

**21 Today #4**  
**Brief Answers**

**GCSE Mathematics**  
**Twenty-One Today**

**Answer 1**

$$(i) \quad \text{Area} = \frac{1}{2} \times \pi \times \left( \frac{9.6}{2} \right)^2 = 36.2 \text{ cm}^2$$

[ 1 mark ]

$$(ii) \quad \text{Perimeter} = \frac{1}{2} \times 2 \times \pi \times \left( \frac{9.6}{2} \right) + 9.6 = 24.7 \text{ cm}$$

[ 1 mark ]

**Answer 2**

$$m = \frac{\Delta y}{\Delta x} = \frac{49}{14} = 3.5$$

[ 1 mark ]

**Answer 3**

$$(i) \quad \vec{BD} = 3a$$

$$(ii) \quad \vec{AE} = 2a + b$$

$$(iii) \quad \vec{CD} = a - b$$

$$(iv) \quad \vec{DA} = -4a - 2b$$

[ 2 marks ]

**Answer 4**

$$H = \sqrt{10^2 + 8^2} = \sqrt{164} = 12.8 \text{ mm}$$

$$\text{Perimeter} = 10 + 8 + 8 + 12.8 + (12.8 - 10) = 41.6 \text{ mm}$$

[ 2 marks ]

**Answer 5**

$$\text{Average (mean)} = \frac{1 + 2 + 3 + 4 + 5 + 6}{6} = 3.5 \text{ pips}$$

[ 1 mark ]

**Answer 6**

Get the data in order !

45    45    48    51    52    55    56    58    63    78    80

$$\frac{11 + 1}{4} = 3$$

45    45    48    51    52    55    56    58    63    78    80

$$IQR = 63 - 48 = 15$$

[ 2 marks ]

**Answer 7**

The hexagon is constructed from 6 equilateral triangles, each with three  $60^\circ$  angles.

$$\text{Area Hexagon} = 6 \times \frac{1}{2} \times 10 \times 10 \times \sin 60 = 260 \text{ cm}^2$$

[ 3 marks ]

**Answer 8**

$$16 \times 120 \times 100 = 192000 \text{ ways}$$

**[ 2 marks ]****Answer 9**

$$\frac{3x - 2}{4} - \frac{2x + 5}{3} = \frac{1 - x}{6}$$

Multiply through by 12

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

$$9x - 6 - 8x - 20 = 2 - 2x$$

$$3x = 28$$

$$x = \frac{28}{3}$$

**[ 4 marks ]****Answer 10**

$$y = k\sqrt{x}$$

$$100 = k\sqrt{400}$$

$$100 = 20k$$

$$k = 5 \quad \Rightarrow y = 5\sqrt{x}$$

**[ 2 marks ]****Answer 11**

$$\frac{30000}{15} = \text{£}2000 \text{ for each part}$$

Mary gets 4 more parts than Peter so Mary gets £8000 more

**[ 2 marks ]****Answer 12**

$$(i) \quad x = 132^\circ \quad (ii) \quad y = 66^\circ$$

**[ 2 marks ]****Answer 13**

$$(i) \quad \text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{1000}{340} = 3 \text{ seconds}$$

**[ 1 mark ]**

$$(ii) \quad \text{About 2 km}$$

**[ 1 mark ]****Answer 14**

$$fff(2) = ff(4) = f(1) = 16$$

**[ 2 marks ]****Answer 15**

$$3x^2 = 108 \Leftrightarrow x^2 = 36 \Leftrightarrow x = \pm 6$$

**[ 1 mark ]**

**Answer 16**

$$200000 \times 1.015^4 = \text{£}212272.71 \text{ in the account after 4 years}$$

$$\therefore \text{Total interest} = \text{£}12272.71$$

**[ 2 marks ]****Answer 17**

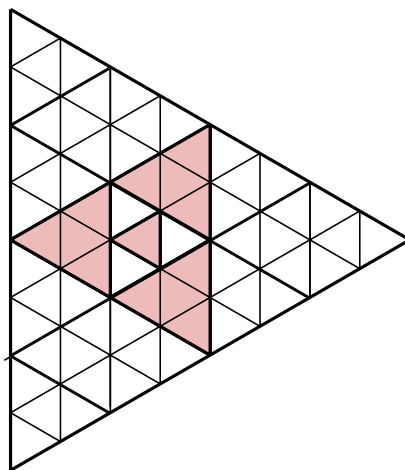
( i )  $1.102 \times 10^{18}$  (This is 1.102 ExaFlops)

**[ 1 mark ]**

( ii )  $\frac{365 \times 24 \times 60 \times 60}{10\,000\,000} = 3.15 \text{ seconds}$

**[ 1 mark ]****Answer 18**

$$\text{Radius} = \sqrt{24^2 + 7^2} = 25$$

**[ 1 mark ]****Answer 19**

$$\text{Fraction shaded} = \frac{13}{64}$$

**[ 2 marks ]****Answer 20**

$$f(f^{-1}(x)) = x$$

**[ 1 mark ]****Answer 21**

$$\frac{13}{52} \times \frac{12}{51} \times \frac{11}{50} \times \frac{10}{49} = \frac{11}{4165} \text{ (About 0.00264)}$$

**[ 2 marks ]**