Mock Set 1 Paper 02 Calculator — Solutions

Foundation Tier   —   Total Marks: 80

Time allowed: 1 hour and 30 minutes

Instructions

This document provides worked solutions to all questions from the mock paper. Use this for revision and checking your methods.

Solutions

Question 1

Answer

4, 6

Explanation

A factor divides the number exactly.

Factors of 24 are $1, 2, 3, 4, 6, 8, 12, 24$.

Any two of these are acceptable (e.g., 4 and 6).

Question 2

Answer

$\dfrac{4}{5}$

Explanation

$0.8 = \dfrac{8}{10}$

Simplify by dividing top and bottom by $2 : \dfrac{8}{10} = \dfrac{4}{5}$.

Question 3

Answer

450 cm

Explanation

1 metre = 100 cm

4.5 metres $= 4.5 \times 100 = 450$ cm

Question 4

Answer

25

Explanation

Square numbers are: $1, 4, 9, 16, 25, 36, 49, \ldots$

Between 10 and 50, we have $16, 25, 36, 49$.

One example is 25.

Question 5

Answer

120

Explanation

$50\% = \dfrac{50}{100} = \dfrac{1}{2}$

Half of $240 = 120$

Question 6

Answer

£12

Explanation

Total pay $= 48$, total hours $= 4$

Pay per hour $= \dfrac{48}{4} = 12$

Question 7

Question 7(a)

Answer

Cylinder

Explanation

This shape has two equal circular faces and one curved surface, which makes it a cylinder.

Question 7(b)

Answer

Sketch of a rectangular prism

Explanation

Draw a 3D shape with 6 rectangular faces, opposite faces equal in size.

Question 8

Answer

Yes

Explanation

Footballs: $4 \times £8.50 = £34$

Hockey sticks: 6 sticks = 3 packs at $£24 = £72$

Cricket bats: $3 \times £21 = £63$

Tennis balls: £6 for $6 = £6$

Total = $£(34 + 72 + 63 + 6) = £175 \leq £180 \Rightarrow$ Yes, he can buy everything.

Question 9

RP, RS, RC, BP, BS, BC, GP, GS, GC

Shirts: Red (R), Blue (B), Green (G)

Ties: Plain (P), Striped (S), Checked (C)

List all combinations:

$RP, RS, RC, BP, BS, BC, GP, GS, GC$

Question 10

5:7

Number of green marbles $= 35$,   Number of yellow marbles $= 49$.

Ratio (green : yellow) $= 35 : 49$.

Divide both numbers by their greatest common divisor (GCD) which is 7:

$35 \div 7 = 5$, $49 \div 7 = 7$.

$\therefore$ Simplest form is $5 : 7$.

Question 11

Question 11(a)

unlikely

$P(\text{picking an Ace}) = \frac{4}{52} = \frac{1}{13}$, which is small, so 'unlikely'.

Question 11(b)

> **Answer**
>
> evens

> **Explanation**
>
> $P(\text{picking a red card}) = \frac{26}{52} = \frac{1}{2}$, so 'evens'.

Question 12

> **Answer**
>
> 216 km

> **Explanation**
>
> $\text{Distance} = \text{Speed} \times \text{Time}$
> $= 72 \times 3 = 216$ km

Question 13

Question 13(a)

> **Answer**
>
> She multiplied each dimension twice instead of once; correct area is $7 \times 3 = 21$ cm^2.

> **Explanation**
>
> $\text{Area} = 7 \times 3 = 21 \text{ cm}^2, \text{not } 7 \times 3 \times 7 \times 3.$

Question 13(b)

> **Answer**
>
> Area should be in cm^2, not cm.

> **Explanation**
>
> Area is measured in square units; 42 cm is a length, not an area.

Question 14

Answer

£7.90

Explanation

Let rice cost per kg $= r$, beans cost per kg $= b$.
$4r = 5.60 \Rightarrow r = 1.40$.
$3r + 7b = 10.15 \Rightarrow 4.20 + 7b = 10.15 \Rightarrow 7b = 5.95 \Rightarrow b = 0.85$.
$2r + 6b = 2(1.40) + 6(0.85) = 2.80 + 5.10 = 7.90$.

Question 15

Answer

£56.40

Explanation

Liam gets 65% of £120 $= 0.65 \times 120 = 78$.
He spends 28% of £78 $= 0.28 \times 78 = 21.84$.
Money left $= 78 - 21.84 = 56.40$.

Question 16

Answer

23

Explanation

Total people $= 150$. Children $= 64 \Rightarrow$ Adults $= 86$.
Football total $= 28$: children 12 $\Rightarrow$ adults 16.
Basketball total $= 70$: adults 41 $\Rightarrow$ children 29.
Let children choosing tennis $= x$. Adults choosing tennis $= 9$.
Given: children choosing tennis $=$ adults choosing rugby (y), so $x = y$.
Rugby total $= 150 - 28 - 70 - (9 + x) = 43 - x$.
Children total: $12 + 29 + x + \big((43 - x) - y\big) = 64 \Rightarrow 84 - y = 64 \Rightarrow y = 20$.
Hence $x = 20$, Rugby total $= 43 - x = 23$.

Question 17

    Question 17a

Question 18

> **Answer**
>
> (a) $\dfrac{12.5 + 7.3}{5.4 \times 3.2} = \dfrac{19.8}{17.28} \approx 1.1458333333$
>
> (b) To 2 decimal places: 1.15

> **Explanation**
>
> Numerator: $12.5 + 7.3 = 19.8$.
> Denominator: $5.4 \times 3.2 = 17.28$.
> Division: $19.8 \div 17.28 \approx 1.1458333333$.
> Rounded to 2 d.p.: 1.15.

Question 19

> **Answer**
>
> $115°$

> **Explanation**
>
> Since $DE \parallel AC$ and CD is a transversal, the interior angles on the same side are supplementary.
>
> $x + 65° = 180° \;\Rightarrow\; x = 115°$.

Question 20

x	-2	-1	0	1	2	3
y	5	0	-3	-4	-3	0

and sketch a smooth curve.

Plot (-2,5),(-1,0),(0,-3),(1,-4),(2,-3),(3,0)

Explanation

Use $y = x^2 - 2x - 3$. Compute for each x:

$x = -2:\ 4 + 4 - 3 = 5.$ $x = -1:\ 1 + 2 - 3 = 0.$ $x = 0:\ 0 - 0 - 3 = -3.$

$x = 1:\ 1 - 2 - 3 = -4.$ $x = 2:\ 4 - 4 - 3 = -3.$ $x = 3:\ 9 - 6 - 3 = 0.$

Plot the points and join with a smooth U-shaped curve.

Question 21

Answer

Reflection in the line $y = x$.

Explanation

Triangles A and B are congruent, so the transformation is isometric.

Their orientation is reversed, so it is not a translation or rotation of $180°$.

Checking corresponding vertices shows $(a, b) \mapsto (b, a)$, so each point is mirrored across $y = x$.

$\therefore$ the single transformation is a reflection in the line $y = x$.

Question 22

Question 22(a)

Answer

$9a + 11$

Explanation

$4(a + 3) = 4a + 12,\quad 5(a - 1) = 5a - 5,$

$4a + 12 + 5a - 5 = 9a + 7.$

Question 22(b)

Answer

$7y(y-6)$

Explanation

HCF of $14y^2$ and $42y$ is $7y$,
$14y^2 - 42y = 7y(y-6)$.

Question 22(c)

Answer

$\dfrac{q+8}{5}$

Explanation

$q = 5p - 8 \Rightarrow q + 8 = 5p \Rightarrow p = \dfrac{q+8}{5}$.

Question 23

Answer

32

Explanation

Total cost $= 85 + 150 + 95 = 330$.
Tickets sold $= 60 \times 7.25 = 435$.
Profit $= 435 - 330 = 105$.
Percentage profit $= \dfrac{105}{330} \times 100 \approx 31.82\%$ (32% to the nearest whole number).

Question 24

Answer

£5310.74

Explanation

$\text{Principal} = 5000, \ \text{Rate} = 3.05\% = 0.0305, \ \text{Time} = 2 \text{ years}.$

$\text{Amount} = 5000 \times (1 + 0.0305)^2$

$= 5000 \times (1.0305)^2$

$= 5000 \times 1.062148025$

$= 5310.74.$

Question 25

Answer

8

Explanation

$7y - 10 = 38 - y$

$7y + y - 10 = 38$

$8y - 10 = 38$

$8y = 38 + 10$

$8y = 48$

$y = 8$

Question 26

£18

Explanation

Initial ratio: $5 : 3 : 4$, Ben's share $= 3k = ninety$

$k = 30$.

Alex: $5k = 150$, Ben: 90, Carl: $4k = 120$.

Final ratio: $4 : 5 : 3$, let multiplier be m.

Alex: $4m$, Ben: $5m$, Carl: $3m$.

Total initially: $150 + 90 + 120 = 360$, total finally: $12m$.

$12m = 360 \Rightarrow m = 30$.

Final shares: Alex: 120, Ben: 150, Carl: 90.

Carl had initially 120, now 90, so he gave away 30. Of this, Alex's loss is $150 - 120 = 30$, so all of Carl's loss went to

Actually, Ben had 90, now 150, so gained 60. Alex had 150, now 120, so lost 30. The remaining 30 gained by Ben cam

Carl gave to Ben: 18

Question 27

Answer

$065°$

Explanation

Bearings are measured clockwise from north.

If the bearing from X to Y is $245°$,

then the bearing from Y to X is $245° + 180° = 425°$.

Since this is greater than $360°$, subtract $360°$ $\Rightarrow 065°$.

Question 28

Answer

85

Explanation

Volume of cylinder $V = \pi r^2 h = \pi(18)^2(50) = \pi \cdot 324 \cdot 50 = \pi \cdot 16200$

$V \approx 50893.8 \text{ cm}^3 = 50.8938 \text{ L}$ $(1 \text{ L} = 1000 \text{ cm}^3)$.

$\text{Time} = \dfrac{50.8938}{0.60} = 84.823\ldots$ minutes $\Rightarrow$ $\boxed{85 \text{ minutes}}$ (nearest minute).

Question 29

Answer

14.3 cm

Explanation

In right-angled $\triangle ABC$, $\angle C = 37°$ and the side adjacent to $\angle C$ is $BC = 19$ cm.

$\tan(37°) = \dfrac{\text{opposite}}{\text{adjacent}} = \dfrac{AB}{19}$.

$AB = 19\tan(37°) \approx 19 \times 0.7536 = 14.317\ldots$ cm.

To 3 s.f.: 14.3 cm.

Question 30

Answer

x = 2,   y = -1

Explanation

$2x + y = 3$ (1)

$5x + 3y = 7$ (2)

Multiply (1) by 3: $6x + 3y = 9$ (3)

$(3) - (2):$ $(6x - 5x) + (3y - 3y) = 9 - 7$

$x = 2$

Substitute into (1): $2(2) + y = 3$

$4 + y = 3$ $\Rightarrow$ $y = -1$