**S5/6 REVISION**

**Calculator**

**1.** Calculate and give your answer correct to **2** significant figures

**(a)** 5∙16 × 22∙7 **(b)** 27∙3 ÷ 6∙84 **(c)** 3∙14 × 92

Calculate and give your answer correct to 3 significant figures

1. 2∙29 × 58∙1 **(b)** 325∙9 ÷ 68∙2 **(c)** 3∙14 × 18

**PERCENTAGES**

**Reverse percentages to calculate an original quantity**

**1.** A gym’s membership has increased by 17% over the past year. It now has 585 members.

How many members did it have a year ago?

**2.** The number of school pupils not wearing school uniform has decreased by 72% since the start of last year. There are now 42 pupils not wearing school uniform.

 How many pupils were not wearing school uniform at the start of last year?

**3.** My house has increased in value by 15% in the last two years. It is now worth £230000.

 How much was it worth 2 years ago?

**4.** I bought a new car in September of last year. By this September the car had

depreciated by 20% and was now worth £9600.

 How much did I pay for the car last September?

**APPRECIATION and DEPRECIATION**

**5**. The Smiths buy a house for £60,000. If it appreciates in value at the rate of 9% per year, how much will it be worth in 5 year’s time?

**6**. Amanda wins some money and decides to spend £200 on some jewellery. If it appreciates at the rate of 2% per year, how much will the jewellery be worth 3 years from now?

**7**. In 1990 the world population was estimated to be 5300 million, and was increasing at the rate of 1∙7% per annum.

 What will the population be in the year 2000? (answer to 2 significant figures)

**8**. Peter buys a car for £3000. If it depreciates at the rate of 20% per annum, how much will he be able to sell it for in 3 year’s time?

**9**. Brian buys a new car costing £12600. It depreciates in value by 30% in the first year and by 20% each year after that.

How much will he be able to trade it in for in 3 year’s time

**CIRCLE**

O

A

B

***d***

**1.** The diagram shows a section of a cylindrical drain whose **diameter** is 1 metre. The surface of the water in the drain AB is 70 cm.

 ` **(a)** Write down the length of OA.

**(b)** Calculate the depth of water in the pipe, ***d***. (Give your answer to the nearest cm.)

# O

## A

B

B

***x***

A

**2.** The diagram shows a section of a disused mineshaft whose diameteris 2 metres. The surface of the water in the shaft, AB, is 140 cm.

**(a)** Write down the length of OB.

**(b)** Calculate the depth of water in the pipe, ***x***. (Give your answer to the nearest cm.)

**3.** A circular bathroom mirror, diameter 48 cm, is suspended from the ceiling by **two** equal wires from the centre of the mirror, O.

48 cm

O

C

B

A

The ceiling, AB, is a tangent to the circle at C. AC is 45 cm.

Calculate the total length of wire used to hang the mirror.

**4.**

AC is a diameter and O is the centre of the circle shown opposite. CD is a tangent to the circle with C the point of contact.

54o

O

C

 If BCD = 54o, find the size of CAB.

A

**5**. In the diagram shown, BD is a tangent to the circle centre O.

B

Angle BAC = 28o.

28o

Calculate the size of angle CBD.

O

D

C

A

**6.** The diagram shows a circle with centre O. ST is a tangent to the circle with point of contact Q. PQT = 56o.

P

O

Q

T

56o

S

 **(a)** Calculate the size of POQ.

**(b)** Hence calculate the length of the major arc PQ given that the radius of the circle is 14cm.

**ARCS and SECTORS of a CIRCLE *.***

**1.** Calculate the area of the sector shown in the diagram, given that it has radius 6∙8cm.

O

42o

135o

O

42o

130o

1·6m

**2.** A table is in the shape of a sector of a circle with radius 1·6m.

The angle at the centre is 130o as shown in the diagram.

 Calculate the perimeter of the table.

**3.** The door into a restaurant kitchen swings backwards and forwards through 110o.

90cm

110o



The width of the door is 90cm.

 Calculate the area swept out by the door as it swings back and forth.

**4.** A sensor on a security system covers a horizontal area in the shape of a sector

 **105º**

 of a circle of radius 3·5m.

 The sensor detects movement in an area with an angle of 105º.

 Calculate the area covered by the sensor.

**5.** A biscuit is in the shape of a sector of a circle with triangular part removed as shown in the diagram.

P

Q

R

S

 The radius of the circle, PQ, is 7cm and PS = 1∙5cm.

 Angle QPR = 80o.

 Calculate the area of the biscuit.

**6.** A sector of a circle with radius 6cm is shown opposite.

 Angle AOB 

 If the exact **area** of the sector is 4 square centimetres,

 calculate the size of the angle marked *x*.

**7.** A hand fan is made of wooden slats with material on the outer edge.



15cm

9cm

105˚

**(a)** Calculate the area of material needed for the hand fan.

1. Calculate the perimeter of the shaded area in the diagram above.

**Standard Deviation**

Q. Over a 10-day period, the temperature at noon is measured in Glasgow and London (in $°C$).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Glasgow** | **3** | **4** | **3** | **5** | **6** | **6** | **5** | **3** | **2** | **6** |
| **London** | **0** | **4** | **7** | **9** | **8** | **7** | **10** | **7** | **6** | **5** |

1. **For each city,** find the mean and the standard deviation of the temperature, round your answers to 2 decimal places.
2. Use the mean and standard deviation from part (a) to **make two valid comments comparing the temperatures in Glasgow and London**

**Non Calculator**

**STRAIGHT LINE**

**1.** A straight line has the equation 3*x* − 2*y* = − 4.

Find the gradient and *y*-intercept of the line.

**2.** The line AB passes through the points (0, 6) and (8, 0) as shown in the diagram.

***x***

***y***

**0**

**A**

**B**

Find the equation of the line AB.

**4.** Find the gradient and *y* – intercept of the straight line with equation

 .

**5.** Find the equation of the line shown in the diagram below.

**−1**

**−2**

**−3**

**−4**

**−5**

**−1**

**−2**

**−3**

**−4**

**−5**

**0**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**1**

**2**

**3**

**4**

**5**

***x***

 ***y***

**6.** A line has equation 2*y* + 6*x* = 9.Find its gradient and *y* - intercept**.**

**7.** A line has equation 3*y* + 4*x* = 15. Make a sketch of this line on plain paper showing clearly where it crosses the *y* - axis.

**8.** The relationship between variables *v* and *T* produces a straight line graph as shown below.

 The line passes through the point P(24,16) as shown.

*T*

*v*

0

10

P(24,16)

**(a)** Find the gradient of the line.

**(b)** Hence, write down the equation of the line in terms of *v* and *T*.

**9.** A straight line has equation 3*y* − 2*x* = 6. Find the gradient and *y*-intercept of the line.

**10.** Find the equation of the straight line which passes through the point A(3, −2) and is parallel to the line 3*y* − 2*x* = 5

**11. (a)** A straight line has equation 4*y* – 3*x* = 6.

 State the gradient and the *y*-intercept point for this line.

1. Write down the equation of the line with gradient -½ which has the same

*y* – intercept point as the line above.

**ALGEBRA**

1. Expand and simplify:

**(a)** 3(3*a* − 1) + 2*a* **(b)** 2(5*x* + 3) − 3*x* **(c)** 8(*b* + 2) − 9

**2**. Multiply out the brackets:

**(a)** (*x* + 2)(*x* + 3) **(b)** (*s* − 4)(*s* − 7) **(c)** (*p* − 10)(*p* + 2)

**(d)** (5y + 2)2 **(e)** 2*x*(*x*2 + 2*x* + 3) **(f)** (*x* + 9)(*x*2 + 5*x* − 6)

**3**. Fully factorise these expressions:

 **(a)** 3*x*2 − 3 **(b)** 2*p*2 + 12*p* + 10 **(c)** 9*x*2 − 36

 **(d)** 5*x*2 + 25*x* + 30 **(e)** *ax*2 + 5*ax* + 6*a* **(f)** 3*y*2 − 12*y* − 15

 **(g)** 15*c*2 + 27*c* + 12 **(h)** 16*b*2 + 28*b* + 6 **(i)** 9*q*2 + 33*q* + 18

 **(j)** 10*s*2 − 35*s* + 15 **(k)** 8*m*2 −20*m* + 12 **(l)** 8*a*2 −36*a* + 36

 **(m)** 4*t*2 + 2*t* − 56 **(n)** 90*d*2 −60*d* −80 **(o)** 400*x*2 − 4

**Completing the Square form**

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 **Solve the following inequalities:**

|  |  |  |
| --- | --- | --- |
| 1. $-9x<18-6x $
 | 1. $-4c+8\geq 7c-23$
 | 1. $4\left(t+5\right)\leq 5(2t-6)$
 |

**Fractions - Calculate the following:**

|  |  |  |
| --- | --- | --- |
| a) 1$\frac{3}{5}+3\frac{3}{4}$ | b) $3\frac{1}{4}÷5\frac{1}{5}$ | c) $\frac{1}{5}×\left(\frac{3}{4}+1\frac{1}{3}\right)$ |

**Change the subject of the following formulae to** $x.$

|  |  |  |
| --- | --- | --- |
| 1. $T=\frac{xr^{2}}{5}$
 | 1. $B=tx^{2}-\sqrt{y}$
 | 1. $C=\frac{y}{t-x}$
 |