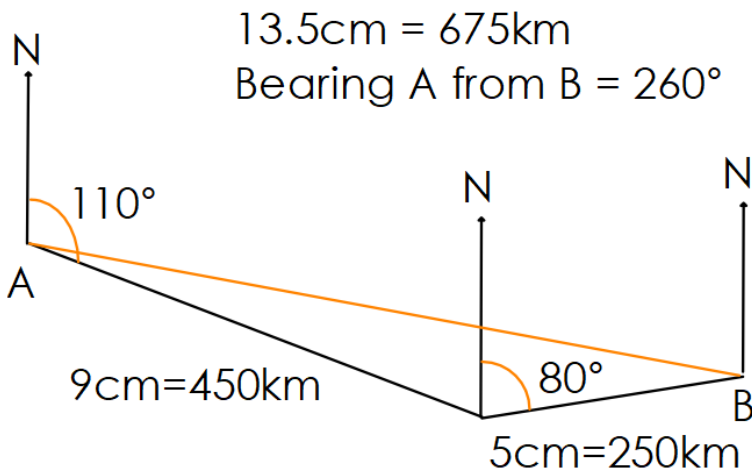
12th

$$225792 \div 1.12^2 = 180,000$$

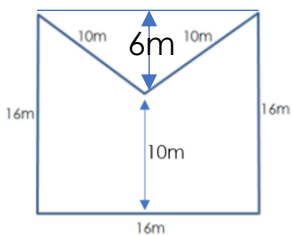
13th



14th / 15th



16th



Area of square  
 $= 16 \times 16 = 256\text{cm}^2$   
 Area of triangle  
 $= \frac{1}{2} \times 16 \times 6 = 48\text{cm}^2$   
 Area of Pentagon  
 $= 256 - 48 = 208\text{cm}^2$

**17<sup>th</sup>**

(a)

$$5(3x + 1) + 2(5 - 2x) = 15x + 5 + 10 - 4x = 11x + 15$$

(b)

$$(x + 9)(2x - 3) = 2x^2 + 12x - 27$$

**18<sup>th</sup>**

(a) Find the nth term for the sequence

7, 11, 15, 19, 23, 27,...

(b) Paul says that 325 is in both the sequence in (a) and the sequence with nth term  $8n - 9$ .

Is Paul correct?

Explain your reasoning.

(a)  $4n - 3$

(b)  $4n - 3 = 325$

$$4n = 328 \quad n = 82 \quad 82^{\text{nd}} \text{ term in } 1^{\text{st}} \text{ sequence}$$

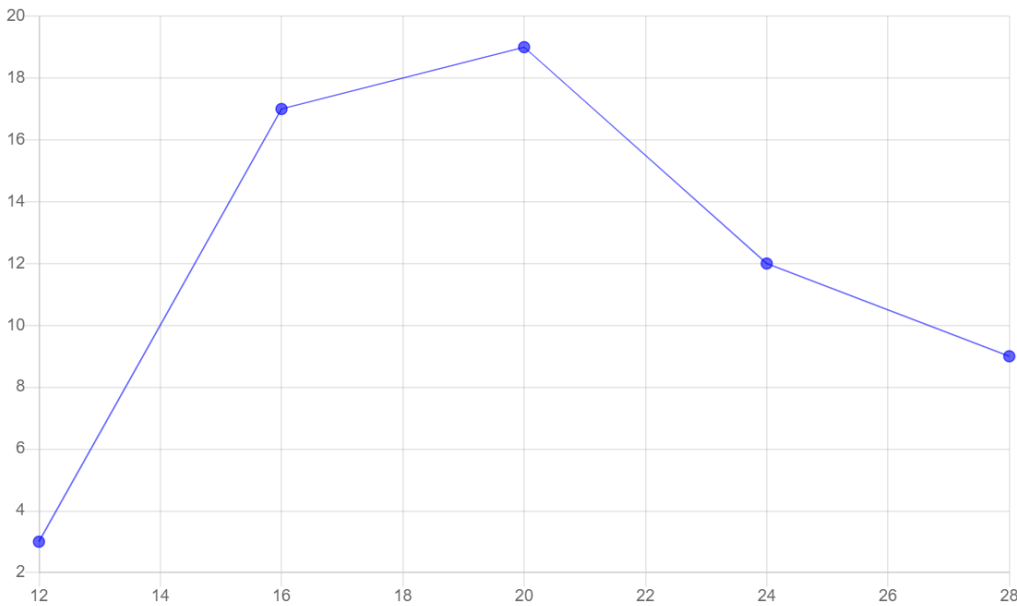
$$8n - 9 = 325$$

$$8n = 334$$

$n = 41.75$   $n$  has to be a whole number so 325 is NOT in the 2<sup>nd</sup> sequence

So Paul is wrong.

**19<sup>th</sup>**



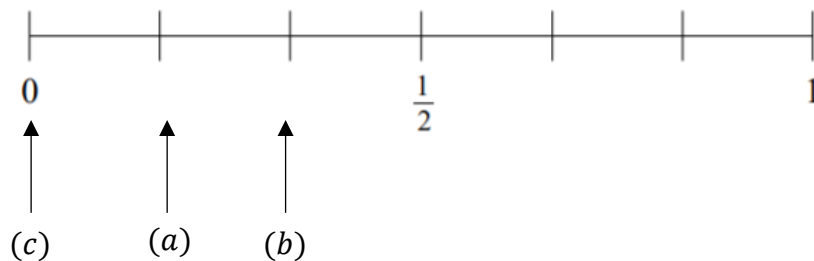
**20<sup>th</sup>**

6 painters = 4 days = 12 rooms (inverse proportion)

3 painters = 8 days = 12 rooms (direct proportion)

3 painters = 10 days = 15 rooms

**21<sup>st</sup> / 22<sup>nd</sup>**



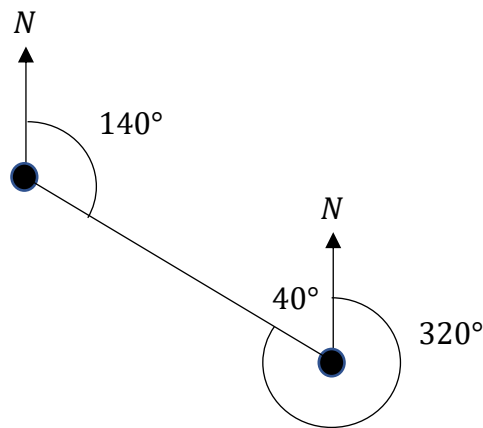
**23<sup>rd</sup>**

(a)  $4x^3 - 9x^5 = x^3(4 - 9x^2)$

(b)  $12ab - 3b + 9ab^2 = 3b(4a - 1 + 2ab)$

**24<sup>th</sup>**

320°



**25<sup>th</sup>**

Swimming =  $\frac{2}{1.4} = \frac{10}{7} hr$

Running =  $\frac{5}{6} hr$

Cycling =  $\frac{20}{15} = \frac{4}{3} hr$

Total Time =  $\frac{10}{7} + \frac{5}{6} + \frac{4}{3} = \frac{151}{42} hr = 3h36m$

**26<sup>th</sup>**

Rent =  $1260 \div 3 = £420$

Food =  $0.15 \times 1260 = £189$

Gas/Electricity =  $1260 \div 12 = £105$

Left =  $1260 - 420 - 189 - 105 = £546$

**27<sup>th</sup>**

Ann =  $x$

Ben =  $3x$

Chris =  $3x - 7$

Denise =  $x + 13$

$3x - 7 = x + 13$

$2x - 7 = 13$

$2x = 20$

$x = 10$

Ann = 10, Ben = 30, Chris and Denise = 23 Total = 86

**28<sup>th</sup> / 29<sup>th</sup>**

Points	Frequency
0	7
1	14
2	11
3	6
4 or more	0

(a) Mean =  $\frac{(0 \times 7) + (1 \times 14) + (2 \times 11) + (3 \times 6)}{38} = \frac{54}{38} = 1.42$

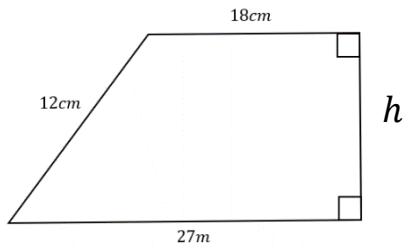
(b) Range =  $3 - 0 = 3$

(c) Thurlstone Town has a larger mean than Thurlstone Rovers so they score more goals per game on average. Thurlstone Town has a smaller range than Thurlstone Rovers so their goal scoring is more consistent.

**30<sup>th</sup>**

- (a) a factor of 20 = 2 or 10 (a number which divides into 20 without a remainder)
- (b) a multiple of 6 = 24, 36 or 48 (a number in the 6 times table)
- (c) a prime number = 2 or 11 (a number which has exactly 2 factors, 1 and itself)
- (d) a square number = 9 or 36 (a number found by multiplying one number by itself)
- (e) a cube number = 8 or 27 (a number found by multiplying one number by itself and by itself again)

**31<sup>st</sup>**



$$h^2 + 9^2 = 12^2$$

$$h = 144 - 81 = 63$$

$$h = \sqrt{63}$$

$$\text{Area} = \frac{1}{2}(18 + 27)(\sqrt{63}) = 178.6\text{cm}^2$$