

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)

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)

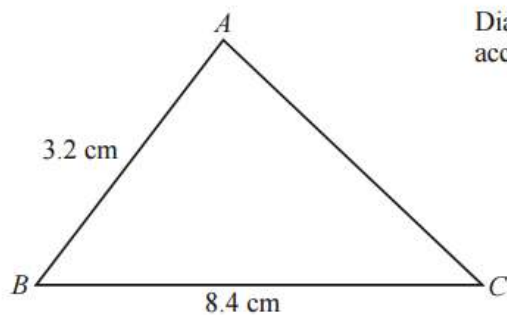


Diagram **NOT**
accurately drawn

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

The area of triangle ABC is 10 cm².

Calculate the perimeter of triangle ABC .

Give your answer correct to three significant figures.

Q19)

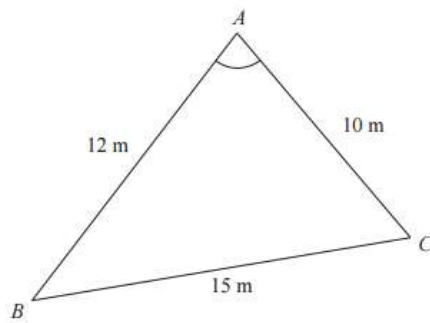
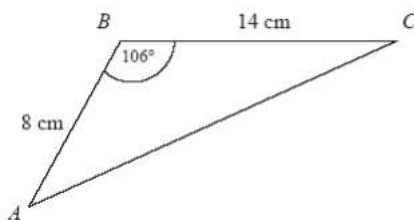


Diagram **NOT** accurately drawn

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

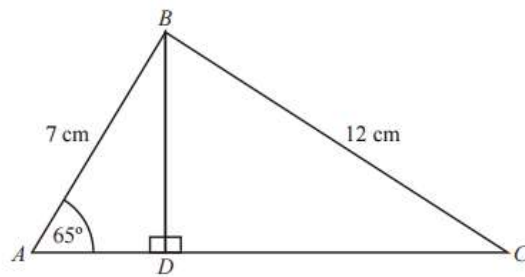
$BC = 14$ cm

Angle $ABC = 106^\circ$

Calculate the area of the triangle.

Give your answer correct to 3 significant figures.

Q21)

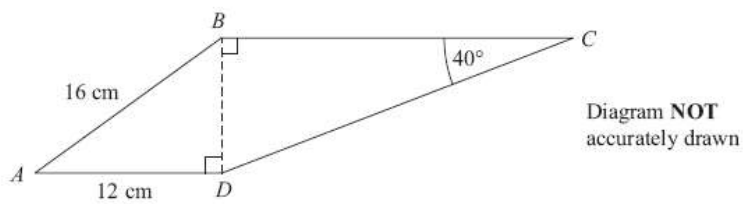


ABC is a triangle.
 ADC is a straight line with BD perpendicular to AC .
 $AB = 7$ cm.
 $BC = 12$ cm.
Angle $BAD = 65^\circ$.

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 .

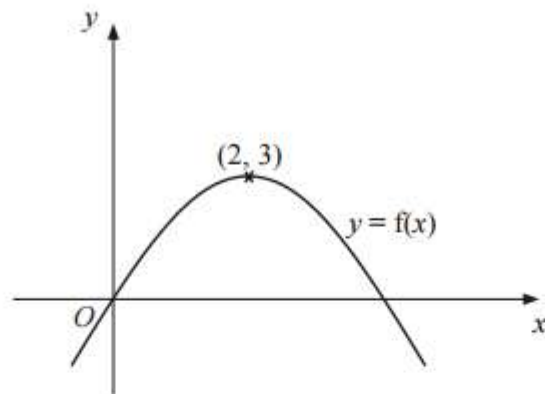
Q25)

- 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

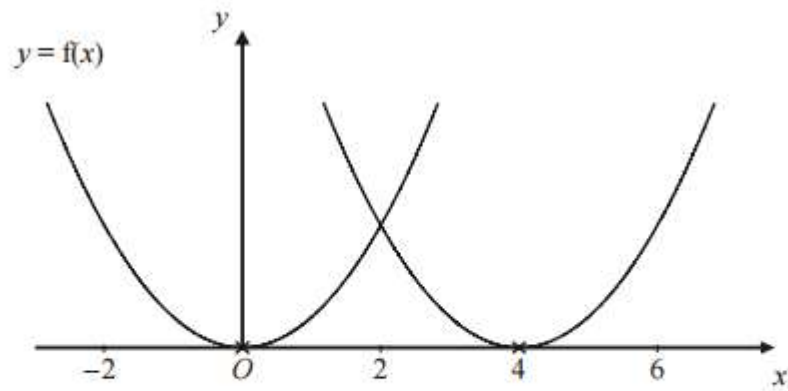
(a) $y = f(x - 2)$

(.....,))

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

(.....,))

Q27)

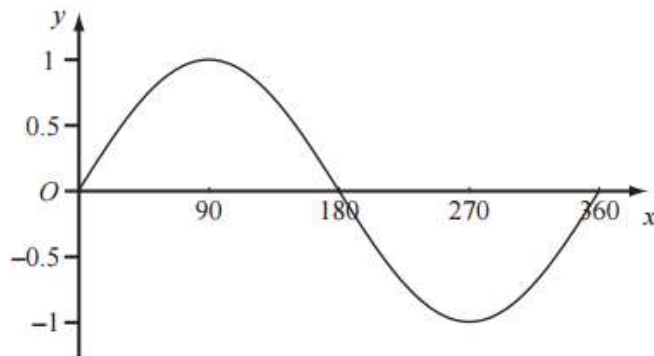


The curve with equation $y = f(x)$ is translated so that the point at $(0, 0)$ is mapped onto the point $(4, 0)$.

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 $\sin 60^\circ = \frac{\sqrt{3}}{2}$

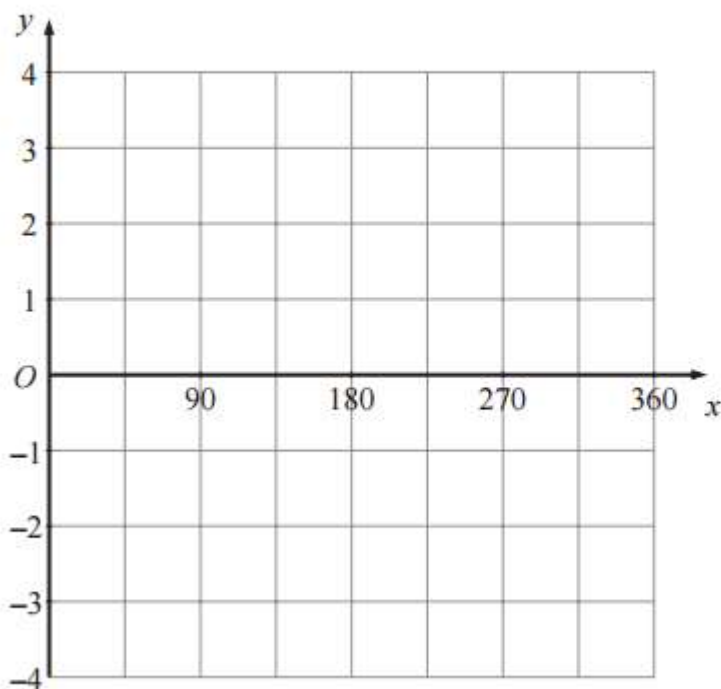
(a) Write down the exact value of

(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)