



REVISION QUESTIONS

FORM 3 to 4
2010-2011

1. Factorise the following:

- (a) $9x^2 - 16$
 - (b) $2x^2yz - 6x^2y^2 + 10x^2y$
 - (c) $a^2 - b^2 - 8a + 8b$
 - (d) $2x^2 + 7x + 3$
 - (e) $6x^2 + 7x - 3$
-

2. Solve the following equations:

- (a) $\frac{4}{x+1} = \frac{7}{3x-2}$
 - (b) $x^2 - 49 = 0$
 - (c) $2x^2 - 3x = 4$
 - (d) $\frac{x}{x+1} - \frac{x+1}{3x-1} = \frac{1}{4}$
-

3. Simplify:

- (a) $\frac{2x^2 + 5x - 3}{4x^2 - 1}$
 - (b) $\frac{15x^2}{4x-8} \div \frac{3x}{x^2-4}$
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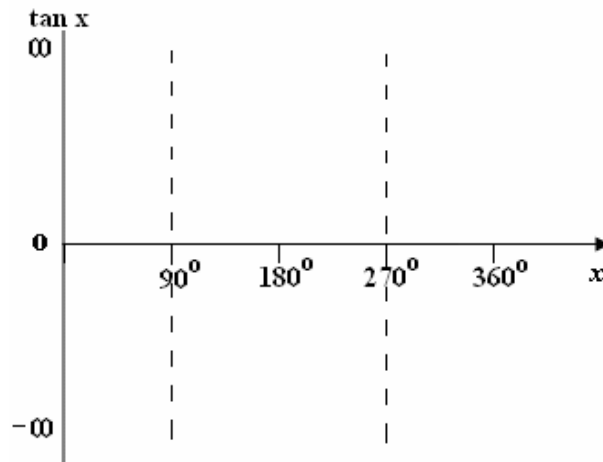
4. Simplify:

(a) $-2a^4 \times 5a^{-7} =$

(c) $\frac{3abc \times 4a^3b^2c \times 6c^2}{9a^2bc} =$

(b) $(64t^3)^{\frac{2}{3}} =$

5. On the axis below sketch the graph of $y = \tan x$ for the domain $0^\circ \leq x \leq 360^\circ$.



Find the range of $y = \tan x$ for the given domain:

- i. Domain: $90^\circ \leq x < 270^\circ$, Range:
- ii. Domain: $270^\circ < x \leq 360^\circ$, Range:

6. Evaluate the following:

(a) $64^{\frac{1}{3}} =$ (c) $\left(\frac{64}{81}\right)^{\frac{1}{2}} =$

(b) $\left(\frac{100}{64}\right)^{\frac{-3}{2}} =$

7. Simplify:

(a) $\sqrt{18} =$ (b) $\sqrt{63} - 2\sqrt{28} + \sqrt{175} =$

(c) $(3 + 5\sqrt{2})^2 =$

8. Rationalise the denominator:

$$(a) \frac{4}{5-\sqrt{8}} =$$

$$(b) \frac{1}{3\sqrt{3}} =$$

9. Solve the following simultaneous equations.

$$(a) x + y = 7$$

$$(b) 3x + 2y = 13$$

$$x^2 + y^2 = 25$$

$$x - 2y = -1$$

10. A sum of money is split between two people in the ratio of 2:3. If the smaller amount is €100, what is the value of the larger amount and the total sum of money altogether?

11. In the first few days of its life, the length of an earthworm L is thought to be proportional to the square root of the number of hours n which have elapsed since its birth. If a worm is 2cm long after 1 hour, find:

(a) a formula for L in terms of n .

(b) How long will it take to grow to a length of 14cm?

12. The electrical resistance R , of a fixed length of a wire is inversely proportional to the cube of its radius r . If $R = 0.5$ when $r = 2$, find:

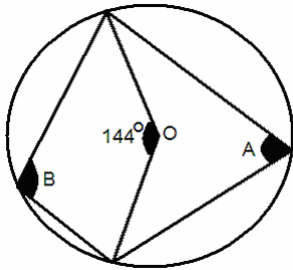
(a) The formula for R in terms of r .

(b) Calculate R when the radius is 3.

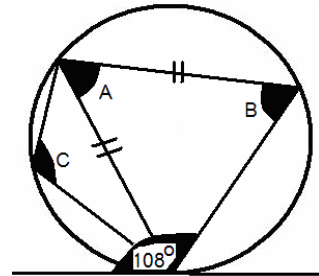
(c) Calculate the value of r when $R = 25$, giving your answer correct to 3 significant figures.

13. Calculate the values of the missing angles. In each case add a reason to your answer.

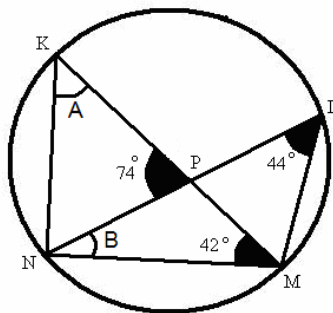
(a)



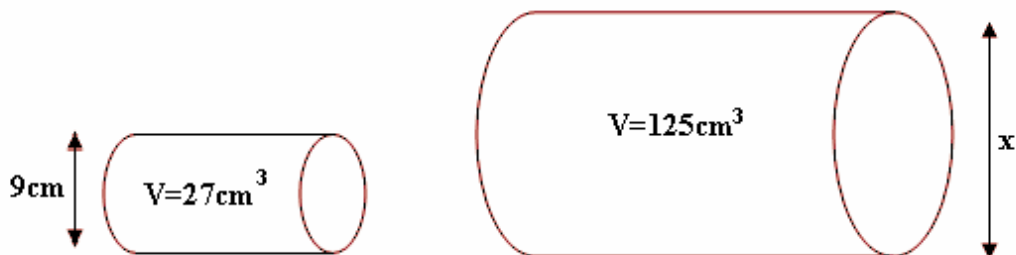
(b)



(c)

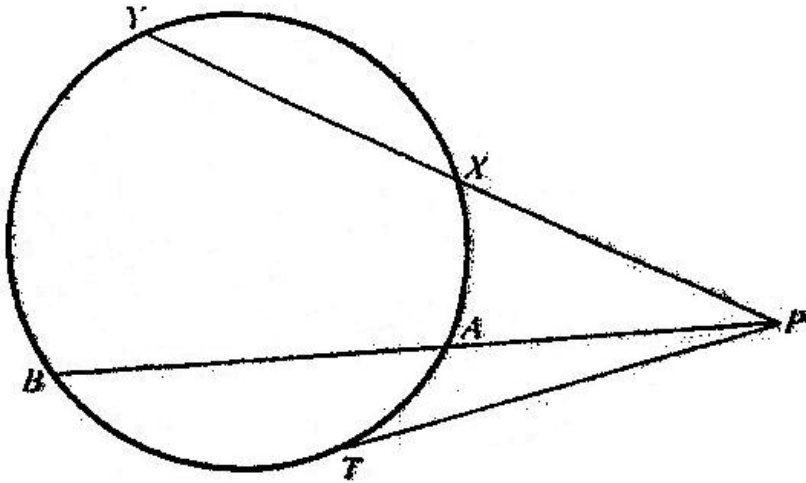


14. The two cylinders below are similar. The volume of the smaller cylinder is 27cm^3 and the larger cylinder is 125cm^3 . If the diameter of the smaller cylinder is 9cm find the diameter of the larger cylinder.



15. In the diagram $PX = 4$ cm, $XY = 16.25$ cm, $PA = 3$ cm, and PT is a tangent to the circle. Calculate

- (a) the length of AB
- (b) the length of PT

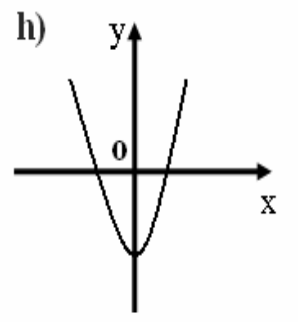
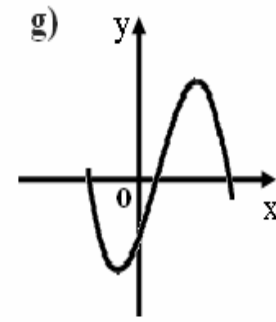
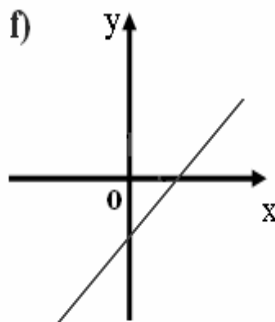
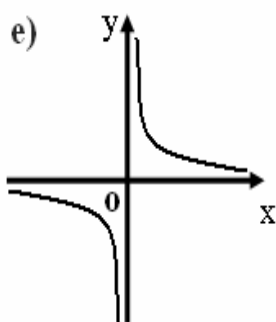
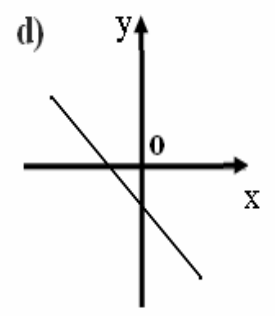
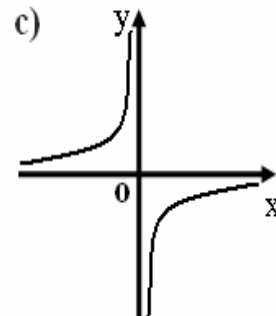
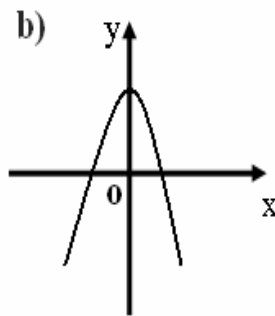
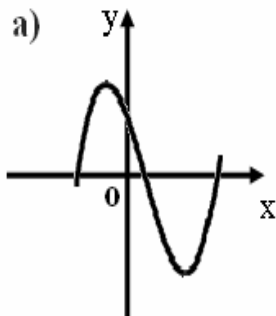


16. In a class of 24 students, 22 have mobile phone and 10 have a portable DVD player. One student has neither.

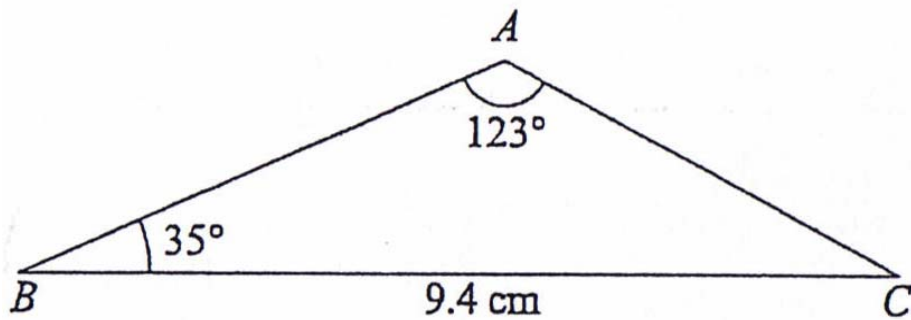
- (a) Draw a Venn diagram to show this information. Show the number of students in each region.
 - (b) How many students have:
 - i) a mobile phone only?
 - ii) a portable DVD player only?
 - iii) both a mobile phone and a portable player?
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17. Complete the table by labelling the equations with the corresponding graphs

EQUATION	GRAPH
$y = 2x - 3$	
$y = -2x - 3$	
$y = x^2 - 4$	
$y = 9 - x^2$	
$y = 5/x$	
$y = -4/x$	
$y = x^3 - 2x^2 - 15x + 4$	
$y = -x^3 + 2x^2 + 15x - 4$	



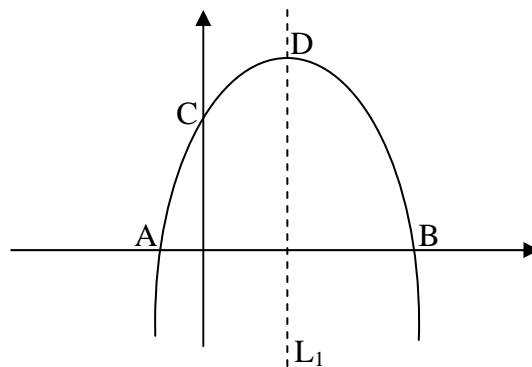
18.



Given that $BC = 9.4 \text{ cm}$, $\angle BAC = 123^\circ$ and $\angle ABC = 35^\circ$.

- Calculate the length of AC. Give your answer correct to 3 significant figures.
 - Calculate the area of triangle ABC. Give your answer correct to 3 significant figures.
-

19. In the diagram below is given the graph of $y = -x^2 + x + 6$.



- Find the coordinates of the points A, B, C and D.
 - Find the equation of the line L_1 .
 - Find the equation of the line that should be drawn to solve the following equations:
 - $-x^2 + x = 0$
 - $-2x^2 + 3x + 8 = 0$
-

20. (a) Given that $y = x^3 - 2x^2 - 15x$ complete the following table:

X	-4	-3	-2	-1	0	1	2	3	4	5	6
X^3	-64		-8	-1	0	1			64		
$-2x^2$	-32		-8		0	-2			-32		
$-15x$	60				0	-15			-60		
y	-36				0	-16			-28		

(b) By taking 1cm as one unit on the x-axis and 2cm as 5 units on the y-axis, plot the points you found according to the table you completed above and join them to form a smooth curve.

(c) Use your graph to find:

- i) the maximum and minimum values of $y = x^3 - 2x^2 - 15x$ and the corresponding values of x.
- ii) the x-ordinates between the curve $y = x^3 - 2x^2 - 15x$ and the line $y = 20$
- iii) the gradient of the curve when $x = 2$
- iv) the range of values of x such that $x^3 - 2x^2 - 15x < -10$.
- v) Solve the equation $x^3 - 2x^2 - 13x - 5 = 0$

21. Write the following numbers to 3 significant figures:

(a) 54963 _____

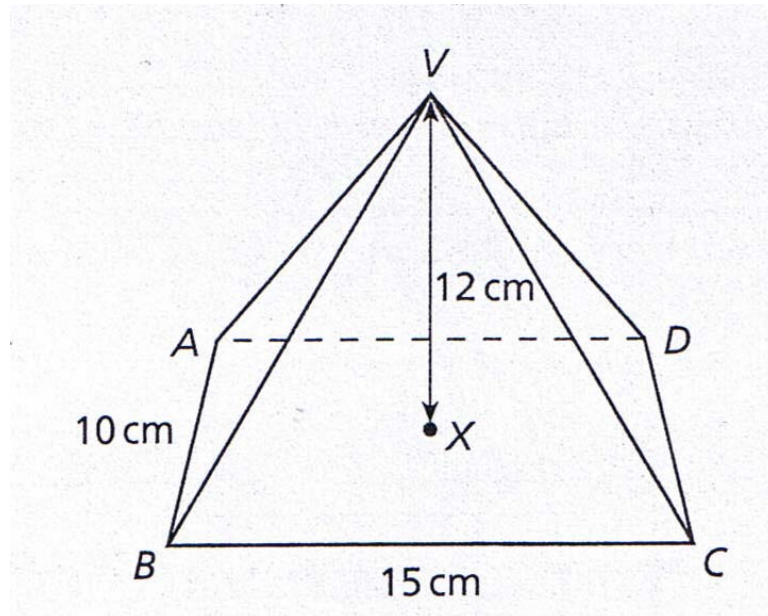
(b) 0.000002854 _____

Write the following numbers to 2 decimal places:

(a) 1.5893 _____

(b) 0.0088 _____

22.



$VABCD$ is a pyramid, with $ABCD$ a rectangle and $VA = VB = VC = VD$. $AB = 10\text{cm}$ and $BC = 15\text{cm}$. V is 12cm above the centre X of $ABCD$. (Give your answers to the nearest whole number)

Find:

- (a) the length of AC ,
- (b) the slant height VB ,
- (c) the angle between VB and BD .

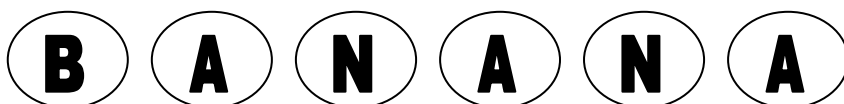
Let M be the midpoint of AB . Find

- (d) the length of VM
- (e) the angle between VM and $ABCD$.

23. Seven values are 3,3,3,4,5,8 and x .

- (a) State the mode of these seven values.
 - (b) The mean of these seven values is equal to twice their mode. Calculate x .
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24. The diagram shows six counters.



Each counter has a letter on it.

Mark puts the six counters into a bag. He takes a counter at random from the bag. He records the letter which is on the counter and **replaces** the counter in the bag. He then takes a second counter at random and records the letter which is on the counter.

- (a) Calculate the probability that the first letter will be **A** and the second letter will be **N**.
 - (b) Calculate the probability that both letters will be the same.
-

25. A box contains 50 balls coloured blue, red and green. The probability of getting a blue ball is 32% and the probability of getting a red ball is 0.46.

- (a) How many blue balls are there in the box?
 - (b) How many red balls are there in the box?
 - (c) What is the probability of getting a green ball?
-

26. The following information gives the heights of 15 plants:

13 cm, 36 cm, 15 cm, 13 cm, 21 cm, 18 cm, 37 cm, 18 cm,
12 cm, 21 cm, 18 cm, 20 cm, 6 cm, 37 cm, 39 cm

Calculate:

- (a) the mean mark
 - (b) the mode mark
 - (c) the median mark
 - (d) the lower quartile
 - (e) the upper quartile
 - (f) the interquartile range
-

27. 300 students at a college were asked about the courses they are following.

There are 200 students who study Business Administration.

- (a) Find the angle of the sector, in degrees, representing Business Administration.

The angle of the sector of a pie chart representing the students who study Hotel Management is 48° .

- (b) Calculate the number of students who study Hotel Management.

The rest of the students study Computer Science.

- (c) Find the angle of the sector, in degrees, representing Computer Science.

- (d) Draw the pie chart below, indicating the angle and number of students in each subject.

