

**Enfield Grammar**

**Name:**

**Get Yourself Ready for AS Level Maths**

Q1) Expand and simplify

a)  $7(x - 2) + 3(x + 4) - 6(x - 2)$

b)  $3x^2 - x(3 - 4x) + 7$

c)  $3x^2(2x + 1) - 5x^2(3x - 4)$

Q2) Factorise

a)  $5x^2 - 25xy$

b)  $15y - 20yz^2$

c)  $xy^2 - x^2y$

Q3) Factorise

a)  $2x^2 + 5x + 2$

b)  $5x^2 - 16x + 3$

c)  $2x^2 + 7x - 15$

Q4) Factorise

a)  $x^2 - 49$

b)  $9x^2 - 25y^2$

c)  $2x^2 - 50$

Q5) Simplify

a)  $x^{\frac{3}{2}} \times x^{\frac{5}{2}}$

b)  $3x^{0.5} \times 4x^{-0.5}$

c)  $3x^4 \times 2x^{-5}$

5 Simplify these expressions.

a  $\left(\frac{5a}{b^2}\right)^2$

b  $(-2a^2b)^4$

c  $(5t^2)^3 - (5y^2)^3$

d  $(2y)^3 \times (3z)^3$

e  $(3a)^{-2}$

f  $\left(\frac{2}{r^2}\right)^{-3}$

g  $\left(\frac{2z^2}{3y}\right)^{-1}$

h  $(4b)^{-3} \times \left(\frac{1}{3b}\right)^{-2}$

i  $4(y^2)^{-3} \div (2y)^{-2}$

j  $(3y^2t)^2 \div (3yt^2)^{-2}$

Q6) Simplify

a)  $27^{\frac{1}{3}}$

b)  $(-5)^{-3}$

c)  $(1\frac{9}{16})^{\frac{3}{2}}$

d)  $(\frac{343}{512})^{-\frac{2}{3}}$

Q7) Simplify

a)  $\sqrt{50}$

b)  $\frac{\sqrt{12}}{2}$

c)  $\sqrt{200} + \sqrt{18} - \sqrt{72}$

d)  $\sqrt{80} - 2\sqrt{20} + 3\sqrt{45}$

e)  $\sqrt{12} + 3\sqrt{48} + \sqrt{75}$

Q8) Rationalise the denominator

a)  $\frac{\sqrt{5}}{\sqrt{80}}$

b)  $\frac{1}{1 + \sqrt{3}}$

c)  $\frac{4}{3 - \sqrt{5}}$

d)  $\frac{5}{2 + \sqrt{5}}$

Q9) Solve

a)  $x^2 - 9x + 20 = 0$

b)  $x^2 - 4x - 12 = 0$

c)  $6x^2 - 7x - 3 = 0$

d)  $4x^2 - 16x + 15 = 0$

e)  $(2x - 3)^2 = 9$

f)  $2x^2 = 8$

g)  $(x - 3)^2 = 13$

h)  $5x^2 - 10x^2 = -7 + x + x^2$

Q10) Solve

a)  $x^2 + 12x + 3 = 0$

b)  $x^2 + 4x - 2 = 0$

c)  $2x^2 - 7 = 4x$

d)  $10 = 3x - x^2$

e)  $5x^2 + 8x - 2 = 0$

Q11) Solve

$$\begin{aligned} \mathbf{1} \quad & 2x - y = 6 \\ & 4x + 3y = 22 \end{aligned}$$

$$\begin{aligned} \mathbf{2} \quad & 7x + 3y = 16 \\ & 2x + 9y = 29 \end{aligned}$$

$$\begin{aligned} \mathbf{3} \quad & 5x + 2y = 6 \\ & 3x - 10y = 26 \end{aligned}$$



Q10)

**1** Solve the simultaneous equations:

**a**  $x + y = 11$

$xy = 30$

**d**  $x + y = 9$

$x^2 - 3xy + 2y^2 = 0$

**b**  $2x + y = 1$

$x^2 + y^2 = 1$

**e**  $3a + b = 8$

$3a^2 + b^2 = 28$

**c**  $y = 3x$

$2y^2 - xy = 15$

**f**  $2u + v = 7$

$uv = 6$

Q11)

Find the set of values of  $x$  for which:

**a**  $2x - 5 < 7$

**b**  $5x + 9 \geq x + 20$

**c**  $12 - 3x < 27$

**d**  $3(x - 5) > 5 - 2(x - 8)$

Q12)

Solve the simultaneous equations:

$$x + 2y = 3$$

$$x^2 - 2y + 4y^2 = 18$$

Q13)

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Work out the gradient of the line joining these pairs of points:

**a**  $(4, 2), (6, 3)$

**b**  $(-1, 3), (5, 4)$

Q14)

The line joining  $(3, -5)$  to  $(6, a)$  has gradient 4. Work out the value of  $a$ .

Q15)

The line  $y = 6x - 18$  meets the  $x$ -axis at the point  $P$ . Work out the coordinates of  $P$ .

Q16)

Show that the line  $y = 3x + 4$  is perpendicular to the line  $x + 3y - 3 = 0$ .

Q17)

Work out whether these pairs of lines are parallel, perpendicular or neither:

**a**  $y = -2x + 9$   
 $y = -2x - 3$

**b**  $3x - y - 2 = 0$   
 $x + 3y - 6 = 0$

**c**  $y = \frac{1}{2}x$   
 $2x - y + 4 = 0$

Q18)

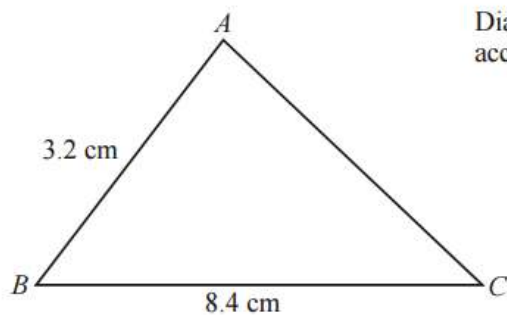


Diagram **NOT**  
accurately drawn

$AB = 3.2$  cm  
 $BC = 8.4$  cm

The area of triangle  $ABC$  is  $10$  cm<sup>2</sup>.

Calculate the perimeter of triangle  $ABC$ .

Give your answer correct to three significant figures.

Q19)

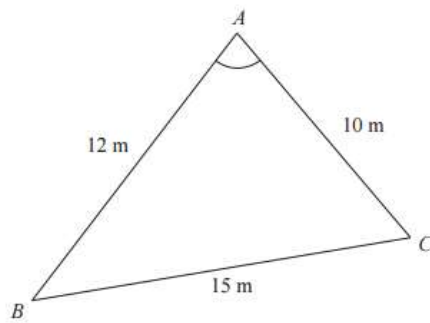
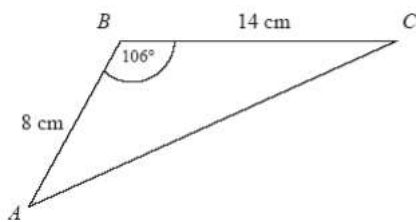


Diagram **NOT** accurately drawn

$ABC$  is a triangle.  
 $AB = 12$  m.  
 $AC = 10$  m.  
 $BC = 15$  m.

Calculate the size of angle  $BAC$ .  
Give your answer correct to one decimal place.

Q20)



$ABC$  is a triangle.

$AB = 8$  cm

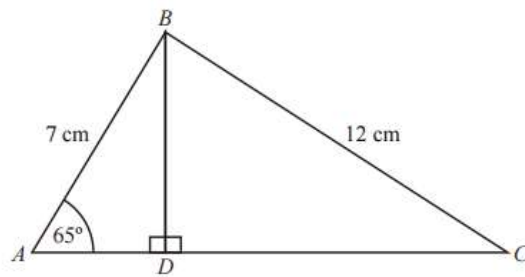
$BC = 14$  cm

Angle  $ABC = 106^\circ$

Calculate the area of the triangle.

Give your answer correct to 3 significant figures.

Q21)

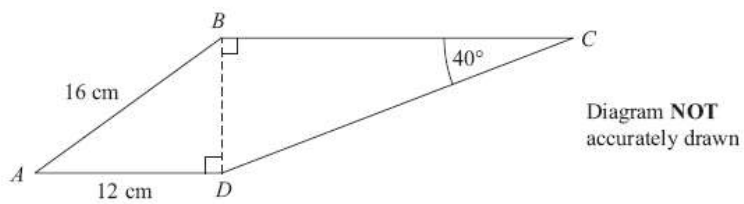


$ABC$  is a triangle.  
 $ADC$  is a straight line with  $BD$  perpendicular to  $AC$ .  
 $AB = 7$  cm.  
 $BC = 12$  cm.  
Angle  $BAD = 65^\circ$ .

Calculate the length of  $AC$ .  
Give your answer correct to 3 significant figures.

Q22)

The diagram shows a quadrilateral  $ABCD$ .



$AB = 16$  cm.  
 $AD = 12$  cm.  
Angle  $BCD = 40^\circ$ .  
Angle  $ADB = \text{angle } CBD = 90^\circ$ .

Calculate the length of  $CD$ .  
Give your answer correct to 3 significant figures.



Q23)

Prove that  $(3n + 1)^2 - (3n - 1)^2$  is a multiple of 4, for all positive integer values of  $n$ .

Q24)

4. Prove that

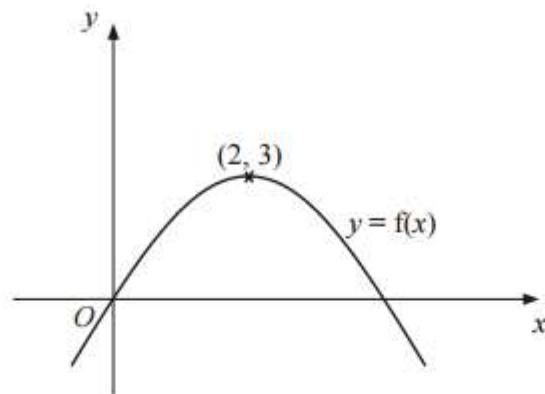
$(2n + 3)^2 - (2n - 3)^2$  is a multiple of 8

for all positive integer values of  $n$ .

Q25)

- a) .Prove algebraically that the difference between the squares of any two consecutive numbers is always an odd number
  
- b) .Prove algebraically that the sum of the squares of any three consecutive even numbers always a multiple of 4.
  
- c) .Prove algebraically that the sum of the squares of any three consecutive odd numbers always leaves a remainder of 11 when divided by 12.

Q26)



The diagram shows part of the curve with equation  $y = f(x)$ .  
The coordinates of the maximum point of this curve are  $(2, 3)$ .

Write down the coordinates of the maximum point of the curve with equation

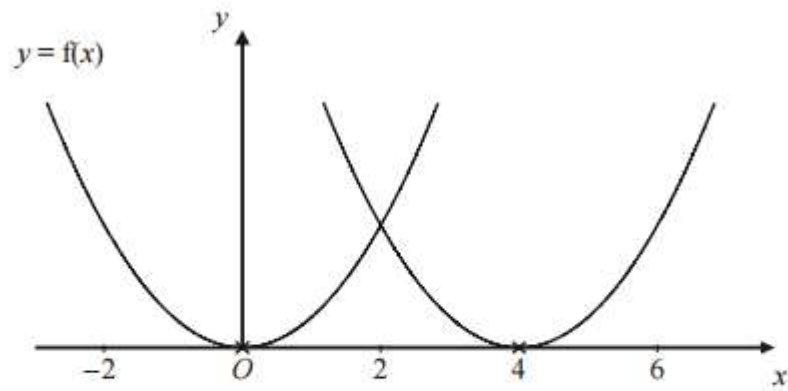
(a)  $y = f(x - 2)$

(....., .....) )

(b)  $y = 2f(x)$

(....., .....) )

Q27)

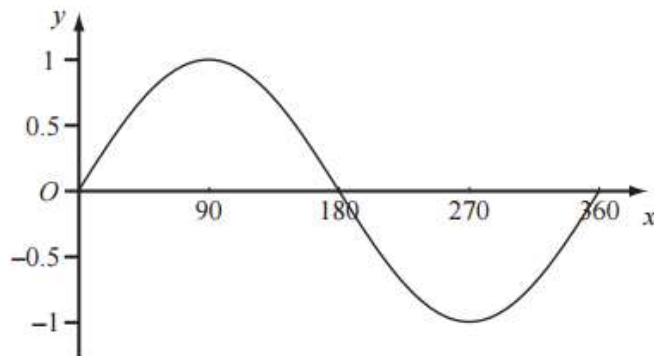


The curve with equation  $y = f(x)$  is translated so that the point at  $(0, 0)$  is mapped onto the point  $(4, 0)$ .

Find an equation of the translated curve.

Q28)

The diagram shows a sketch of the curve  $y = \sin x^\circ$  for  $0 \leq x \leq 360$



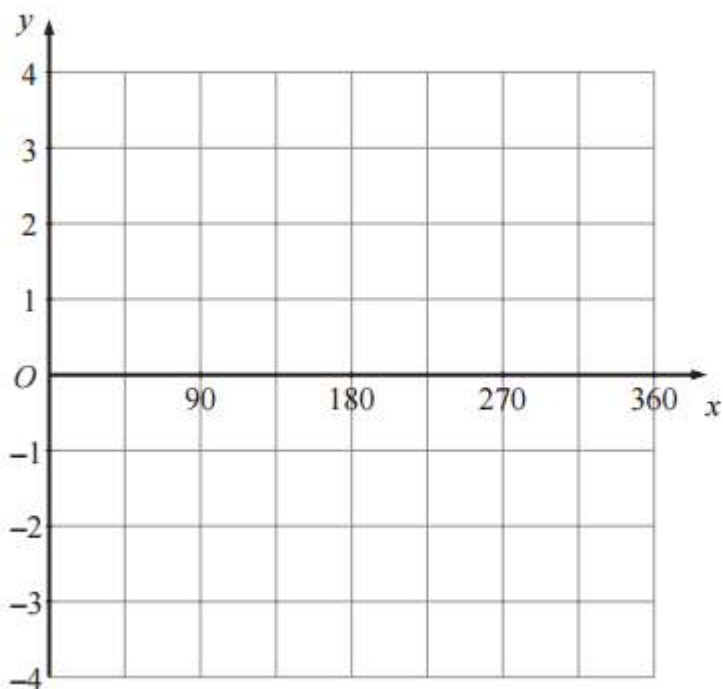
The exact value of  $\sin 60^\circ = \frac{\sqrt{3}}{2}$

(a) Write down the exact value of

(i)  $\sin 120^\circ$ ,

(ii)  $\sin 300^\circ$ .

(b) On the grid below, sketch the graph of  $y = 3 \sin 2x^\circ$  for  $0 \leq x \leq 360$



(2)