ERROR INTERVALS

BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

KEY IDEA

Inequality symbols compare numbers.

<	less than	>	greater than
≤	less than or equal to	≥	greater than or equal to

Tip: the small, pointy end points to the smaller number: 3 < 7

1 Write < or > in each box.

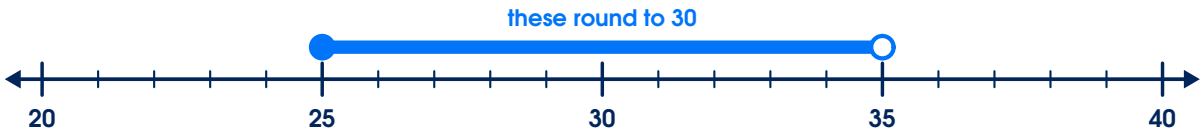
a) 45 ☐ 54

b) 7.2 ☐ 7.12

c) 0.5 ☐ 0.45

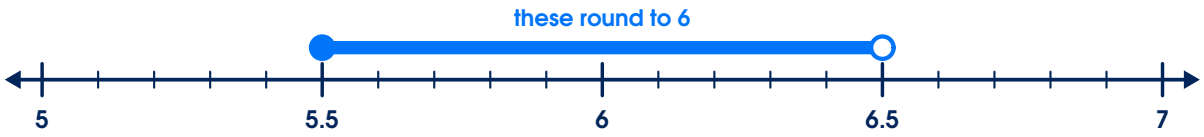
d) 99 ☐ 100

2 The blue part shows the numbers that round to 30 (nearest 10). Circle them below.



24 25 28 33 35 34.9

3 The blue part shows the numbers that round to 6 to the nearest whole number.



a) What is the smallest number that rounds to 6? ☐

b) Does 6.5 round to 6? YES NO

c) Does 6.49 round to 6? YES NO

4 Draw a line to match each inequality to its meaning.

x ≥ 4 •	• x is 4 or less
x < 4 •	• x is more than 4
x > 4 •	• x is less than 4
x ≤ 4 •	• x is 4 or more

ERROR INTERVALS

SUPPORT

NAME _____ CLASS _____ DATE _____

KEY IDEA

x rounds to 9 to the nearest whole number. The error interval shows every value x could be.

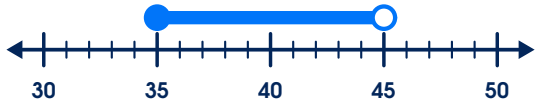


$8.5 \leq x < 9.5$

filled circle: x can equal 8.5
open circle: x cannot equal 9.5

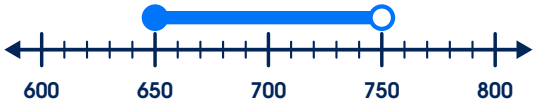
1 Use the number line to complete each error interval.

a) n = 40 (nearest 10)



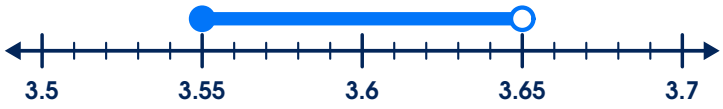
☐ ≤ n < ☐

b) m = 700 (nearest 100)



☐ ≤ m < ☐

2 x = 3.6, rounded to 1 decimal place. Complete the error interval.



☐ ≤ x < ☐

3 t rounds to 12 to the nearest whole number. Could t be each of these? Circle YES or NO.

a) 11.5 YES NO

b) 12.49 YES NO

c) 12.5 YES NO

d) 11.4 YES NO

4 y = 8, rounded to the nearest whole number. Ella writes $7.5 \leq y < 8.49$

a) Write the correct error interval. ☐ ≤ y < ☐

b) Explain Ella's mistake.

.....

ERROR INTERVALS

CORE

NAME _____ CLASS _____ DATE _____

KEY IDEA

If x = 41 to the nearest whole number, x can be any value from 40.5 up to, but not including, 41.5. The error interval is $40.5 \leq x < 41.5$. The lower bound is included; the upper bound is not.

FLUENCY

1 Write the error interval for each rounded value.

a) **p = 260** (nearest 10) ☐ ≤ p < ☐

b) **q = 4000** (nearest 1000) ☐ ≤ q < ☐

c) **r = 7.3** (1 d.p.) ☐ ≤ r < ☐

d) **s = 0.6** (1 d.p.) ☐ ≤ s < ☐

e) **w = 12.47** (2 d.p.) ☐ ≤ w < ☐

f) **v = 90** (1 s.f.) ☐ ≤ v < ☐

2 Write the error interval for each measurement.

a) A pencil is 14 cm long, to the nearest cm. ☐ ≤ l < ☐

b) A bag of flour weighs 3.8 kg, to 1 d.p. ☐ ≤ m < ☐

c) A race took 25 seconds, to the nearest second. ☐ ≤ t < ☐

REASONING

3 x = 23 to the nearest whole number. Ola says, "The largest x could be is 23.4". Explain why Ola is wrong, then write the error interval for x.

Error interval: ☐ ≤ x < ☐

4 The error interval for a rounded number x is $6.25 \leq x < 6.35$

a) What was x rounded to? ☐

b) Degree of accuracy? ☐

ERROR INTERVALS

GREATER DEPTH

NAME _____ CLASS _____ DATE _____

REASONING

1 Is each statement always, sometimes or never true? Circle your answer.

If it is sometimes true, give an example of when it is true and when it is not.

a) The lower bound rounds to the stated value. ALWAYS SOMETIMES NEVER

b) The upper bound rounds to the stated value. ALWAYS SOMETIMES NEVER

c) Nearest 10 error intervals have a width of 10 ALWAYS SOMETIMES NEVER

d) 1 s.f. and nearest 10 give the same interval. ALWAYS SOMETIMES NEVER

.....

PROBLEM SOLVING

2 Write the error interval for each rounded value.

a) **h = 35, to the nearest 5** ☐ ≤ h < ☐

b) **k = 4.5, to the nearest half** ☐ ≤ k < ☐

3 A lift can safely carry 600 kg. 8 people get in. Each person has a mass of 75 kg, to the nearest kg.

a) What is the upper bound for one person's mass? ☐

b) What is the upper bound for the total mass of the 8 people? ☐

c) Could the lift be overloaded? Explain. .....

★ CHALLENGE FOR ALL

4 x rounds to 50 to the nearest 10, to 46 to the nearest whole number and to 46.4 to 1 decimal place.

a) Write one error interval that fits all three facts. ☐ ≤ x < ☐

b) x has 2 decimal places and its digits add up to 19. What is x? ☐

ERROR INTERVALS ? ANSWERS

ANSWERS

BUILDING BLOCKS

Q1 a) $45 < 54$ · b) $7.2 > 7.12$ · c) $0.5 > 0.45$ · d) $99 < 100$

Q2 25, 28, 33, 34.9

Q3 a) 5.5 · b) No (6.5 rounds to 7) · c) Yes

Q4 $x \geq 4$: x is 4 or more · $x < 4$: x is less than 4 · $x > 4$: x is more than 4 · $x \leq 4$: x is 4 or less

SUPPORT

Q1 a) $35 \leq n < 45$ · b) $650 \leq m < 750$

Q2 $3.55 \leq x < 3.65$

Q3 a) Yes · b) Yes · c) No · d) No

Q4 a) $7.5 \leq y < 8.5$ · b) The upper bound is 8.5, not 8.49: numbers such as 8.495 also round to 8. The < sign already shows that y cannot equal 8.5

CORE

Q1 a) $255 \leq p < 265$ · b) $3500 \leq q < 4500$ · c) $7.25 \leq r < 7.35$ · d) $0.55 \leq s < 0.65$ · e) $12.465 \leq w < 12.475$ · f) $85 \leq v < 95$

Q2 a) $13.5 \leq l < 14.5$ · b) $3.75 \leq m < 3.85$ · c) $24.5 \leq t < 25.5$

Q3 Numbers bigger than 23.4, such as 23.45 or 23.499, still round to 23. The error interval is $22.5 \leq x < 23.5$

Q4 a) 6.3 · b) 1 decimal place

GREATER DEPTH

Q1 a) Always · b) Never (it rounds up to the next value) · c) Always · d) Sometimes: $x = 40$ gives $35 \leq x < 45$ both ways, but for $x = 400$ the 1 s.f. interval is $350 \leq x < 450$ and the nearest 10 interval is $395 \leq x < 405$

Q2 a) $32.5 \leq h < 37.5$ · b) $4.25 \leq k < 4.75$

Q3 a) 75.5 kg · b) $8 \times 75.5 = 604$ kg · c) Yes: the total could be more than 600 kg (anything up to 604 kg)

Q4 a) $46.35 \leq x < 46.45$ · b) 46.36 ($4 + 6 + 3 + 6 = 19$; 46.45 is not allowed)