1 Write $27 \times \left(3^2\right)^7$ as a single power of 3

[3 marks]

(1) $3^3 \times 3^{14}$ (1)

$= 3^{3+14}$

$= 3^{17}$ (1)

Answer 3^{17}

2 Work out the value of $100^{-\frac{1}{2}}$

[2 marks]

$= \frac{1}{\sqrt{100}}$

$= \frac{1}{10} = 0.1$ (2)

Answer 0.1

3 Work out

cube root of 512 : reciprocal of 0.4

Give your answer in the form $n : 1$

[3 marks]

$\sqrt[3]{512} = 8$ (1) , $\frac{1}{0.4} = \frac{10}{4} = 2.5$ (1)

$8 : 2.5$ $\quad$ $8 \div 2.5 = 3.2$

Answer 3.2 (1) : 1

4 b is 3 more than the square root of a.

Circle the correct equation.

[1 mark]

$b = \sqrt{a} + 3$ $b = \sqrt{a} - 3$ $b = \sqrt{a+3}$ $b = \sqrt{a-3}$

5 $a^b = 3$ where a is an integer and b is a proper fraction.

Work out **one** possible pair of values of a and b.

[1 mark]

$a =$ 9 (1) $b =$ $\frac{1}{2}$

6 (a) Work out $\frac{3^{12}}{3^7}$

Give your answer as a whole number.

[2 marks]

$3^{12-7} = 3^5$

$= 243$ (2)

Answer 243

6 (b) Simplify $8 \times 2^6 \times 2^4$

Give your answer as a power of 2

[2 marks]

$8 = 2^3$

$2^3 \times 2^6 \times 2^4$

$= 2^{3+6+4} = 2^{13}$

Answer 2^{13} (2)

7 Work out the value of $\left(\frac{3}{2}\right)^2$

Give your answer as a mixed number.

[1 mark]

$\left[\frac{3}{2}\right]^2 = \frac{9}{4} = \frac{4}{4} + \frac{4}{4} + \frac{1}{4}$

$= 2\frac{1}{4}$

Answer $2\frac{1}{4}$ (1)

8 $2^a \times 3 \times 5^2 = 600$

Work out the value of a.

You **must** show your working.

[3 marks]

$2^a \times 3 \times 25 = 600$ (1)

$2^a \times 75 = 600$

$2^a = \frac{600}{75} = 8$ (1)

$2^a = 8$

$a = 3$ (1)

$a =$ 3

9 Circle the value of $\left(\sqrt{6}\right)^4$ $(6^{1/2})^4 = 6^2 = 36$

[1 mark]

12 36 10 $\sqrt{24}$

10 Work out $\dfrac{4^6 - 11}{\sqrt{625} - 225}$

Circle your answer.

[1 mark]

−61.6 −20.425 204.25 3870.56

11 Work out $\left(3.1 \times 10^9\right)^2$

Circle your answer.

[1 mark]

6.2×10^{18} 6.2×10^{81} 9.61×10^{18} 9.61×10^{81}

12 (a) k is a whole number between 40 and 50

The cube root of k is 3, to the nearest whole number.

Work out the **largest** possible value of k.

[2 marks]

$3.5^3 = 42.875$ (1)

$k = 42$

Answer 42 (1)

12 (b) Fay tries to solve $x^2 = 100$

She says,

"The only possible value of x is 10"

Give a reason why she is **not** correct.

[1 mark]

x could also be -10 (1)

13 $2^x = 32$

Circle the value of x.

[1 mark]

4 5 6 7

14 Work out $12^2 \div \left(\frac{1}{3} \times \sqrt{36}\right)$

[3 marks]

$12^2 = 144$

$\sqrt{36} = 6$ (1)

$= 144 \div \left(\frac{1}{3} \times 6\right)$

$= 144 \div 2$ (1)

$= 72$

Answer 72 (1)

15 (a) Between which two **consecutive** integers does the square root of 210 lie?

[1 mark]

$14^2 = 196$

$15^2 = 225$

square root of 210 is between 14 to 15.

Answer 14 and 15 ✓ (1)