11.1   Practice Questions 1

1. Definitions

   (a) What is the definition of a **factor**?

   (b) What is the definition of a **multiple**?

   (c) What is the definition of a **prime number**?

2. In each set of Whole Numbers, circle the prime numbers.
   (remember that the division test numbers will be 2,3,5,7).

   (a) {40, 41, 42, 43, 44, 45, 46, 47, 48, 49}

   (b) {65, 66, 67, 68, 69, 70, 71, 72, 73, 74}

   (c) {83, 84, 85, 86, 87, 88, 89, 90, 91, 92}

3. Make factor trees for the following numbers (unless the number is prime) and write each number
   as a product of its prime factors.

   (a) 100   (b) 120   (c) 164   (d) 163

4. Find the Lowest Commmon Multiple for the following pairs of prime numbers

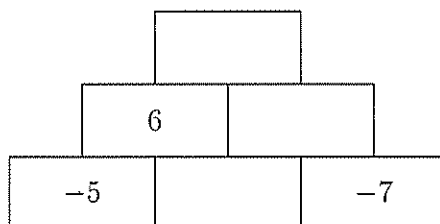   (a) 12, 26   (b) 18, 33   (c) 52, 169   (d) 56, 108   (e) 84, 96

5. Write factor lists for:

   (a) 144   (b) 196   (c) 220   (d) 180
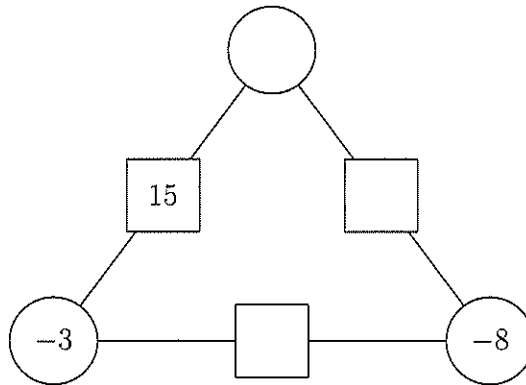
6. Calculate the following

   (a) $-17 - 21 =$ (c) $-105 + -3$ (e) $15 \div -3 =$

   (b) $-26 - -14 =$ (d) $-17 \times -3 =$ (f) $4 \times -8 =$

7. The two bricks below add to the brick above. Fill in the missing bricks:

8. The numbers in the circles **multiply** to give the number in the squares between them. Fill in the missing spaces:

9. (Difficult)Calculate the following

   (a) $(-3)^2 \div 9 =$

   (b) $-3 \times (-4) \div \sqrt{36} =$

   (c) $-16 \div -2 \times (5 + -7) =$

   (d) $(-2^5 + 3) \times -7 =$

   (e) $(-2 + 3)^{20} \times \sqrt[3]{27} =$

   (f) $4^4 \times -0.5 + \sqrt{121} =$

10. Write the following Decimals as Fractions

    (a) $0.\dot{3}$

    (b) $0.\dot{6}$

    (c) $0.\dot{4}$

    (d) $0.\dot{8}$

11. Write the following Decimals as Fractions

    (a) $0.\dot{3}\dot{5}$

    (b) $0.\dot{6}\dot{8}$

    (c) $0.4\dot{1}$

    (d) $0.8\dot{8}$ ✗

12. (Difficult)Write the following Decimals as Fractions

    (a) $0.7\dot{5}$

    (b) $0.1\dot{8}$

    (c) $0.1\dot{6}$

    (d) $0.9\dot{8}$

13. Evaluate the following:

    (a) $9^2 - \sqrt{900}$

    (b) $(-2)^9$

    (c) $121^{\frac{1}{2}}$

    (d) 5^{-3}

14. Simplify:

    (a) $\sqrt{7} \times \sqrt{12}$

    (b) $\sqrt{12} \times \sqrt{3}$

    (c) $\sqrt{0.5} \times \sqrt{2}$

    (d) $\dfrac{4}{\sqrt{32}} \times \dfrac{4}{\sqrt{2}}$

15. Write the following surds in the form $a\sqrt{b}$:

    (a) $\sqrt{360}$

    (b) $\sqrt{50}$

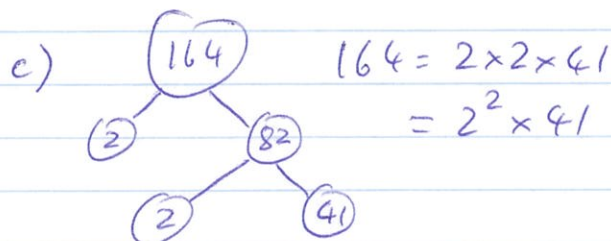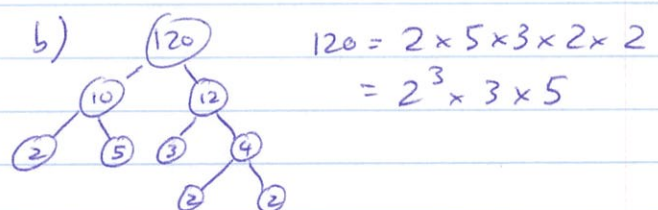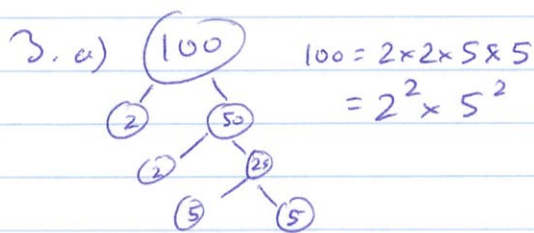   (c) $\sqrt{216}$

    (d) $\sqrt{500}$

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Practice Questions

1. **Factor:** A factor of a number is a whole number that divides into another number and leaves no remainder.

   Multiple: A multiple of a number is any number that is the product of that number and another whole number.

   Prime Number: A number that only has itself and one as factors.

2. a) 41, 43, 47
   b) 67, 71, 73
   c) 83, 89,

3. a)

   $100 = 2 \times 2 \times 5 \times 5$
   $= 2^2 \times 5^2$

   b)

   $120 = 2 \times 5 \times 3 \times 2 \times 2$
   $= 2^3 \times 3 \times 5$

   c)

   $164 = 2 \times 2 \times 41$
   $= 2^2 \times 41$

   d) 163 is prime.

4. a) LCM (12,26) = 156   b) LCM (18,33) = 198
   c) LCM (52,169) = 676   d) LCM (56,108) = 1512
                            e) LCM (84,96) = 672

5. a) 1, 144   b) 1, 196   c) 1, 220
      2, 72   2, 98   2, 110
      3, 48   4, 49   4, 55
      4, 36   7, 28   5, 44
      6, 24   14, 14   10, 22
      8, 18   11, 20
      9, 16
     12, 12   d) 1, 180   6, 30
                     2, 90   9, 20
                     3, 60   10, 18
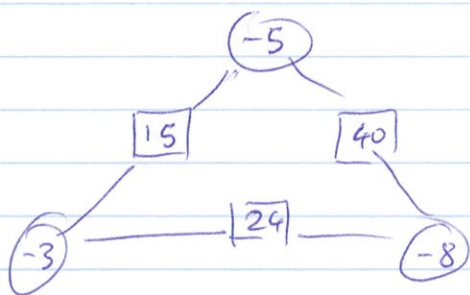   4, 45   12, 15
                     5, 36

6. a) $-17-21 = -38$
    b) $-26 - -14 = -26 + 14 = -12$
    c) $-105 + -3 = -105 - 3 = -108$
    d) $-17 \times -3 = +51$
    e) $15 \div -3 = -5$
    f) $4x - 8 = -32$

7.
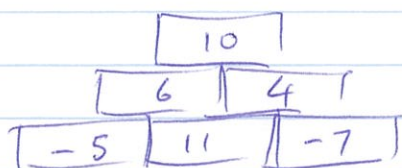
8.

9. a) $(-3)^2 \div 9 = 1$
    b) $-3 \times (-4) \div \sqrt{36} = \dfrac{12}{6} = 2$

    $2 \times 12 \times 8$

    c) $-16 \div -2 \times (5 + -7)$
    $= 8 \times -2$
    $= -16$

    d) $(-2^5 + 3) \times -7$
    $= (-32 + 3) \times -7$
    $= -29 \times -7$
    $= +203$

    e) $(-2+3)^{20} \times \sqrt[3]{27}$
    $= (1)^{20} \times 3 = 1$

    f) $4^4 \times -0.5 + \sqrt{121} = 4 - 8 + 11 = 3$

10. a) $0.\overset{\circ}{3} = \dfrac{3}{9} = \dfrac{1}{3}$ b) $0.\overset{\circ}{6} = \dfrac{6}{9} = \dfrac{2}{3}$

     c) $0.\overset{\circ}{4} = \dfrac{4}{9}$ d) $0.\overset{\circ}{8} = \dfrac{8}{9}$

11. a) $0.\overset{..}{3}\overset{..}{5} = \dfrac{35}{99}$ b) $0.\overset{..}{6}\overset{..}{8} = \dfrac{68}{99}$

c) $0.\overset{..}{4}\overset{..}{1} = \dfrac{41}{99}$ d) ~~$0.\overset{..}{8}\overset{..}{8} = \dfrac{8\!\!\!/8}{99} = \dfrac{8\!\!\!/}{9\!\!\!/}$~~

d) $0.\overset{..}{8}\overset{..}{1} = \dfrac{81}{99} = \dfrac{9}{11}$

12. a) $0.7\overset{.}{5}$

$A = 0.75555...$

$10A = 7.55555...$

$100A = 75.5555...$

$100A - 10A = 68$

$90A = 68$

$A = \dfrac{68}{90} = \dfrac{34}{45}$

b) $0.1\overset{.}{8}$

$A = 0.1888...$

$10A = 1.8888...$

$100A = 18.888...$

$100A - 10A = 17$

$A = \dfrac{17}{90}$

c) $0.1\overset{.}{6} = \dfrac{15}{90} = \dfrac{1}{6}$ d) $0.9\overset{.}{8} = \dfrac{89}{90}$

13. a) $9^2 - \sqrt{900}$

$= 81 - 30$

$= 51$

b) $(-2)^9 = -512$

c) $121^{\frac{1}{2}} = \sqrt{121} = 11$ d) $5^{-3} = \dfrac{1}{125}$

14. a) $\sqrt{7} \times \sqrt{12} = \sqrt{84} = 2\sqrt{21}$

b) $\sqrt{12} \times \sqrt{3} = \sqrt{36} = 6$

c) $\sqrt{0.5} \times \sqrt{2} = \sqrt{1} = 1$

d) $\dfrac{4}{\sqrt{32}} \times \dfrac{4}{\sqrt{2}} = \dfrac{16}{\sqrt{64}} = \dfrac{16}{8} = 2$

15. a) $\sqrt{360} = \sqrt{36} \times \sqrt{10} = 6\sqrt{10}$

b) $\sqrt{50} = \sqrt{2} \times \sqrt{25} = 5\sqrt{2}$

c) $\sqrt{216} = \sqrt{6} \times \sqrt{36} = 6\sqrt{6}$

$\quad\searrow 4 \times 54$

$\quad\searrow = 4 \times 9 \times 6$

d) $\sqrt{500} = \sqrt{100} \times \sqrt{5}$

$\quad = 10\sqrt{5}$