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**PiXL Independence:**

**Mathematics** –Answer Booklet

KS4 FOUNDATION

**Topic 3 – Expressions, Equations and Inequalities**

**Contents:**

Answers

1. **Basic Skills Check**

*Answer the following questions. In order to improve your basic arithmetic you should attempt these without a calculator.*

**Skills Check 1**

1. What is the product of 20 and 21?

420

1. The price of a 6 pack of loo roll is reduced by 4%, the original price was £1.50. What is the new price?
 £1.44
2. Write down any three factors of 30.

Any three of 1, 2, 3, 5, 6, 10, 15, 30

1. Which of these numbers are square numbers?

1,2,3,4,5,6,7,8,9

Squares = 1, 4, 9

1. Simplify 8J + 3k – 7k + 4J.

12j -4k

1. Solve:

x= 3

1. Find a.

a = 38

**142**

**a**

1. In a year group of 120 students 1/6th of the class are left handed. How many are left handed?

20

1. Expand the bracket 7(2a-8)

14a-56

1. In a quadrilateral the angles are 1220, 320, 1200 and A. Find the value of A.

86o

**Skills Check 2**

1. An electricity bill is £96 plus VAT at 20%. Calculate the VAT charged.

£19.20

1. A bunch of flowers priced at £15 is reduced by a quarter. What is the new price?

£11.25

1. Write down all the factors of 50.

1, 2, 5, 10, 25, 50

1. Round 0.002550 to one significant figure.

0.003

1. Simplify 7x + 3y + 2x – 8y.

9x-5y

1. Solve: .

X = 1

1. Find A.

420

470

A

A = 180- (47+42) = 91o

1. Estimate the answer to 3.45 x 16.9.

3 x 20 = 60

1. Expand and simplify 3(2a+8) +3(a-4).

6a+24+3a-12 = 9a+12

1. Find the next two terms in the sequence; 20, 10, 5, 2.5, ………..

1.25, 0.265

**Skills Check 3**

1. A sofa costs £165, delivery costs a further 5%. What is the delivery charge?

£8.25

1. A train ticket that costs £156 is reduced by a 1/3. What is the new cost?

£104

1. Find the highest common factor (HCF) of 9 and 33.

HCF = 3

1. Round 9.9999 to two significant figures.

10.0

1. Expand 2(7x – 1).

14x-2

1. Solve: .

X=4

1. Find B.

550

550

B

B = 180- 110 = 70o

1. In a packet of 30 sweets 4 are red. You take a sweet without looking; what is the probability of choosing a red sweet?
2. Calculate

=

1. Find the next two terms in the sequence; 9, 13, 17, 21,…….

25, 29

1. **Short Exam Questions**

**Section 1- Solving Basic Equations**

1. I think of a number, double my number and add 4. I now have 56. What number did I first think of?
26
2. Solve each of the following equations:
	1. x = 14

* 1. x = 36

* 1. z = 7

* 1. g = 50

* 1. h = 6

* 1. f = 5

* 1. k = 12

1. Use the formula to find when .

U = 50

1. Solve .

X = 9

1. Find the value of when .

-6+20 = 14

1. Find the value of when .

 53

1. Solve the equation .

X= 5

1. Solve the equation .

 y =12

1. Make the subject of the formula .

1. Solve the equation .

6𝑥 = 12

𝑥 = 2

**Section 2 – Forming Equations From Words**

1. Find the length of the missing side of the shape below, given the perimeter is 23 cm.

 cm

 cm

 4 cm

 4 cm

1. a) If is an odd number, what can you say about ? even

* + 1. and are odd numbers. Is *p* + *q* an odd number, an even number or could it be either?
		Write an explanation of how you know. Even, because even + even = even, and odd numbers are an even number +1 so you would have even + even +1+1 which is even +2.

1. Bag *A* contains countersBag *B* contains 6 more counters than Bag *A.* Bag *C* contains 4 times as many counters as Bag *B.*Find the total number of counters in Bags *A, B* and *C* . Simplify your answer as far as possible.

So

1. The perimeter of this rectangle is 32cm. Write down an equation in terms of x and use it to find the dimensions of the rectangle.

 RECTANGLE



1. When Paul asked Simon for his house number,, he replied

*“one subtracted from twice my house number is 47”.*

Write an equation in terms of for Simon’s house number and then solve the equation.

1. Natalie is ‘**a**’ years old. Write down expressions in terms of **a** for the following people’s ages:
a) Joyce, who is 10 years older than Natalie a + 10
b) John, who is half Natalie’s age. a ÷ 2
c) Gavin, who is twice *Joyce’s* age. 2(a + 10)
d) Steven, who is 4 years older than *John*.
2. The angles in a triangle are x, 3x and 5x.
Write an equation to find the value of x.
Write down the size of each angle in the triangle.

Sides of the triangle are 20o 60o 100o

1. Biscuits are sold in packets. Each packet contains 16 biscuits. Jason buys *m* packets of biscuits.
	1. Write down an expression, in terms of *m*, for the number of biscuits Jason buys.

16m

Jason eats six biscuits.

* 1. Write down an expression, in terms of *m*, for the number of biscuits left.

 16m - 6

1. Rajiv is *x* years old.

 His sister Tanvi is 5 years younger than Rajiv.

 a) Write down an expression, in terms of *x*, for Tanvi’s age.

 The total of Rajiv’s age and Tanvi’s age is 41 years.

 b) Form an equation and solve it to find the value of *x*.

 c)Write down Tanvi’s age. 18

1. The four angles of a quadrilateral are 45°, 105°, (4*x* – 15)° and 5*x*°.

 a) Form an equation, in terms of *x*, using this information.

 b) Solve your equation and work out the size of the largest angle of the quadrilateral.

1. Jo, Tara & Amy go to a party. They each take CDs to play and have 64 between them. Tara had 9 more than Amy & Amy had 14 more than Jo. How many CDs did Jo bring?

Let Jo = x so Amy x + 14 Tara x + 14 + 9

**Section 3 – Solving Inequalities**

1. For each of the inequalities solve them and then display them on a diagram.

|  |  |  |
| --- | --- | --- |
|  | Solve | Diagram |
|  |  |  |
|  |  |  12 |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1. Solve the following inequalities:
2.

1.

1. <3

1. x>−1

1. Given is an integer, list the possible values of when

.

1,2,3

1. Solve these inequalities and represent the solutions on a number line;
a) 3x < 24
b) 2x – 5 > 17
c) 2(x + 5) ≤ 16 d) 7x – 5 ≥ 3x + 3
e) 3x + 1 < x + 3
2. Make a list of numbers that satisfy these inequalities.
a) 2 < y < 8 3, 4, 5, 6, 7 c) -5 ≤ y < 5 -5, -4, -3, -2, -1, 0, 1, 2, 3, 4
b) 2 < y ≤ 8 3, 4, 5, 6, 7, 8 d) -1 < y ≤ 1 0, 1

1. Show the following inequalities on a number line:
	1.



5

-3

11

5

**Section 4 – Mixed Exam Style Questions**

1. *k* is an even number.
Jo says that *k* + 1 is always even.

Give an example to show that Jo is wrong. Use 4, give 3 so shows she is wrong

1. The letters *a* and *b* represent prime numbers. Give an example to show that *a* + *b* is **not** always an even number. Use a = 2 and b = any other prime
2. The sides of a rectangle are 2y + 1, and y – 3.
The perimeter is 26cm - find the value of y and the length of each side.

Sides length 11,11,2,2

1. Form an equation for the area of the triangle;

8

 Area of triangle =

(2a+4)

1. A shop sells two sizes of bags of cookies.
The large bag contains 6 cookies and the small bag contains 3 cookies.
	1. How many cookies are there in *L* large bags?

6L

* 1. Write an expression for the total number of cookies
	 in *L* and *S* small bags.

6L+3S

1. The dimensions of a rectangle are **length = 2x** and **width = 4x-2 .** The perimeter of the rectangle is 32cm. Find the area in cm2.

So sides 6cm and 10 cm. Area= 60cm2

1. The size of the largest angle in a quadrilateral, is 3 times that of the smallest angle. The other two angles are equal and are 30° less than the largest.

Work out in degrees the size of all four angles in the quadrilateral.

You must show your working.

Smallest angle =

Largest =

Other two =

Total:

Angles 126, 96, 96, 42

1. Given that the two lengths are equal, calculate the length of Sides.

Sides = 22

|  |  |
| --- | --- |
| A | B |
| 2p + 4  | 4p - 15 |

Expression A is 10 more than twice expression B. Find p.

1. If I double my age, add 4, divide by 5, then take away 2 I get the age at which I first voted (18). How old am I now?

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