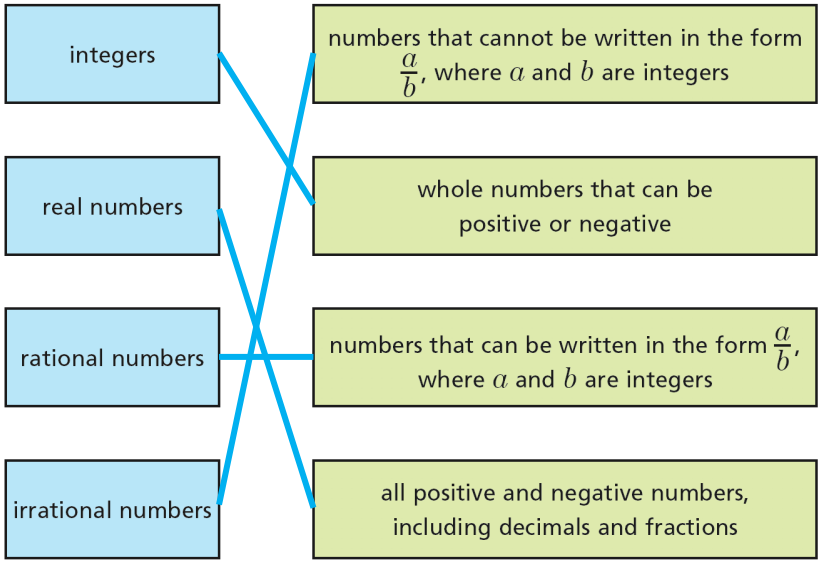
Y9 – Spring – Block 1 – Step 1 – Integers, real and rational numbers Answers

Question 1



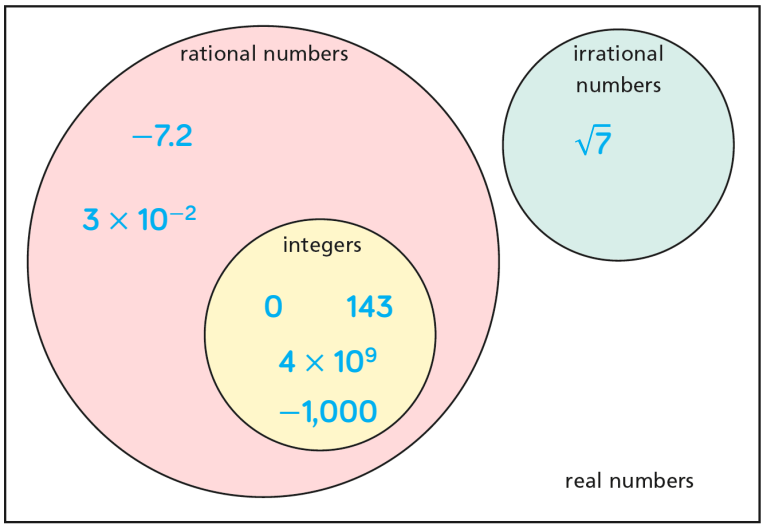
Question 2

a)

Number	Integer	Rational	Irrational	Real
5	✓	✓		✓
π			✓	✓
7.2		✓		✓
9.5		✓		✓
–7	✓	✓		✓
$\frac{2}{3}$		✓		✓
$\sqrt{2}$			✓	✓
0	✓	✓		✓

b) multiple possible answers, e.g.:

Integers	1 -999 1,000,001
Rational numbers	25 -10.25 $\frac{1}{10}$
Irrational numbers	$-\sqrt{2}$ $\sqrt{3}$ $\frac{1}{\pi}$
Real numbers	155 9,909.1 $-\frac{1}{9}$

Question	Answer
3	a)  b) multiple possible answers c) All real numbers are either rational or irrational numbers. d) All integers are rational numbers. No number can be both rational and irrational.
4	a) true Any integer can be written in the form of a fraction with a denominator of 1 b) false For example, 0.1 is a rational number but not an integer. c) false An irrational number is a number that cannot be written in the form $\frac{a}{b}$ whereas any integer can be written in this way with a denominator of 1
5	a) 15 The number has been written as a fraction. b) 12 $\frac{15}{3} = 5$, which is an integer.
6	a) $\frac{17}{2}$ $\frac{19}{4}$ $\frac{25}{5}$ ✓ $\frac{10}{100}$ $\frac{100}{10}$ ✓ $\frac{49}{7}$ ✓ b) The numerator is a multiple of the denominator.
7	a) 10 The number has been written as a square root, and many square roots are irrational. b) 15 $\sqrt{9} = 3$, which is an integer.

Y9 – Spring – Block 1 – Step 1 – Integers, real and rational numbers Answers (continued)

Question	Answer
8	a) true b) true c) true d) true When we have counted to the highest number, there is always a number that is one higher. This can apply to integers, the numerator or denominator of rational numbers and, for example, the number under a square root.

Y9 – Spring – Block 1 – Step 2 – Understand and use surds Answers

Question	Answer
1	a) not a surd $\sqrt{4} = 2$ b) surd 5 is not a square number, so $\sqrt{5}$ is not rational. c) not a surd $\sqrt{\frac{1}{4}} = \frac{1}{2}$ d) surd 81 is not a cube number, so $\sqrt[3]{81}$ is not rational. e) not a surd $\sqrt[3]{27} = 3$
2	a) $\sqrt{4} = 2$ and $\sqrt{25} = 5$ $2 \times 5 = 10$ $\sqrt{100} = 10$ b) $\sqrt{100} = 10$ and $\sqrt{9} = 3$ $10 \times 3 = 30$ $\sqrt{900} = 30$ c) $\sqrt{25} = 5$ and $\sqrt{16} = 4$ $5 \times 4 = 20$ $\sqrt{400} = 20$ d) $\sqrt{1} = 1$ and $\sqrt{49} = 7$ $1 \times 7 = 7$ $\sqrt{49} = 7$
3	$\sqrt{ab}$
4	a) $\sqrt{35}$ b) $\sqrt{33}$ c) $\sqrt{105}$ d) $\sqrt{102}$ e) $\sqrt{195}$ f) $\sqrt{13x}$ g) $\sqrt{21xy}$ h) $\sqrt{125}$
5	a) 4 b) 100 c) 900 d) 6 The division of the two numbers on the left without the square root gives the number on the right without the square root.
6	$\sqrt{\frac{a}{b}}$

Question	Answer
7	a) $\sqrt{3}$ b) $\sqrt{5}$ c) $\sqrt{7}$ d) $\sqrt{11}$ e) $\sqrt{22}$ f) $\sqrt{3}$
8	a) $\sqrt{9} \times \sqrt{3}$ b) $\sqrt{4} \times \sqrt{3}$ c) $\sqrt{25} \times \sqrt{2}$ d) $\sqrt{4} \times \sqrt{2}$ e) $\sqrt{100} \times \sqrt{2}$ f) $\sqrt{16} \times \sqrt{2}$ or $\sqrt{4} \times \sqrt{8}$
9	a) They have both expressed 72 as the product of two integers where one of them is a square number. Dexter used the greatest possible square number, but Dora used a smaller square number. b) Dexter $\sqrt{2}$ cannot be simplified any further. c) $3\sqrt{8} = 3 \times \sqrt{4} \times \sqrt{2} = 3 \times 2 \times \sqrt{2} = 6\sqrt{2}$
10	a) $3\sqrt{3}$ b) $2\sqrt{3}$ c) $5\sqrt{2}$ d) $2\sqrt{2}$ e) $10\sqrt{2}$ f) $4\sqrt{2}$ For part f), some students may have only simplified as far as $2\sqrt{8}$

Y9 – Spring – Block 1 – Step 3 – Work with directed number Answers

Question	Answer
1	a) $7 - 5 = 2$ $5 - 7 = -2$ $-7 + 5 = -2$ $-5 + 7 = 2$ $-5 - -7 = 2$ $-7 - -5 = -2$ b) $54 - 17 = 37$ $17 - 54 = -37$ $-54 + 17 = -37$ $-17 + 54 = 37$ $-17 - -54 = 37$ $-54 - -17 = -37$ The difference is the same but the sign varies. Subtracting a negative number is the same as adding the positive number.
2	a) $5 \times 7 = 35$ $-5 \times 7 = -35$ $5 \times -7 = -35$ $-5 \times -7 = 35$ b) $48 \div 4 = 12$ $-48 \div 4 = -12$ $48 \div -4 = -12$ $-48 \div -4 = 12$
3	-4×8 $8 \div -4$ $-8 \div -4$ -8×-4
4	a) $-4a$ b) $-6b$ c) $-3.5d$ d) $-22e$ e) $-g$ f) $0.7k$
5	a) $-4m$ b) $-16m$ c) $4m$ d) $-4m$ e) $-21m$ f) $-20m$
6	multiple possible answers, e.g.: -3 0 5 The first number is -3 and the other two numbers sum to 5
7	Yes. For example, three correct answers score 21, eight incorrect answers score -32 and 9 unanswered questions score 0 giving a total score of -11.

Y9 – Spring – Block 1 – Step 3 – Work with directed number Answers (continued)

Question	Answer
8	multiple possible answers, e.g.: −16 −4 2 4 16 The greatest number must be a multiple of 8 and the middle three numbers cannot all be the same sign, e.g.: −24 −12 1 3 8 −8 −3 3 4 24
9	a) −£34 b) £66 c) £528
10	a) 0 b) −11.5 c) −78.5
11	a) a is positive and b is negative. b) $a = 3, b = -15$

Y9 – Spring – Block 1 – Step 4 – Solve problems with integers Answers

Question	Answer
1	a) 707 b) 29
2	£16,065
3	a) £217 b) £31 c) £3,010
4	a) 2,749 b) £247.41
5	a) 45 km b) 1:3
6	a) 22,222 b) 493,817,284 The digits of the answer for part b) are the same as the digits of the two numbers in part a).
7	a) 121 144 169 b) 121 441 961 In part b), the digits of the answers are the same digits as the answers to part a) in reverse order.
8	multiple possible answers, e.g.: 81: $8 + 1 = 9$ $81 \div 9 = 9$ 531: $5 + 3 + 1 = 9$ $531 \div 9 = 59$ 12,222: $1 + 2 + 2 + 2 + 2 = 9$ $12{,}222 \div 9 = 1{,}358$
9	a) 21 b) Yes. 3

Y9 – Spring – Block 1 – Step 5 – Solve problems with decimals Answers

Question	Answer
1	37 miles
2	a) £6.69 b) £5.33
3	111.9 m
4	£6.73
5	a) 4.695 cm b) longer A number divided by 6 will be greater than the same number divided by 8
6	2.56 cm
7	a) 7.5 kg b) 5.32 kg
8	a) Amir £7.65 Whitney £8.76 b) They both bought 12 tins, so Amir got the better value for money as he got them cheaper.
9	a) number of comics sold = 12 + 9 + 11 + 4 + 3 = 39 comics sold for 39 × £3.45 = £134.55, which is more than £120 b) £52.50
10	1st = 0.51 m 2nd = 0.31 m 3rd = 0.08 m

Y9 – Spring – Block 1 – Step 6 – HCF and LCM Answers

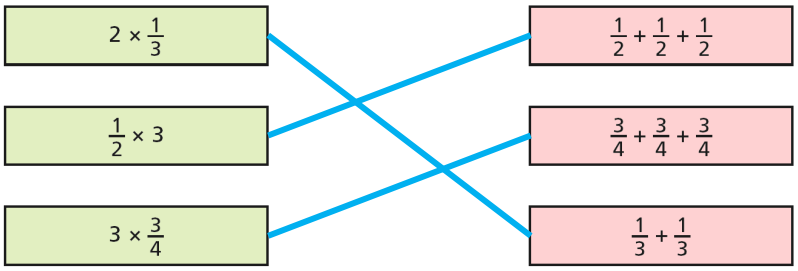
Question	Answer
1	a) 1, 2, 3, 5, 6, 10, 15, 30 b) 1, 2, 4, 5, 8, 10, 20, 40 c) 1, 2, 5, 10 d) 10
2	a) 8, 16, 24, 32, 40, 48, 56, 64, 72, 80 b) 6, 12, 18, 24, 30, 36, 42, 48, 54, 60 c) 24, 48 d) 24
3	a) 8 b) i) 16 ii) 80
4	a) 150 b) 48 c) 105 d) 108
5	three possible answers: 48 and 56 16 and 56 56 and 32
6	No. 17 is a factor of 51, so the HCF is 17
7	9
8	possible answers: 7, 14, 21, 42, 63, 126
9	a) $6x$ b) $6x^2$ c) $6xy$ d) $6y + 9$
10	two possible answers: 6 and 90 18 and 30
11	10 packets of burgers 12 packets of bread rolls 15 packets of cheese slices
12	11:40 am

Y9 – Spring – Block 1 – Step 7 – Adding and subtracting fractions Answers

Question	Answer
1	a) $\frac{3}{8}$ b) $\frac{3}{8}$ c) $\frac{3}{8}$
2	a) $\frac{7}{9}$ b) $\frac{1}{3}$ c) $\frac{1}{12}$ d) $\frac{14}{99}$ e) $\frac{21}{20} = 1\frac{1}{20}$ f) $\frac{46}{35} = 1\frac{11}{35}$
3	a) Ron has subtracted the numerator of the fraction from the whole number. b) $3\frac{2}{5}$ c) i) $10\frac{3}{7}$ ii) $9\frac{4}{7}$
4	$\frac{5}{24}$
5	a) $\frac{14}{15}$ b) $\frac{13}{36}$
6	a) $y = \frac{5}{24}$ b) $x = \frac{35}{36}$ c) $h = \frac{5}{36}$ d) $p = \frac{23}{45}$
7	a) $\frac{5}{12}$ and $\frac{3}{8}$ b) $\frac{5}{6}$ and $\frac{8}{15}$ c) $\frac{5}{12}$ and $\frac{8}{15}$

Question	Answer
8	a) $3\frac{1}{3}$ b) $3\frac{19}{20}$ c) $6\frac{13}{33}$ d) $2\frac{13}{21}$ e) $7\frac{7}{18}$ f) $5\frac{19}{24}$
9	$\frac{13}{36}$
10	a) $\frac{3}{2y}$ b) $\frac{13}{3y}$ c) $\frac{5y}{8}$ d) $\frac{18y}{35}$
11	$\frac{3}{2x}$ | $\frac{7}{4x}$ | $\frac{1}{2x}$ $\frac{1}{4x}$ | $\frac{5}{4x}$ | $\frac{9}{4x}$ $\frac{2}{x}$ | $\frac{3}{4x}$ | $\frac{1}{x}$

Y9 – Spring – Block 1 – Step 8 – Multiplying and dividing fractions Answers

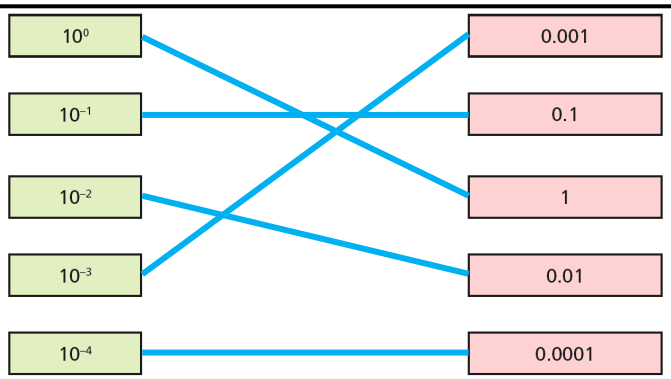
Question	Answer
1	
2	Annie should only have multiplied the numerator by 6, not the denominator as well. The correct answer is $\frac{12}{5}$
3	a) $1\frac{1}{4}$ b) $3\frac{1}{2}$ c) $2\frac{2}{5}$ d) 6
4	There are **4** quarters in one whole. So $1 \div \frac{1}{4} = 4$
5	a) $\frac{1}{6}$ b) $\frac{1}{20}$
6	a) 2 b) 2 c) 4 d) 6 e) 10 f) 16
7	a) $<$ b) $=$ c) $>$ d) $>$

Question	Answer
8	a) $\frac{2}{15}$ b) $\frac{15}{36} = \frac{5}{12}$ c) $\frac{16}{49}$ d) $\frac{1}{16}$ e) $\frac{3}{4} \times \frac{7}{9} = \frac{21}{36}$ f) $0.1 \times \frac{3}{5} = \frac{3}{50}$
9	a) 9 b) $\frac{1}{9}$ c) $\frac{21}{16}$ d) $\frac{16}{21}$ e) $\frac{21}{2}$ f) $\frac{2}{21}$
10	a) $\frac{5}{7}$ b) $\frac{2}{5}$ c) $\frac{5}{21}$ d) $\frac{35}{108}$
11	a) $\frac{7}{10}$ b) $\frac{35}{2}$ c) $3\frac{17}{20}$ d) $1\frac{27}{28}$
12	a) $\frac{xy}{24}$ b) $\frac{3x}{2y}$ c) $\frac{3x}{2y}$ d) $\frac{xy}{24}$
13	$\frac{7}{10}$ km

Y9 – Spring – Block 1 – Step 9 – Solve problems with fractions Answers

Question	Answer
1	$\frac{1}{4}\,m^2$
2	a) $Z = \frac{5}{7}$ b) $<$
3	£478
4	55
5	80 g
6	£11
7	2,450
8	$22\frac{33}{40}\,cm^2$
9	$\frac{29}{66}$
10	$x = \frac{8}{9}$
11	96
12	$\frac{89}{121}$

Y9 – Spring – Block 1 – Step 10 – Numbers in standard form Answers

Question	Answer
1	6×10^6 $6 \times 10^{\frac{1}{6}}$ 60×10^6 $\frac{1}{6} \times 10^6$ 0.6×10^6 6×10^{16} 6×10^1 $6 \times 10^{1.6}$
2	a) 2,000 b) 2,100 c) 201,000 d) 200,100
3	a) 4×10^4 b) 4.5×10^4 c) 4.05×10^5 d) 4.0005×10^5 e) 4×10^1 f) 4.5×10^0
4	
5	a) 0.07 b) 0.0072 c) 0.000729 d) 0.00007029
6	a) 8×10^{-4} b) 8×10^{-6} c) 8.5×10^{-3} d) 8.57×10^{-2}

Question	Answer
7	a) 5×10^5 b) 9.3×10^4 c) 4×10^4 d) 8.24×10^6 e) 8.2×10^5 f) 8×10^{-6} g) 8×10^{-3} h) 8.24×10^{-2} i) 8.24×10^{-4}
8	a) $<$ b) $>$ c) $<$ d) $<$
9	a) He has not converted his answer so that the number part of standard form is between 1 and 10 The correct answer is 3×10^4 b) i) 8×10^{-5} ii) 1.2×10^9 iii) 2.3×10^{-1} iv) 4×10^5 v) 5×10^2 vi) 7.5×10^{-9}
10	a) 6×10^3 b) 2×10^3 c) 1.1×10^6 d) 7×10^{-5} e) 1.29×10^5 f) 1.29×10^{-3} g) 3×10^2 h) 3×10^{-4}
11	0.3 3 5.61 $(6.2 \times 10^{-4}) - (5.9 \times 10^{-5}) = 0.00062 - 0.000059 = 0.000561 = 5.61 \times 10^{-4}$

Y9 – Spring – Block 1 – Step 10 – Numbers in standard form Answers (continued)

Question	Answer
12	a) 1.8×10^{9} b) 4.5×10^{2} c) 1.25×10^{-9} d) 2×10^{-6}
13	2.3004×10^{13}