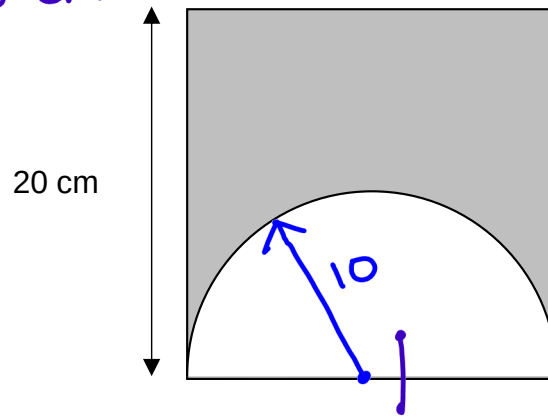


16 A semicircle is cut from a square as shown.



$$A = 400 \text{ cm}^2$$



$$A = \pi r^2$$

Work out the area of the shaded region.
Give your answer in terms of π

$$= \pi \times 10^2$$

$$A = 100\pi \text{ cm}^2$$



$$A = 400 - 100\pi \text{ cm}^2$$

..... cm^2
(Total for Question 16 is 4 marks)

17 5 congruent circles of radius 4 cm fit inside a larger circle.



identical

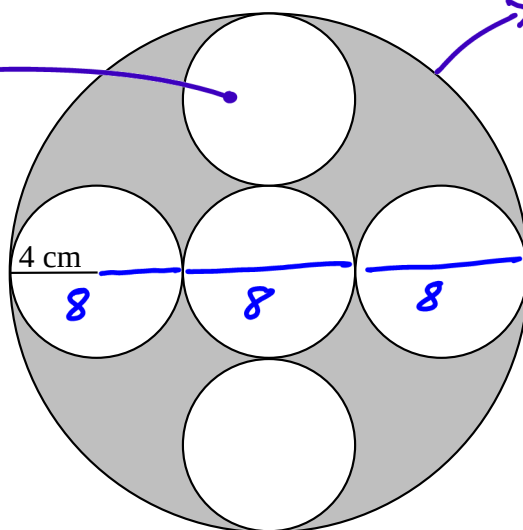
$$A = 4^2 \times \pi$$

$$A = 16\pi \text{ cm}^2$$

$\times 5$

$$5 = 80\pi \text{ cm}^2$$

circled



$$A = \pi r^2$$

$$d = 24$$

$$r = 12 \text{ cm}$$

$$A = \pi \times 12^2$$

$$A = 144\pi \text{ cm}^2$$

Work out the area of the shaded region.

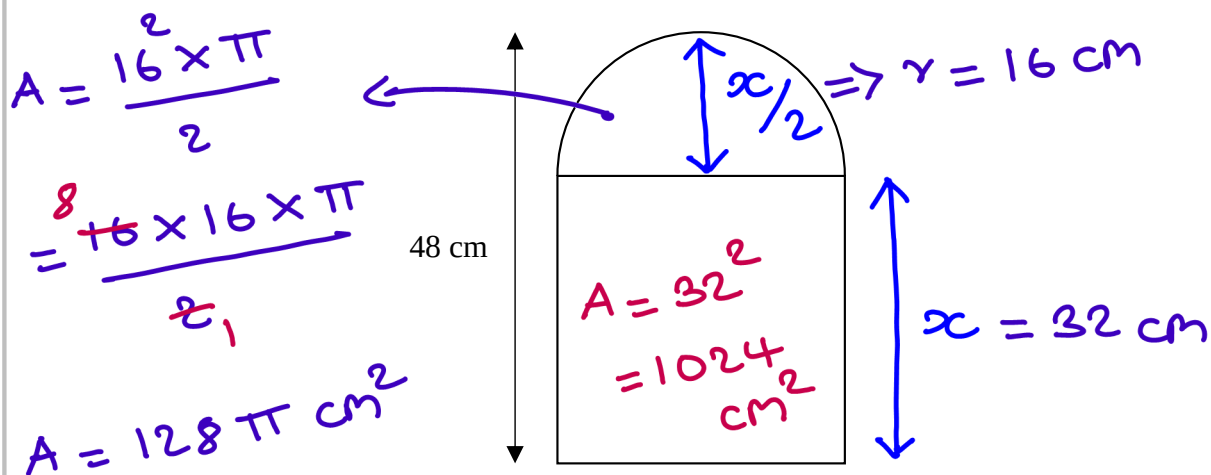
Give your answer in terms of π

$$\rightarrow 144\pi - 80\pi$$

$$= 64\pi \text{ cm}^2$$

..... cm^2
(Total for Question 17 is 4 marks)

18 A design is made by placing a semicircle on top of a square.



The total height of the design is 48 cm.
Work out the total area of the design.
Give your answer to 1 decimal place.

$$\frac{x}{2} \times \frac{x}{1} + \frac{x}{2} = 48$$

↓

$$A = 128\pi + 1024$$

$$= 1426.1 \text{ cm}^2$$

$$\frac{2x}{2} + \frac{x}{2} = 48$$

$$2 \times \frac{3x}{2} = 48 \times 2$$

$$\frac{3x}{1} = \frac{96}{1}$$

$$x = 32 \text{ cm}$$

..... cm²
(Total for Question 18 is 4 marks)

Multiplying out brackets

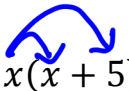
1. Multiply out the brackets and simplify where possible:

a. $4(x + y - z)$


$$= 4x + 4y - 4z$$

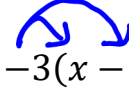
.....

b. $x(x + 5)$


$$x^2 + 5x$$

.....

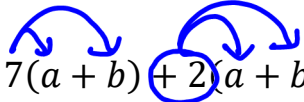
c. $-3(x - 2)$

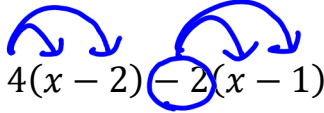

$$= -3x + 6$$

+	x	+	=	+
-	x	+	=	-
+	x	-	=	-
-	x	-	=	+

.....

d. $7(a + b) + 2(a + b)$

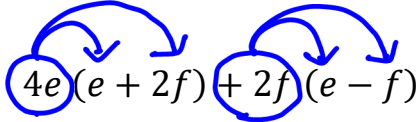

$$= 7a + 7b + 2a + 2b$$
$$= 9a + 9b$$

e. 

$$= 4x - 8 - 2x + 2$$

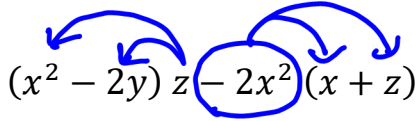
$$= 2x - 6$$

+	x	+	=	+
-	x	+	=	-
+	x	-	=	-
-	x	-	=	+

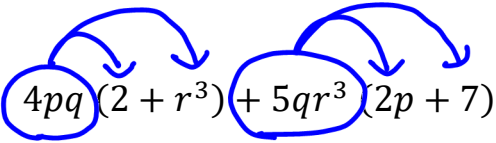
f. 

$$= 4e^2 + 8ef + 2ef - 2f^2$$

$$= 4e^2 + 10ef - 2f^2$$

g. 

$$= -2yz + zx^2 - 2x^3 - 2x^2z$$

h. 

$$= 8pq + 4pqr^3 + 10qr^3p + 35qr^3$$

$$= 8pq + 14pqr^3 + 35qr^3$$

- 10 The circumference of a circle is 200 cm.
Work out the radius of the circle.
Give your answer to 2 decimal places.

$$\frac{\pi d}{\pi} = \frac{200}{\pi}$$

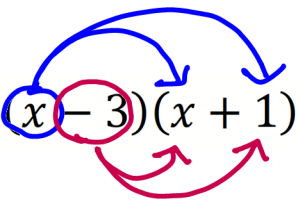
$$d = \frac{200}{\pi} = 63.66\dots$$

$$r = \frac{63.66\dots}{2} = 31.8309\dots$$

$$r = 31.83 \text{ cm}$$

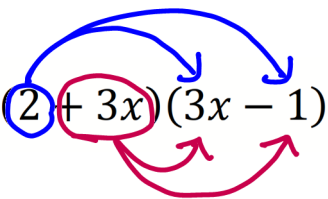
✱

$$\begin{aligned} & 4[(x+y) - 3(y-x)] \\ &= 4[x+y-3y+3x] \\ &= 4(4x-2y) \\ &= 16x-8y \end{aligned}$$

* 

$$= x^2 + x - 3x - 3$$

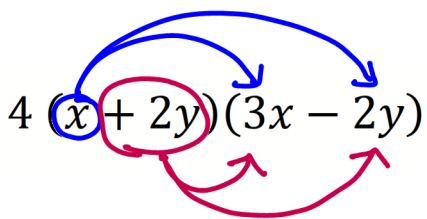
$$= x^2 - 2x - 3$$

* 

$$= 6x - 2 + 9x^2 - 3x$$

$$= 3x - 2 + 9x^2$$

$$= 9x^2 + 3x - 2$$

* 

$$= 4 [3x^2 - 2xy + 6xy - 4y^2]$$



$$= 4 [3x^2 + 4xy - 4y^2]$$

$$= 12x^2 + 16xy - 16y^2$$

$$\begin{aligned}
 * \quad (2a - b)^2 &= (2a - b)(2a - b) \\
 &= 4a^2 - 2ab - 2ab + b^2 \\
 &= 4a^2 - 4ab + b^2
 \end{aligned}$$

$$\begin{aligned}
 * \quad (x - 1)(2x + 1)^2 &= (x - 1)(2x + 1)(2x + 1) \\
 &= (x - 1)(4x^2 + 2x + 2x + 1) \\
 &= (x - 1)(4x^2 + 4x + 1) \\
 &= 4x^3 + \cancel{4x^2} + x - \cancel{4x^2} - 4x - 1 \\
 &= 4x^3 - 3x - 1
 \end{aligned}$$