

EXAM 1_2 (Numbers)

1) Complete (rounding):

(1.5 points)

Number	to the tenth	to the hundredth	to the thousandth
0.1759			
-43.079			
3.2547			
-0.31086			

2) a) Which of the following numbers are rational numbers? (2.5 points)

 $1.180180018\dots$; $1.\overline{18}$; 1.18 ; 1.1818 ; $1.\overline{18}$

b) Arrange them in ascending order.

c) Express each rational number as a fraction.

3) Work out and simplify:

(1.5 points)

a) $3^{-2} \cdot \left(1 - \frac{5}{3} + \frac{3}{5}\right) - \frac{2}{45} =$

b) $5 \cdot \left(\frac{1}{2} + 1\right) - \frac{3}{4} \div \left(\frac{1}{4} - \frac{1}{2}\right)^2 =$

4) Complete (giving the answer with 3 s.f.):

(2 points)

Decimal	Standard form	Decimal	Standard form
230457		12781000000	
0.00128392		0.0000092516	
	3.105×10^7		1.1516×10^{-7}
	1.094×10^{-5}		5.153×10^8

 5) The speed of light is 3×10^8 meters/second. If the sun is 1.5×10^{11} meters from earth, how many seconds does it take light to reach the earth. Express your answer in scientific notation (Standard form) (1 point)

6) Mark on the real number line the following:

(1.5 points)

$-\frac{2}{5}, \frac{8}{5}, -\frac{7}{4}, \frac{11}{4}$

SOLUTION

1) Complete (rounding):

Number	to the tenth	to the hundredth	to the thousandth
0.1759	0.2	0.18	0.176
-43.079	-43.1	-43.08	-43.079
3.2547	3.3	3.25	3.255
-0.31086	-0.3	-0.31	-0.311

2) a) Which of the following numbers are rational numbers?

 $1.180180018\dots$; $1.\widehat{18}$; 1.18 ; 1.1818 ; $1.\widehat{1\overline{8}}$

 Rational numbers: $1.\widehat{18}$; 1.18 ; 1.1818 ; $1.\widehat{1\overline{8}}$

 Irrational: $1.180180018\dots$

b) Arrange them in ascending order.

 $1.18 < 1.180180018\dots < 1.1818 < 1.\widehat{1\overline{8}} < 1.\widehat{18}$

c) Express each rational number as a fraction.

 $1.\widehat{18} \rightarrow N = 1.18888\dots; 10N = 11.8888\dots; 100N = 118.8888\dots \Rightarrow 90N = 107 \rightarrow N = \frac{107}{90}$

$$1.18 = \frac{118}{100} = \frac{59}{50}; \quad 1.1818 = \frac{11818}{10000} = \frac{5909}{5000}$$

 $1.\widehat{1\overline{8}} \rightarrow N = 1.181818\dots; 100N = 118.181818\dots \Rightarrow 99N = 117 \Rightarrow N = \frac{117}{99} = \frac{13}{11}$

3) Work out and simplify:

$$\begin{aligned} \text{a) } 3^{-2} \cdot \left(1 - \frac{5}{3} + \frac{3}{5}\right) - \frac{2}{45} &= \frac{1}{9} \cdot \left(\frac{15}{15} - \frac{25}{15} + \frac{9}{15}\right) - \frac{2}{45} = \frac{1}{9} \cdot \frac{-1}{15} - \frac{2}{45} = -\frac{1}{135} - \frac{2}{45} = \\ &= -\frac{1}{135} - \frac{6}{135} = -\frac{7}{135} \end{aligned}$$

$$\begin{aligned} \text{b) } 5 \cdot \left(\frac{1}{2} + 1\right) - \frac{3}{4} \div \left(\frac{1}{4} - \frac{1}{2}\right)^2 &= 5 \cdot \frac{1+2}{2} - \frac{3}{4} \div \left(\frac{1}{4} - \frac{2}{4}\right)^2 = \frac{5 \cdot 3}{2} - \frac{3}{4} \div \left(-\frac{1}{4}\right)^2 = \\ &= \frac{15}{2} - \frac{3}{4} \div \frac{1}{16} = \frac{15}{2} - \frac{3 \cdot 16}{4 \cdot 1} = \frac{15}{2} - 12 = \frac{15}{2} - \frac{24}{2} = -\frac{9}{2} \end{aligned}$$

4) Complete (giving the answer with 3 s.f.):

Decimal	Standard form	Decimal	Standard form
230457	2.30×10^5	12781000000	1.28×10^{10}
0.00128392	1.28×10^{-3}	0.0000092516	9.25×10^{-6}
31100000	3.105×10^7	0.000000115	1.1516×10^{-7}
0.0000109	1.094×10^{-5}	515000000	5.153×10^8

5) The speed of light is 3×10^8 meters/second. If the sun is 1.5×10^{11} meters from earth, how many seconds does it take light to reach the earth. Express your answer in scientific notation (Standard form)

$$1.5 \times 10^{11} \div 3 \times 10^8 = 0.5 \times 10^{11-8} = 0.5 \times 10^3 = 5 \times 10^2 \text{ seconds}$$

6) Mark on the real number line the following:

$$-\frac{2}{5}, \frac{8}{5}, -\frac{7}{4}, \frac{11}{4}$$

