2.17 Geometry, Measures and Constructions Depth: 1-hour Pack

Total Marks

ISEB CE 13+ Mathematics · Calculator allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

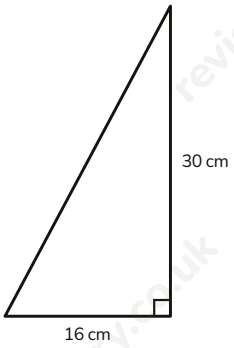
Answer ALL questions. Show all your working.

1 Each interior angle of a regular polygon is 168 degrees. How many sides does the polygon have?

- ☐ A) 168
- ☐ B) 29
- ☐ C) 30
- ☐ D) 31
- ☐ E) 32

---

2 A right-angled triangle has shorter sides of 16 cm and 30 cm. Find the length of the hypotenuse.



- ☐ A) 34 cm
- ☐ B) 14 cm
- ☐ C) 1156 cm
- ☐ D) 35 cm
- ☐ E) 46 cm

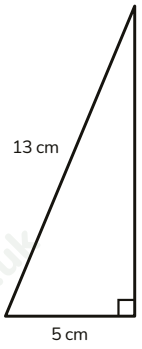
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3 Each exterior angle of a regular polygon is 15 degrees. How many sides does the polygon have?

- [ ] A) 25
- [ ] B) 23
- [ ] C) 15
- [ ] D) 12
- [ ] E) 24

---

4 A right-angled triangle has a hypotenuse of 13 cm and one other side of 5 cm. Find the length of the third side.



- [ ] A) 8 cm
- [ ] B) 12 cm
- [ ] C) 13 cm
- [ ] D) 144 cm
- [ ] E) 194 cm

---

5 Two parallel lines are crossed by a straight line. Two alternate angles are (x - 14) degrees and (2x - 47) degrees. Find the value of x.

- [ ] A) 33
- [ ] B) 161
- [ ] C) 31
- [ ] D) 19
- [ ] E) 35

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6 What is the size of each interior angle of a regular polygon with 12 sides?

- [ ] A) 1800 degrees
- [ ] B) 30 degrees
- [ ] C) 165 degrees
- [ ] D) 160 degrees
- [ ] E) 150 degrees

---

7 A ship sails 20 km due east then 12 km due north. How far is it from its starting point, to 1 decimal place?

- [ ] A) 23 km
- [ ] B) 16.0 km
- [ ] C) 32 km
- [ ] D) 23.3 km
- [ ] E) 544 km

---

8 Two parallel lines are crossed by a straight line. Two corresponding angles are $(4x + 17)$ degrees and $(x + 38)$ degrees. Find the value of x.

- [ ] A) 45
- [ ] B) 9
- [ ] C) 7
- [ ] D) 25
- [ ] E) 135

---

9 Two parallel lines are crossed by a straight line. Two alternate angles are $(x + 41)$ degrees and $(3x + 27)$ degrees. Find the value of x.

- [ ] A) 28
- [ ] B) 48
- [ ] C) 5.5
- [ ] D) 7
- [ ] E) 5

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10 Each exterior angle of a regular polygon is 40 degrees. How many sides does the polygon have?

- [ ] A) 40
- [ ] B) 8
- [ ] C) 9
- [ ] D) 10
- [ ] E) 11

---

11 A rectangle measures 9 cm by 16 cm. Find the length of its diagonal, to 1 decimal place.

- [ ] A) 18.4 cm
- [ ] B) 19 cm
- [ ] C) 12.5 cm
- [ ] D) 13.2 cm
- [ ] E) 25 cm

---

12 Two parallel lines are crossed by a straight line. Two corresponding angles are (2x + 21) degrees and (3x - 10) degrees. Find the value of x.

- [ ] A) 29
- [ ] B) 83
- [ ] C) 33
- [ ] D) 97
- [ ] E) 31

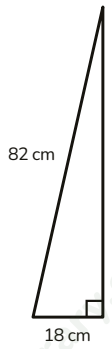
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13 Each exterior angle of a regular polygon is 30 degrees. How many sides does the polygon have?

- [ ] A) 13
- [ ] B) 12
- [ ] C) 30
- [ ] D) 6
- [ ] E) 8

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14 A right-angled triangle has a hypotenuse of 82 cm and one other side of 18 cm. Find the length of the third side.



- [ ] A) 6400 cm
- [ ] B) 81 cm
- [ ] C) 7048 cm
- [ ] D) 100 cm
- [ ] E) 80 cm

---

15 Two parallel lines are crossed by a straight line. Two alternate angles are (2x + 5) degrees and (3x - 34) degrees. Find the value of x.

- [ ] A) 97
- [ ] B) 83
- [ ] C) 41
- [ ] D) 39
- [ ] E) 37

---

16 What is the size of each interior angle of a regular polygon with 24 sides?

- [ ] A) 15 degrees
- [ ] B) 165 degrees
- [ ] C) 175 degrees
- [ ] D) 172.5 degrees
- [ ] E) 7.5 degrees

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17 Two parallel lines are crossed by a straight line. Two corresponding angles are (5x + 33) degrees and (x + 57) degrees. Find the value of x.

- [ ] A) 6
- [ ] B) 15
- [ ] C) 63
- [ ] D) 22.5
- [ ] E) 45

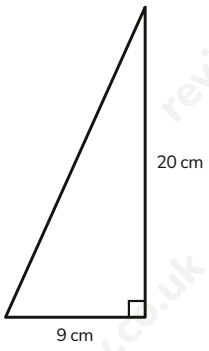
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18 Each exterior angle of a regular polygon is 10 degrees. How many sides does the polygon have?

- [ ] A) 37
- [ ] B) 35
- [ ] C) 36
- [ ] D) 10
- [ ] E) 18

---

19 A right-angled triangle has shorter sides of 9 cm and 20 cm. Find the length of the hypotenuse. Give your answer to 1 decimal place.



- [ ] A) 17.9 cm
- [ ] B) 22 cm
- [ ] C) 21 cm
- [ ] D) 481 cm
- [ ] E) 21.9 cm

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20 Two parallel lines are crossed by a straight line. Two alternate angles are (5x - 14) degrees and (3x + 36) degrees. Find the value of x.

- [ ] A) 111
- [ ] B) 69
- [ ] C) 79
- [ ] D) 25
- [ ] E) 8.5

---

21 What is the size of each exterior angle of a regular 30-sided polygon?

- [ ] A) 6 degrees
- [ ] B) 12 degrees
- [ ] C) 168 degrees
- [ ] D) 22 degrees
- [ ] E) 348 degrees

---

22 A rectangle measures 14 cm by 16 cm. Find the length of its diagonal, to 1 decimal place.

- [ ] A) 21.3 cm
- [ ] B) 15.0 cm
- [ ] C) 22 cm
- [ ] D) 452 cm
- [ ] E) 21 cm

---

23 Two parallel lines are crossed by a straight line. Two corresponding angles are (3x - 8) degrees and (x + 56) degrees. Find the value of x.

- [ ] A) 32
- [ ] B) 92
- [ ] C) 78
- [ ] D) 34
- [ ] E) 88

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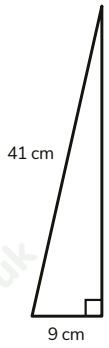
24 What is the size of each exterior angle of a regular 20-sided polygon?

- [ ] A) 342 degrees
- [ ] B) 9 degrees
- [ ] C) 162 degrees
- [ ] D) 28 degrees
- [ ] E) 18 degrees

---

25 A right-angled triangle has a hypotenuse of 41 cm and one other side of 9 cm. Find the length of the third side.

Diagram NOT accurately drawn



- [ ] A) 1600 cm
- [ ] B) 32 cm
- [ ] C) 40 cm
- [ ] D) 41 cm
- [ ] E) 50 cm

---

26 Two parallel lines are crossed by a straight line. Two alternate angles are $(3x + 37)$ degrees and $(x + 47)$ degrees. Find the size of the angle $(3x + 37)$ degrees.

- [ ] A) 109 degrees
- [ ] B) 52 degrees
- [ ] C) 181 degrees
- [ ] D) 5 degrees
- [ ] E) 41.5 degrees

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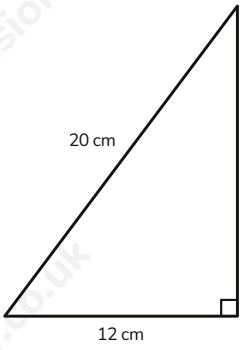
27 What is the sum of the interior angles of a polygon with 16 sides?

- [ ] A) 2340 degrees
- [ ] B) 2700 degrees
- [ ] C) 2880 degrees
- [ ] D) 2520 degrees
- [ ] E) 5040 degrees

---

28 A right-angled triangle has a hypotenuse of 20 cm and one other side of 12 cm. Find the length of the third side.

Diagram NOT accurately drawn



- [ ] A) 23 cm
- [ ] B) 16 cm
- [ ] C) 17 cm
- [ ] D) 256 cm
- [ ] E) 544 cm

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29 Pythagoras' theorem and its converse.

(a) A rectangular field measures 40 m by 30 m. Calculate the length of the diagonal path across the field. **(3)**

(b) A triangular flowerbed has sides of length 7 m, 24 m and 25 m. Show that the flowerbed is right-angled, and state which angle is the right angle. **(3)**

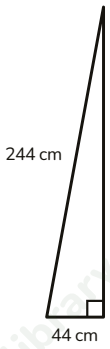
30 Two parallel lines are crossed by a straight line. Two corresponding angles are (3x - 28) degrees and (4x - 45) degrees. Find the value of x.

- ☐ A) 15
- ☐ B) 19
- ☐ C) 23
- ☐ D) 17
- ☐ E) 157

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31 A right-angled triangle has a hypotenuse of 244 cm and one other side of 44 cm. Find the length of the third side.

Diagram NOT accurately drawn



- [ ] A) 241 cm
- [ ] B) 57600 cm
- [ ] C) 240 cm
- [ ] D) 200 cm
- [ ] E) 61472 cm

---

32 Two parallel lines are crossed by a straight line. Two alternate angles are (5x + 38) degrees and (3x + 56) degrees. Find the value of x.

- [ ] A) 43
- [ ] B) 83
- [ ] C) 97
- [ ] D) 11
- [ ] E) 9

---

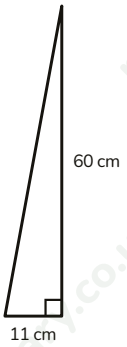
33 What is the sum of the interior angles of a nonagon?

- [ ] A) 630 degrees
- [ ] B) 1260 degrees
- [ ] C) 1440 degrees
- [ ] D) 2520 degrees
- [ ] E) 1620 degrees

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34 A right-angled triangle has shorter sides of 11 cm and 60 cm. Find the length of the hypotenuse.

Diagram NOT accurately drawn



- [ ] A) 61 cm
- [ ] B) 49 cm
- [ ] C) 122 cm
- [ ] D) 3721 cm
- [ ] E) 71 cm

---

35 Two parallel lines are crossed by a straight line. Two corresponding angles are (6x - 12) degrees and (5x + 3) degrees. Find the value of x.

- [ ] A) 78
- [ ] B) 9
- [ ] C) 17
- [ ] D) 15
- [ ] E) 13

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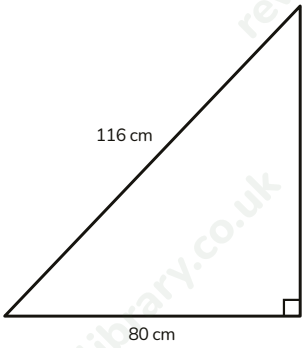
36 What is the size of each interior angle of a regular polygon with 20 sides?

- [ ] A) 9 degrees
- [ ] B) 171 degrees
- [ ] C) 18 degrees
- [ ] D) 172 degrees
- [ ] E) 162 degrees

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37 A right-angled triangle has a hypotenuse of 116 cm and one other side of 80 cm. Find the length of the third side.

Diagram NOT accurately drawn



- [ ] A) 7056 cm
- [ ] B) 85 cm
- [ ] C) 84 cm
- [ ] D) 36 cm
- [ ] E) 140 cm

---

38 Two parallel lines are crossed by a straight line. Two alternate angles are (3x + 2) degrees and (2x + 30) degrees. Find the value of x.

- [ ] A) 28
- [ ] B) 86
- [ ] C) 30
- [ ] D) 148
- [ ] E) 26

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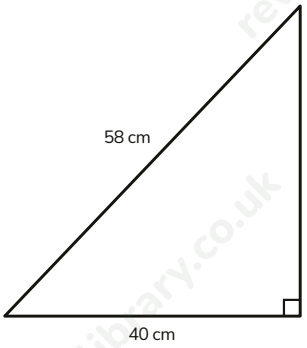
39 What is the size of each interior angle of a regular polygon with 20 sides?

- [ ] A) 171 degrees
- [ ] B) 172 degrees
- [ ] C) 162 degrees
- [ ] D) 9 degrees
- [ ] E) 3240 degrees

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40 A right-angled triangle has a hypotenuse of 58 cm and one other side of 40 cm. Find the length of the third side.

Diagram NOT accurately drawn



- ☐ A) 70 cm
- ☐ B) 42 cm
- ☐ C) 43 cm
- ☐ D) 18 cm
- ☐ E) 1764 cm

---

41 Two parallel lines are crossed by a straight line. Two alternate angles are (6x - 5) degrees and (5x + 9) degrees. Find the value of x.

- ☐ A) 101
- ☐ B) 16
- ☐ C) 12
- ☐ D) 14
- ☐ E) 79

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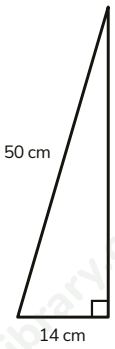
42 The sum of the interior angles of a polygon with 12 sides is found by splitting it into triangles from one corner. What is the sum, in degrees?

- ☐ A) 2160 degrees
- ☐ B) 3600 degrees
- ☐ C) 1980 degrees
- ☐ D) 360 degrees
- ☐ E) 1800 degrees

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43 A right-angled triangle has a hypotenuse of 50 cm and one other side of 14 cm. Find the length of the third side.

Diagram NOT accurately drawn



- [ ] A) 48 cm
- [ ] B) 2304 cm
- [ ] C) 2696 cm
- [ ] D) 36 cm
- [ ] E) 51 cm

---

44 Two parallel lines are crossed by a straight line. Two corresponding angles are (3x + 45) degrees and (4x + 40) degrees. Find the value of x.

- [ ] A) 60
- [ ] B) 5
- [ ] C) 3
- [ ] D) 120
- [ ] E) 7

---

45 Two parallel lines are crossed by a straight line. Two alternate angles are (2x + 2) degrees and (5x - 19) degrees. Find the size of the angle (2x + 2) degrees.

- [ ] A) 6 degrees
- [ ] B) 26 degrees
- [ ] C) 164 degrees
- [ ] D) 7 degrees
- [ ] E) 16 degrees

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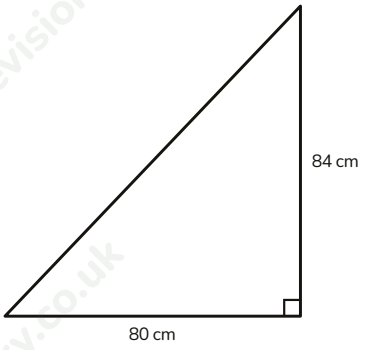
46 What is the sum of the interior angles of a decagon?

- [ ] A) 1620 degrees
- [ ] B) 360 degrees
- [ ] C) 720 degrees
- [ ] D) 1440 degrees
- [ ] E) 1260 degrees

---

47 A right-angled triangle has shorter sides of 80 cm and 84 cm. Find the length of the hypotenuse.

Diagram NOT accurately drawn



- [ ] A) 115 cm
- [ ] B) 164 cm
- [ ] C) 116 cm
- [ ] D) 117 cm
- [ ] E) 4 cm

---

48 Two parallel lines are crossed by a straight line. Two co-interior angles are $(5x + 2)$ degrees and $(2x + 38)$ degrees. Find the value of x.

- [ ] A) 22
- [ ] B) 18
- [ ] C) 102
- [ ] D) 20
- [ ] E) 78

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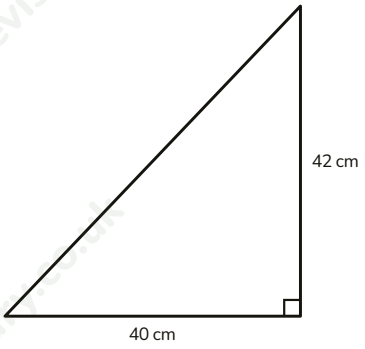
49 Each exterior angle of a regular polygon is 18 degrees. How many sides does the polygon have?

- [ ] A) 18
- [ ] B) 20
- [ ] C) 12
- [ ] D) 19
- [ ] E) 10

---

50 A right-angled triangle has shorter sides of 40 cm and 42 cm. Find the length of the hypotenuse.

Diagram NOT accurately drawn



- [ ] A) 58 cm
- [ ] B) 2 cm
- [ ] C) 3364 cm
- [ ] D) 59 cm
- [ ] E) 116 cm

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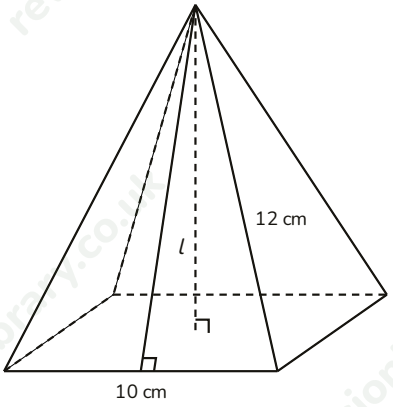
51 Two parallel lines are crossed by a straight line. Two alternate angles are (5x - 6) degrees and (3x + 28) degrees. Find the value of x.

- ☐ A) 79
- ☐ B) 19
- ☐ C) 8.5
- ☐ D) 101
- ☐ E) 17

---

52 A square-based pyramid has a square base of side 10 cm. The apex is directly above the centre of the base, and the vertical height of the pyramid is 12 cm.

(a) Work out the slant height, l, from the apex to the midpoint of a base edge, using Pythagoras' theorem with the vertical height and half the base side. **(3)**



.....

(b) Work out the area of one triangular face of the pyramid. **(2)**

.....

(c) Work out the total surface area of the pyramid (the four triangular faces plus the square base). **(3)**

.....

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Mark scheme · 2.17 Geometry, Measures and Constructions Depth: 1-hour Pack

Question 1

C cao (30); use the angle facts for polygons **B1**

Answer: C) 30

Question 2

A cao (34 cm); $\sqrt{16^2 + 30^2} = 34$ **B1**

Answer: A) 34 cm

Question 3

E cao (24); use the angle facts for polygons **B1**

Answer: E) 24

Question 4

B cao (12 cm); $\sqrt{13^2 - 5^2} = 12$ **B1**

Answer: B) 12 cm

Question 5

A cao (33); angles are equal **B1**

Answer: A) 33

Question 6

E cao (150 degrees); use the angle facts for polygons **B1**

Answer: E) 150 degrees

Question 7

D cao (23.3 km); $\sqrt{20^2 + 12^2}$ **B1**

Answer: D) 23.3 km

Question 8

C cao (7); angles are equal **B1**

Answer: C) 7

Question 9

D cao (7); angles are equal **B1**

Answer: D) 7

Question 10

C cao (9); use the angle facts for polygons **B1**

Answer: C) 9

Question 11

A cao (18.4 cm); $\sqrt{9^2 + 16^2}$ **B1**

Answer: A) 18.4 cm

Question 12

E cao (31); angles are equal **B1**

Answer: E) 31

Question 13

B cao (12); use the angle facts for polygons **B1**

Answer: B) 12

Question 14

E cao (80 cm); $\sqrt{82^2 - 18^2} = 80$ **B1**

Answer: E) 80 cm

Question 15

D cao (39); angles are equal **B1**

Answer: D) 39

Question 16

B cao (165 degrees); use the angle facts for polygons **B1**

Answer: B) 165 degrees

Question 17

A cao (6); angles are equal **B1**

Answer: A) 6

Question 18

C cao (36); use the angle facts for polygons **B1**

Answer: C) 36

Question 19

E cao (21.9 cm); $\sqrt{9^2 + 20^2}$ **B1**

Answer: E) 21.9 cm

Question 20

D cao (25); angles are equal **B1**

Answer: D) 25

Question 21

B cao (12 degrees); use the angle facts for polygons **B1**

Answer: B) 12 degrees

Question 22

A cao (21.3 cm); $\sqrt{14^2 + 16^2}$ **B1**

Answer: A) 21.3 cm

Question 23

A cao (32); angles are equal **B1**

Answer: A) 32

Question 24

E cao (18 degrees); use the angle facts for polygons **B1**

Answer: E) 18 degrees

Question 25

C cao (40 cm); $\sqrt{41^2 - 9^2} = 40$ **B1**

Answer: C) 40 cm

Question 26

B cao (52 degrees); angles are equal **B1**

Answer: B) 52 degrees

Question 27

D cao (2520 degrees); use the angle facts for polygons **B1**

Answer: D) 2520 degrees

Question 28

B cao (16 cm); $\sqrt{20^2 - 12^2} = 16$ **B1**

Answer: B) 16 cm

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Question 29

(a) $40^2 + 30^2$ oe (= 2500) **M1**

(a) $\sqrt{2500}$ **M1**

(a) 50 m cao **A1**

(a) Answer: 50 m

(b) $7^2 + 24^2 = 49 + 576 = 625$ calculated **M1**

(b) $25^2 = 625$, so $7^2 + 24^2 = 25^2$, confirming (by the converse of Pythagoras' theorem) that the triangle is right-angled **A1**

(b) the right angle is between the sides of 7 m and 24 m (i.e. opposite the 25 m side) **B1**

(b) Answer: The triangle is right-angled; the right angle is between the 7 m and 24 m sides.

Question 30

D cao (17); angles are equal **B1**

Answer: D) 17

Question 31

C cao (240 cm); $\sqrt{244^2 - 44^2} = 240$ **B1**

Answer: C) 240 cm

Question 32

E cao (9); angles are equal **B1**

Answer: E) 9

Question 33

B cao (1260 degrees); use the angle facts for polygons **B1**

Answer: B) 1260 degrees

Question 34

A cao (61 cm); $\sqrt{11^2 + 60^2} = 61$ **B1**

Answer: A) 61 cm

Question 35

D cao (15); angles are equal **B1**

Answer: D) 15

Question 36

E cao (162 degrees); use the angle facts for polygons **B1**

Answer: E) 162 degrees

Question 37

C cao (84 cm); $\sqrt{116^2 - 80^2} = 84$ **B1**

Answer: C) 84 cm

Question 38

A cao (28); angles are equal **B1**

Answer: A) 28

Question 39

C cao (162 degrees); use the angle facts for polygons **B1**

Answer: C) 162 degrees

Question 40

B cao (42 cm); $\sqrt{58^2 - 40^2} = 42$ **B1**

Answer: B) 42 cm

Question 41

D cao (14); angles are equal **B1**

Answer: D) 14

Question 42

E cao (1800 degrees); use the angle facts for polygons **B1**

Answer: E) 1800 degrees

Question 43

A cao (48 cm); $\sqrt{50^2 - 14^2} = 48$ **B1**

Answer: A) 48 cm

Question 44

B cao (5); angles are equal **B1**

Answer: B) 5

Question 45

E cao (16 degrees); angles are equal **B1**

Answer: E) 16 degrees

Question 46

D cao (1440 degrees); use the angle facts for polygons **B1**

Answer: D) 1440 degrees

Question 47

C cao (116 cm); $\sqrt{80^2 + 84^2} = 116$ **B1**

Answer: C) 116 cm

Question 48

D cao (20); co-interior angles add to 180 degrees **B1**

Answer: D) 20

Question 49

B cao (20); use the angle facts for polygons **B1**

Answer: B) 20

Question 50

A cao (58 cm); $\sqrt{40^2 + 42^2} = 58$ **B1**

Answer: A) 58 cm

Question 51

E cao (17); angles are equal **B1**

Answer: E) 17

Question 52

(a) half of base side = 10 / 2 = 5 (cm) **M1**

(a) $12^2 + 5^2$ oe (= 169) **M1**

(a) 13 cm cao **A1**

(a) Answer: 13 cm

(b) 0.5 x 10 x 13 oe, ft from part a **M1**

(b) 65 cm² cao, ft **A1**

(b) Answer: 65 cm^2

(c) 4 x 65 oe (= 260), ft from part b **M1**

(c) $10^2 = 100$ (area of the square base) **M1**

(c) 360 cm² cao, ft **A1**

(c) Answer: 360 cm^2

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