PiXL Independence:

Mathematics – Answer Booklet
KS4 FOUNDATION

Topic 2 – Powers and Roots. HCF/LCM. Ratio/ Proportion

Contents:

Answers

I.   Basic Skills Check

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

Skills Check 1

What is the product of 13 and 21?

273

2. The price of a 4 pack of beans is reduced by 12%, the original price was £1.50. What is the new price?

£1.32

3. Write down any three factors of 20.

Any three from 1, 2, 4, 5, 10, 20

4. Which of these numbers are prime?
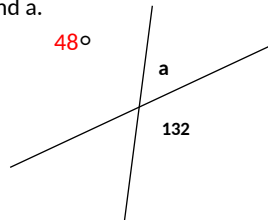
3, 5, 6, 8, 12

3, 5

5. Simplify 7J + 9k – 3k + 4J.

11J + 6k

6. Solve: $5x - 3 = 12.$

x = 3

7. Find a.

48°

a

132

8. In a class of 30 students 1/6th of the class are left handed. How many are left handed?

5

9. Expand the bracket 5(a-8).

5a-40

10. In a quadrilateral the angles are 132^0, 42^0, 110^0 and A. Find the value of A.

76°

Skills Check 2

1. An electricity bill is £87 plus VAT at 5%. Calculate the VAT charged.

£4.35

2. A bunch of flowers priced at £12 is reduced by a quarter. What is the new price?

£9

3. Write down all the factors of 48.

1, 2, 3, 4, 6, 8, 12, 16, 24, 48

4. Round 7850 to one significant figure.

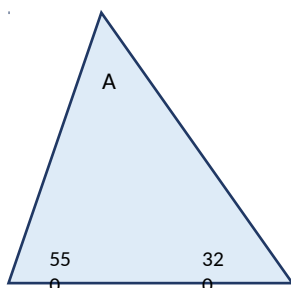8000

5. Simplify 3x + 4y + 2x – 5y.

5x - y

6. Solve: 5p + 6 = -4.

p = -2

7. Find A.

A = 93°

A

2

55
0

32
0

8. In a class of 24 students the probability that a pupil has brown eyes is 1/6th. How many students do not have brown eyes?

20

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

5a + 6

10. Find the next two terms in the sequence; 5, 7, 9, 11, ...

13, 15

Skills Check 3

1. A coat costs £65, delivery costs a further 5%. What is the delivery charge?

£3.25

2. A train ticket that costs £126 is reduced by a 1/3. What is the new cost?

84

3. Find the highest common factor (HCF) of 12 and 40.

4

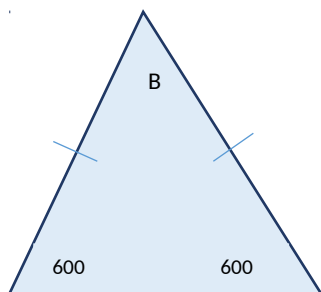4. Round 1.3152 to two significant figures.

1.3

5. Expand 3(7x – 5).

21x-15

6. Solve: 20=5 -3x.

x = -5

7. Find B.

60°

B

600   600

8. In a packet of 20 sweets 6 are red. You take a sweet without looking; what is the probability of choosing a red sweet?

3/10

9. Calculate $\dfrac{2}{5}+\dfrac{1}{4}$.

$\dfrac{13}{20}$

10. Find the next two terms in the sequence; 22, 27, 32, 37,..........

42, 47

II. Short Exam Questions

Section 1 - Powers and Roots

1. Work out 3.7^2.

13.69

2. Work out the cube of 4.

16

3. Work out $3 \div 0.7^2$ Write down the full calculator display.

3

4. Use your calculator to work out $\sqrt{\dfrac{39231}{27.9^2}}$

5. Write down the full calculator display.

7.099217566

6. Use the x^y button on your calculator to work out:

   a) 13^3 = 2197   b) 10^0 = 1   c) 8^{-1} = 0,125

7. Use your calculator to find the values of

(a) $\dfrac{4.75}{3.21 \times 5.76}$. Write down all the figures on your calculator.

0.2569011769

(b) $\sqrt{10 - \pi}$

     (i) Write down all the figures on your calculator. 2.618856114

     (ii) Give your answer to 3 significant figures. 2.62

8. Calculate $(3.24 \times 10^{-2}) \times (2.4 \times 10^3)$.

   Give your answer in standard form.

   7.776×10^1

9. Simplify these expressions, giving your answer in index form.

a) $5^6 \times 5^2$ b) $3^7 \div 3^5$ c) $9^3 \times 9^5 \div 9^2$ d) $\dfrac{2^6 \times 2^5}{2^8}$

   a) 5^8 b) 3^2 c) 9^6 d) 2^3

10. Simplify leaving your answer in surd form.

a) $(3^2)^3$ b) $(5^3)^2$ c) $(4^{-2})^3$ d) $(7^{-4})^2$

a) 3^6 b) 5^6 c) 4^{-6} d) 7^{-8}

Section 2 - HCF/ LCM
1.   Write down all the factors of 24.

2. Explain why 73 is not a multiple of 3.
   73 > 3 therefore it cannot be a multiple of 3
3. Write down all the common factors of 16 and 36.
   1, 2, 4
4. Ben thinks the lowest common multiple of 6 and 10 is 60. Is he correct?
   No
5. Find the highest common factor of 20 and 30.
   1, 2, 5, 10
6. Drummers hit their drums on certain beats. Drummer A hits his drum every 6 seconds. Drummer B hits his drum every 7 seconds. In the first 60 seconds, will they ever play at the same time? Yes
7. Are these correct? If not correct them.
   a) HCF of 21 and 28 is 7   b) HCF of 27 and 45 is 5   c) HCF of 28 and 16 is 8.
   b) HCF of 27 and 45 is 9.   c) HCF of 28 and 16 is 4.
8. a) Write 48 and 120 in prime factor form.
   b) Use your answers to find their highest common factor.
   a) $2^4 \times 3$ b) $2^3 \times 3 \times 5$
9. As a product of prime factors 60 = 2^2 x 3 x 5.
   a) What number is represented by 2 x 3^2 x 5? 90
   b) Find the lowest common multiple of 60 and 48. 240

10. Tom, Sam and Matt are counting drum beats.
    Tom hits a snare drum every 2 beats.
    Sam hits a kettle drum every 5 beats.
    Matt hits a bass drum every 8 beats.

    Will they ever play at the same time during 60 beats?

    Show clearly how you get your answer.
    Yes. The lowest common multiple of 2, 5 and 8 is 40 therefore they will play at the same time on the 40th beat.

Section 3 - Ratio

1. Simplify the following ratios:
   3:9 = 1:3   4:48 = 1:12   3:27 = 1:9   5:125 = 1:25
   2:14 = 1:7   3:81 = 1:27   2:6:18 = 1:3:9   4:14:8 = 2:7:4

2. Write these ratios in the form 1:n

   2:5 = 1:2.5   3:8 = 1:$\dfrac{8}{3}$ 5:12 = 1:2.4   3:4 = 1:$\dfrac{4}{3}$

   5:9 = 1:1.8   6:2 = 1:$\dfrac{1}{3}$ 4:2 = 1:0.5   12:7 = 1:$\dfrac{7}{12}$

3. A school collected £180 for charity. The money was divided between NSPCC and RSPCA in the ratio 2:3. How much did each charity receive?
   NSPCC will receive £72. RSPCA will receive £108.
4. Pocket money is split between Pete, Alan and Helen in the ratio 4:5:6. Dad pays out £60. How much does each person get?
   Pete will get £16, Alan will get £20 and Helen will get £24.
5. Mr Allen, Mrs Book and Ms Collins own 3, 4 and 5 parts of a publishing business. They make £120 profit each week. How much do they each receive?
   Mr Allen will receive £30, Mrs Book will receive £40 and Ms Collins will receive £50.
6. Divide £5 between Bill, Sue and Lucy in the ratio 2:3:5. How much does each person get? How much more than the others does Lucy receive?
   Bill will get £1, Sue will get £1.50 and Lucy will receive £2.50.

7. 5 orange drinks cost £6.00. What is the cost of 10 orange drinks?
   £12

5

8. There are 3 feet in 1 yard. How many feet are in 5 yards?
   15 feet.
9. A recipe for 'flan de naranja' serves 4 and uses:
   275 g caster sugar
   200 ml orange juice
   7 egg yolks
   I am planning a party for 10 people. How much orange juice will I need to buy?
   500ml

Section 4 - Mixed Questions

1. Pete Finnegan works on Saturdays and is paid £33 for 6 hours. How much would he be paid for working 6 hours on Saturday and 4 hours on Sunday?
   £22
2. There are 16 pints in 2 gallons. How many pints are there in 5 gallons?
   40
3. A 250g serving of breakfast cereal contains 450 Kcal. What is the number of Kcal in every 100g?
   180Kcal
4. Andrew went on holiday and had £400 to change into euros (€). The exchange rate was £1 = €1.50. How many euros did he have to spend?
   €600

5. Using the fact that 1.6 km = 1 mile:
   a) How many kilometres are there in 25 miles? 40
   b) How many miles are there in 3200 km? 2000
6. Asif scores 32 out of 40 in his Maths test and 81% in his English test.
   In which test does he do better. Show your working
   Asif did better in his English test because he scored 80% on his Maths test.
7. The ratio of the length of a car to a lorry is 2:5.
   The car has a length of 400cm.
   Express the length of the car as a percentage of the length of the lorry.
   Calculate the length of the lorry.
   The length of the car is 40% of the length of the lorry. The lorry is 1000cm long.
8. Three litres of diesel costs £2.82. What is the cost of 40 litres?
   £37.60
9. 300 grams of sweets cost £1.65. Find the cost of
   a) 100 grams of sweets = £0.55
   b) 500 grams of sweets = £2.75
   c) 5 kg of sweets = £27.50
   Why might your answer to (c) be unrealistic?

10. a) Elana is paid £12.50 per hour. She is given a pay rise of 20%. What is her new pay rate?
    b) Six months later, due to adverse economic
       conditions Elana is asked to take a 20% pay *cut*.
       What will be her hourly rate now?
       a) £15 per hour.
       b) £12 per hour.
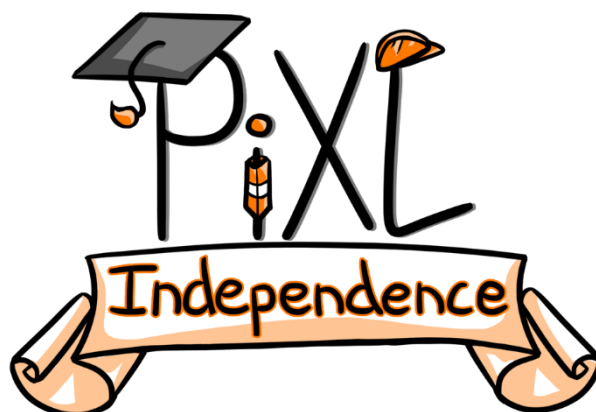
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