Year 9 Standard Form and Bounds – Mixed Practice

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Answers and worked solutions · 30 questions

A. Mixed practice (mixed order)

1. **0.083**

÷ 10^2 means divide by 100
= 0.083

2. **$155 \leq x < 165$**

Half of 10 is 5
160 − 5 = 155 and 160 + 5 = 165

3. **0.0000099**

÷ 10^4 means divide by 10 000
= 0.0000099

4. **$2.465 \leq x < 2.475$**

Half of 0.01 is 0.005
2.47 − 0.005 = 2.465 and 2.47 + 0.005 = 2.475

5. **118 cm**

Upper bound of a side: 29 + 0.5 = 29.5 cm
4 × 29.5 = 118 cm

6. **3.39×10^7**

Write both with 10^7: $9 \times 10^5 = 0.09 \times 10^7$
= 3.39×10^7

7. **5700**

× 10^2 means multiply by 100
= 5700

8. **0.00087**

Divide 8.7 by 10 000
= 0.00087

9. **5.5×10^{-2}**

Put the decimal point after the first non-zero digit: 5.5
$0.055 = 5.5 \times 10^{-2}$

10. **5.9×10^3**

Write both with 10^3: $2 \times 10^2 = 0.2 \times 10^3$
= 5.9×10^3

11. **134 m**

Lower bounds: 30.5 m and 36.5 m
2 × (30.5 + 36.5) = 134 m

12. 97 is not between 1 and 10, so it is not standard form: 970 000 = 9.7×10^5.

Error: the number in front must be at least 1 and less than 10
97 = 9.7 × 10
So 970 000 = 9.7×10^5

13. 1×10^4 photos

Number = card size ÷ photo size
$(4 \times 10^{10}) \div (4 \times 10^6)$
$= 1 \times 10^4$

14. 33.7

$\times 10^1$ means multiply by 10
= 33.7

15. 0.00074; 8.5×10^{-3}; 8.9×10^{-3}; 5.5×10^{-2}

Write them all in standard form and compare the powers of 10 first
Then compare the numbers in front

16. 250 000

Multiply 2.5 by 100 000
= 250 000

17. No. Multiply the numbers and add the indices: 2 × 3 = 6 and $10^3 \times 10^4 = 10^7$, so the answer is 6×10^7.

Test it with an example
Multiply the numbers and add the indices: 2 × 3 = 6 and $10^3 \times 10^4 = 10^7$, so the answer is 6×10^7.
Decide whether it is true

18. 2.7×10^{-3}

Put the decimal point after the first non-zero digit: 2.7
$0.0027 = 2.7 \times 10^{-3}$

19. $2.45 \leq x < 2.55$

Half of 0.1 is 0.05
2.5 – 0.05 = 2.45 and 2.5 + 0.05 = 2.55

20. 470

$\times 10^2$ means multiply by 100
= 470

21. No. $\div 10^{-3}$ is the same as × 1000, so the number gets bigger.

Test it with an example
$\div 10^{-3}$ is the same as × 1000, so the number gets bigger.
Decide whether it is true

22. 7.7×10^{-7}

Write both with 10^{-7}: $1 \times 10^{-8} = 0.1 \times 10^{-7}$
$= 7.7 \times 10^{-7}$

23. 245 kg

Lower bound of one bag: 25 – 0.5 = 24.5 kg
10 × 24.5 = 245 kg

24. lower bound 5.55 litres, upper bound 5.65 litres

Half of 0.1 is 0.05
Lower: 5.6 – 0.05 = 5.55; upper: 5.6 + 0.05 = 5.65

25. 3.6×10^{-3}; 0.0054; 7.8×10^{-3}; 3.2×10^{-2}

Write them all in standard form and compare the powers of 10 first
Then compare the numbers in front

26. 3.7×10^{-2}

Put the decimal point after the first non-zero digit: 3.7
$0.037 = 3.7 \times 10^{-2}$

27. 160 people per km²

People per km² = population ÷ area
$(8 \times 10^7) \div (5 \times 10^5) = 1.6 \times 10^2$
= 160

28. Yes. 85.5 rounds up to 86, so it is the smallest possible length.

Lower bound 85.5, upper bound 86.5
Error interval: 85.5 ≤ length < 86.5
85.5 is inside the interval

29. 0.042

Divide 4.2 by 100
= 0.042

30. Dividing by 10^{-2} is the same as multiplying by 100: $8.7 \div 10^{-2} = 870$.

Error: $\div 10^{-2}$ was treated as ÷ 100
10^{-2} = 1/100, and ÷ 1/100 means × 100
= 870