

Reasoning and Problem Solving

Step 15: Reason from Known Facts

National Curriculum Objectives:

Mathematics Year 6: (6C8) [Solve problems involving addition, subtraction, multiplication and division](#)

Differentiation:

Questions 1, 4 and 7 (Problem Solving)

Developing Solve, correct and explain errors in calculations including whole numbers with up to 4-digits using numerals only.

Expected Solve, correct and explain errors in calculations including numbers with up to 4 – digits and to one decimal place using numerals only.

Greater Depth Solve, correct and explain errors in calculations (where the reasoning from known facts may be indirect and require more than one step) including numbers with up to 4-digits and to one decimal place. Numbers given in numerals or words.

Questions 2, 5 and 8 (Reasoning)

Developing Determine and explain whether a statement is correct or incorrect. Including whole numbers with up to 4-digits using numerals only.

Expected Determine and explain whether a statement is correct or incorrect. Including numbers with up to 4-digits and to one decimal place using numerals only.

Greater Depth Determine and explain whether a statement is correct or incorrect where the reasoning from known facts may be indirect and require more than one step. Including numbers with up to 4-digits and to one decimal place using numbers given in numerals or words.

Questions 3, 6 and 9 (Reasoning)

Developing Find the odd one out including whole numbers up to 4-digits using numerals only.

Expected Find the odd one out including whole numbers up to 4-digits and to one decimal place using numerals only.

Greater Depth Find the odd one out where the reasoning from known facts may be indirect and require more than one step. Including whole numbers up to 4-digits and to one decimal place. Numbers given in numerals or words.

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Reason from Known Facts

Reason from Known Facts

1a. Correct the mistakes in the calculations below using the known fact.

$$25 \times 4 = 100$$

A. $25 \times 40 = 1,000$

B. $4 \times 25 = 1,000$

C. $1,000 \div 250 = 4$

D. $1,000 \div 40 = 250$



PS

1b. Correct the mistakes in the calculations below using the known fact.

$$15 \times 6 = 90$$

A. $150 \times 6 = 9,000$

B. $15 \times 60 = 900$

C. $900 \div 60 = 150$

D. $900 \div 15 = 60$



PS

2a. Alice is using $45 \times 2 = 90$ to solve other calculations.

She says,

45 x 20 will give the same answer as 4,500 x 2. They both equal 900.



Alice

Is she correct? Explain how you know.



R

2b. Ben is using $15 \times 4 = 60$ to solve other calculations.

He says,

15 x 40 will give the same answer as 150 x 4. They both equal 600.



Ben

Is he correct? Explain how you know.



R

3a. Which is the odd one out?

A. 60×20

B. 60×2

C. 6×200

D. 600×2

Explain how you know.



R

3b. Which is the odd one out?

A. 30×50

B. 5×300

C. 50×30

D. 3×50

Explain how you know.



R

Reason from Known Facts

Reason from Known Facts

4a. Correct the mistakes in the calculations below using the known fact.

$$65 \times 4 = 260$$

A. $6.5 \times 40 = 260$

B. $65 \times 40 = 2,600$

C. $2,600 \div 6.5 = 40$

D. $260 \div 65 = 0.4$



PS

4b. Correct the mistakes in the calculations below using the known fact.

$$35 \times 5 = 175$$

A. $3.5 \times 50 = 175$

B. $35 \times 50 = 175$

C. $1,750 \div 35 = 500$

D. $175 \div 3.5 = 50$



PS

5a. Isabel is using $220 \times 30 = 6,600$ to solve other calculations.

She says,

2.2 x 300 will give the same answer as 220 x 30. They both equal 660.



Isabel

Is she correct? Explain how you know.



R

5b. Chuan is using $180 \times 40 = 7,200$ to solve other calculations.

He says,

1.8 x 400 will give the same answer as 180 x 4. They both equal 720.



Chuan

Is he correct? Explain how you know.



R

6a. Which is the odd one out?

A. $0.7 \times 3,000$

B. 7×30

C. 700×0.3

D. 70×3

Explain how you know.



R

6b. Which is the odd one out?

A. $0.5 \times 4,000$

B. 50×40

C. 500×0.4

D. 5×400

Explain how you know.



R

Reason from Known Facts

Reason from Known Facts

7a. Correct the mistakes in the calculations below using the known fact.

$$325 \times 4 = 1,300$$

A. $32.5 \times 0.4 = 1.3$

B. $1,300 \div 32.5 = 40$

C. $162.5 \times 8 = 130$

D. $260 \div 0.8 = 32.5$



PS

7b. Correct the mistakes in the calculations below using the known fact.

$$27 \times 40 = 1,080$$

A. $2.7 \times 400 = 108$

B. $10.8 \div 0.4 = 2.7$

C. $13.5 \times 8 = 10.80$

D. $2,160 \div 20 = 108$



PS

8a. Steph is using $63 \times 80 = 5,040$ to solve other calculations.

She says,

6.3 x eight will give the same answer as 126×0.4 . They both equal 50.4.



Steph

Is she correct? Explain how you know.



R

8b. Johnny is using $227 \times 40 = 9,080$ to solve other calculations.

He says,

2,270 x 0.4 will give the same answer as 113.5×8 . They both equal 908.



Johnny

Is he correct? Explain how you know.



R

9a. Which is the odd one out?

A. 7.5×200

B. $75 \times \text{twenty}$

C. 750×0.2

D. 37.5×40

Explain how you know.



R

9b. Which is the odd one out?

A. $\text{fifteen} \times 60$

B. $1,500 \times 0.6$

C. 7.5×120

D. $1.5 \times 6,000$

Explain how you know.



R

Reasoning and Problem Solving

Reason from Known Facts

Developing

- 1a. B is incorrect. It should be $4 \times 25 = 100$
D is incorrect. It should be $1,000 \div 40 = 25$
2a. Alice is incorrect. $4,500 \times 2 = 9,000$.
3a. 60×2 (B) is the odd one out because it has a product of 120. All the others have 1,200 as the product.

Expected

- 4a. C is incorrect. It should be $2,600 \div 6.5 = 400$
D is incorrect. It should be $260 \div 65 = 4$
5a. Isabel is incorrect. $2.2 \times 300 = 660$ and $220 \times 30 = 6,600$.
6a. $0.7 \times 3,000$ (A) is the odd one out because it has a product of 2,100. All the others have a product of 210.

Greater Depth

- 7a. A is incorrect. It should be $32.5 \times 0.4 = 13$.
C is incorrect. It should be $162.5 \times 8 = 1,300$.
D is incorrect. It should be $260 \div 0.8 = 325$.
8a. Steph is correct. Both calculations are 100 times smaller than the original calculation. The answer of 50.4 is also 100 times smaller than 5,040.
9a. 750×0.2 (C) is the odd one out because it has a product of 150. All the others have a product of 1,500.

Reasoning and Problem Solving

Reason from Known Facts

Developing

- 1b. A is incorrect. It should be $150 \times 6 = 900$.
C is incorrect. It should be $900 \div 60 = 15$
2b. Ben is correct.
3b. 3×50 (D) is the odd one out because it has a product of 150. All the others have 1,500 as the product.

Expected

- 4b. B is incorrect. It should be $35 \times 50 = 1,750$.
C is incorrect. It should be $1,750 \div 35 = 50$.
5b. Chuan is correct.
6b. 500×0.4 (C) is the odd one out because it has a product of 200. All the others have a product of 2,000.

Greater Depth

- 7b. A is incorrect. It should be $2.7 \times 400 = 1,080$.
B is incorrect. It should be $10.8 \div 0.4 = 27$.
C is incorrect. It should be $13.5 \times 8 = 108$.
8b. Johnny is correct. Both calculations are 10 times smaller than the original calculation. The answer of 908 is also 10 times smaller than 9,080.
9b. $1.5 \times 6,000$ (D) is the odd one out because it has a product of 9,000. All the others have a product of 900.