

Transpose the following

1. Make C the subject of the formula $F = 1.8C + 32$

$$\frac{F-32}{1.8} = \frac{1.8C}{1.8}$$

$$C = \frac{F-32}{1.8}$$

2. Make x the subject of the formula $v = \frac{k}{\sqrt{x}} - \sqrt{x}$

$$\sqrt{x} \cdot v = k$$

$$x(\sqrt{x}) = \left(\frac{k}{v}\right)^2 = x = \left(\frac{k}{v}\right)^2 = x = \frac{k^2}{v^2}$$

3. Make b the subject of the formula $p = \sqrt{a+b}$

$$(p)^2 = (a+b)^2$$

$$p^2 = a+b$$

$$b = p^2 - a$$

4. Make s the subject of the formula $s = ut + \frac{1}{2}at^2$

$$s = ut + \frac{1}{2}at^2$$

5. Make x the subject of the formula $y = 4 - x^2$

$$\frac{y-4}{-1} = \frac{-x^2}{-1}$$

$$\sqrt{x^2} = \sqrt{\frac{y-4}{-1}}$$

$$x = \sqrt{\frac{y-4}{-1}}$$

$$x = \sqrt{\frac{y-4}{-1}}$$

$$x = \sqrt{\frac{y}{-1} + 4}$$

$$x = \sqrt{-y+4}$$

$$x = \sqrt{4-y}$$

6. Make t the subject of the equation

$$\frac{a}{b} = k - \frac{m}{t}$$

$$-\frac{a}{b} = -k + \frac{m}{t}$$

$$t = \frac{mb}{cb-a}$$

$$cb-a$$

$$\begin{array}{r} 13 \\ \times 13 \\ \hline 39 \\ 130 \\ \hline 169 \end{array}$$

$$\begin{array}{r} 314 \\ \times 13 \\ \hline 942 \\ 3140 \\ \hline 4082 \end{array}$$

$$A = \pi r^2$$

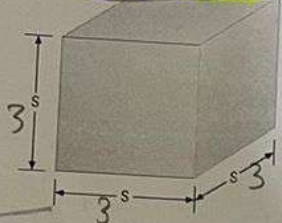
$$\pi (13)^2$$

$$3.14 (13)^2 = 530.66 \text{ ft}^2$$

$$\text{Circumference} = 2\pi r$$

$$2(3.14)(13) = 81.64 \text{ ft}$$

4. Calculate the volume of the following 3D shapes



$$\text{Volume 1} = s \cdot s \cdot s$$

$$s = 3 \text{ cm}$$

$$V = s \cdot s \cdot s = 3 \times 3 \times 3 \text{ or } 3^3 = 27 \text{ cm}^3$$

$$\text{Volume 1} = Lwh$$

$$H = 2 \text{ cm} / L = 3 \text{ cm} / W = 2 \text{ cm}$$

$$V = Lwh$$

$$= 3 \cdot 2 \cdot 2$$

$$= 12 \text{ cm}^3$$

$$\text{Volume 1} = \pi r^2 h$$

$$r = 3 \text{ mm} / H = 15 \text{ mm}$$

$$V = 3.14 (3)^2 (15)$$

$$= 423.90 \text{ mm}^3$$

$$\text{Volume 2} = \pi r^2 h$$

$$r = 11 \text{ inch} / H = 21 \text{ inch}$$

$$3.14 (11)^2 (21)$$

$$3.14 (121) (21)$$

$$= 7978.74 \text{ in}^3$$

$$\text{Volume 2} = \frac{4}{3} \pi r^3$$

$$r = 11 \text{ inch}$$

$$\frac{4}{3} (3.14) (11)^3$$

$$4(3.14) \cdot 1331$$

$$12.56 \times 1331 = 55766.66 \text{ in}^3$$

$$\text{Volume 1} = \frac{1}{3} \pi r^2 h \text{ or } \pi r^2 \frac{h}{3}$$

$$r = 3 \text{ mm} / H = 15 \text{ mm}$$

$$\frac{1}{3} (3.14) (3)^2 (15)$$

$$\frac{1}{3} (3.14) (9) (15)$$

$$3.14 (9) \cdot \frac{15}{3}$$

$$3.14 (9) \cdot 5 = 141.30 \text{ mm}^3$$

$$\text{Volume 2} = \frac{1}{3} \pi r^2 h \text{ or } \pi r^2 \frac{h}{3}$$

$$r = 11 \text{ inch} / H = 21 \text{ inch}$$

$$\frac{1}{3} \pi (11)^2 (21)$$

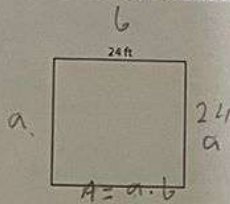
$$\frac{1}{3} (3.14) (121) (21)$$

$$3.14 (121) \cdot \frac{21}{3}$$

$$3.14 (121) \cdot 7 = 2659.58 \text{ in}^3$$

Area, Perimeter and Volume

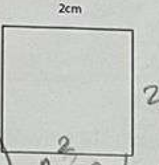
1. Calculate the perimeter and area of the shapes below



$$A = a \cdot b$$

$$\text{Area} = 24 \times 24 = 576$$

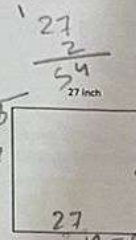
$$\text{Perimeter} = 24 + 24 + 24 + 24 = 96$$



$$A = a \cdot b$$

$$\text{Area} = 2 \times 2 = 4$$

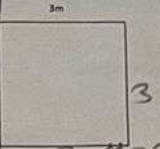
$$\text{Perimeter} = 2 + 2 + 2 + 2 = 8$$



$$A = a \cdot b$$

$$\text{Area} = 27 \times 27 = 729$$

$$\text{Perimeter} = 27 + 27 + 27 + 27 = 108$$



$$A = a \cdot b$$

$$\text{Area} = 3 \times 3 = 9$$

$$\text{Perimeter} = 3 + 3 + 3 + 3 = 12$$

$$A = L \cdot W$$

$$= 6 \cdot 2 = 12 \text{ square cm}$$

$$\text{Perimeter} = 2(6) + 2(2) = 16$$

$$A = L \cdot W = 5 \times 3 = 15 \text{ square mm}$$

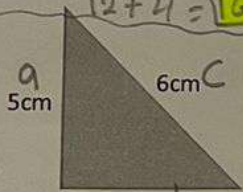
$$\text{Perimeter} = 2(3) + 2(5) = 16$$

$$A = L \cdot W = 9 \times 5 = 45 \text{ square m}$$

$$\text{Perimeter} = 2(9) + 2(5) = 28$$

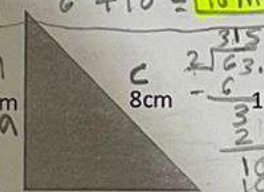
$$A = 3 \times 8 = 24 \text{ square ft}$$

$$\text{Perimeter} = 2(3) + 2(8) = 22$$



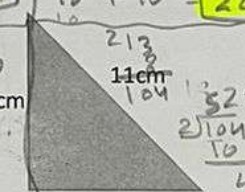
$$A = \frac{ab}{2} = \frac{5 \times 6}{2} = 15$$

$$\text{Perimeter} = a + b + c = 5 + 6 + 7.8 = 18.8$$



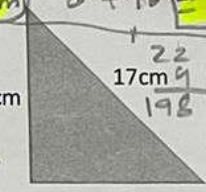
$$A = \frac{ab}{2} = \frac{7 \times 9}{2} = 31.5$$

$$\text{Perimeter} = a + b + c = 7 + 9 + 11.4 = 27.4$$



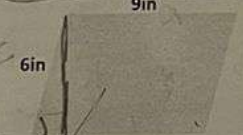
$$A = \frac{ab}{2} = \frac{8 \times 11}{2} = 44$$

$$\text{Perimeter} = 8 + 11 + 13 = 32$$



$$A = \frac{ab}{2} = \frac{17 \times 22}{2} = 187$$

$$\text{Perimeter} = 17 + 22 + 27.7 = 66.7$$



$$\text{Area} = \text{base} \times \text{height}$$

$$\text{Perimeter} = \text{base} + \text{side} + \text{base} + \text{side}$$



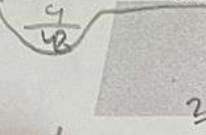
$$\text{Area} = \text{base} \times \text{height}$$

$$\text{Perimeter} = \text{base} + \text{side} + \text{base} + \text{side}$$



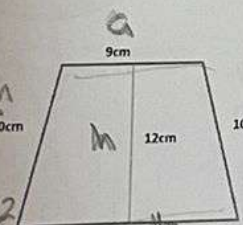
$$\text{Area} = \text{base} \times \text{height}$$

$$\text{Perimeter} = \text{base} + \text{side} + \text{base} + \text{side}$$



$$\text{Area} = \text{base} \times \text{height}$$

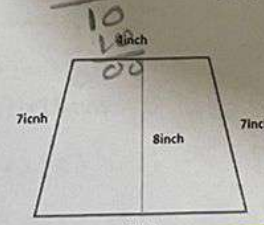
$$\text{Perimeter} = \text{base} + \text{side} + \text{base} + \text{side}$$



$$A = \frac{(a+b)h}{2}$$

$$= \frac{(9+15)12}{2} = 144$$

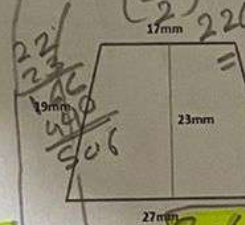
$$\text{Perimeter} = 9 + 15 + 10 + 10 = 44$$



$$A = \frac{(a+b)h}{2}$$

$$= \frac{(7+9)8}{2} = 56$$

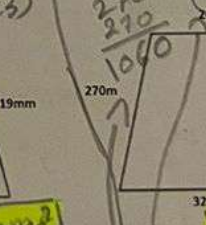
$$\text{Perimeter} = 7 + 9 + 7 + 7 = 30$$



$$A = \frac{(a+b)h}{2}$$

$$= \frac{(17+23)19}{2} = 306$$

$$\text{Perimeter} = 17 + 23 + 19 + 19 = 78$$



$$A = \frac{(a+b)h}{2}$$

$$= \frac{(200+320)270}{2} = 78000$$

$$\text{Perimeter} = 200 + 320 + 270 + 270 = 1060$$

Convert the following octal numbers into their decimal equivalents.

1. $125_8 = 1 \times 8^2 + 2 \times 8 + 5 = 85_{10}$

2. $74_8 = 7 \times 8 + 4 = 60_{10}$

3. $377_8 = 3 \times 8^2 + 7 \times 8 + 7 = 255_{10}$

4. $1502_8 = 1 \times 8^3 + 5 \times 8^2 + 0 \times 8 + 2 = 818_{10}$

Convert the following hexadecimal numbers into their decimal equivalents.

1. $1B7_{16} = 1 \times 16^2 + 11 \times 16 + 7 = 439_{10}$

2. $A5E_{16} = 10 \times 16^2 + 5 \times 16 + 14 = 4286_{10}$

3. $3F9_{16} = 3 \times 16^2 + 15 \times 16 + 9 = 1569_{10}$

4. $1D0B_{16} = 1 \times 16^3 + 13 \times 16^2 + 0 \times 16 + 11 = 11003_{10}$

1.7.1 Use trigonometric tables to find the values of the inverse sine, cosine and tangent (Arcsin, Arccos, Arctan) for angles between 0° and 90° .

Use the table in the book $\Rightarrow$ page 3.14

1. Find the Sine, Cosine and Tangent of the following angle. (3 d.p.)

$35^\circ \sin 35 = 0.574 \quad \cos 35 = 0.819 \quad \tan 35 = 0.700$

2. Find the Sine, Cosine and Tangent of the following angle. (3 d.p.)

$60^\circ \sin 60 = 0.866 \quad \cos 60 = 0.500 \quad \tan 60 = 1.732$
 $\sin 60 = \frac{b}{c} = \frac{a}{c} \cos 60 = \frac{a}{b} \tan 60 = \frac{b}{a}$

3. Find the Sine, Cosine and Tangent of the following angle. (3 d.p.)

$45^\circ \sin 45 = 0.707 \quad \cos 45 = 0.707 \quad \tan 45 = 1.000$

4. Find the Sine, Cosine and Tangent of the following angle. (3 d.p.)

$90^\circ \sin 90 = 1 \quad \cos 90 = 0 \quad \tan 90 = \frac{\sin 90}{\cos 90} = \frac{1}{0} = \text{undefined}$

5. Find the angle that has the following Sine (Arcsin).

$0.940 \quad \sin \theta = 0.940 = \cos \theta = 0.940 \quad \theta = 20^\circ$

$180 - 90 - 20 = 70^\circ$

use table
page 3.14
aviation

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

Use the table
page 3.14

MATHEMATICS

important

$$a = 10$$

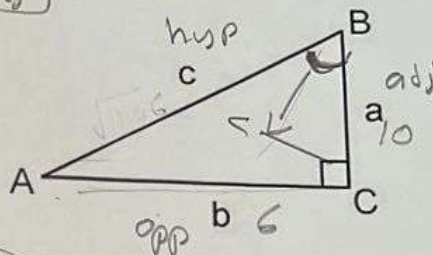
$$b = 6$$

$$B =$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$\tan \theta = \frac{6}{10}$$

$$\tan^{-1}\left(\frac{6}{10}\right) = \tan B = \frac{6}{10} = 0.6 \Rightarrow B = 31^\circ$$



16. Find angle A on the triangle shown. (2 d.p.)

$$b = 4$$

$$c = 9$$

$$A =$$

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

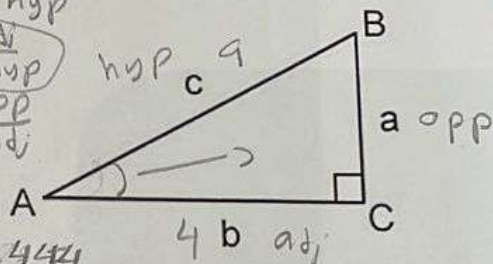
$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\cos \theta = \frac{4}{9}$$

$$\cos^{-1}\left(\frac{4}{9}\right) = \cos B = \frac{4}{9} = 0.444$$

$$\cos B = \sin B = 0.44 \Rightarrow B = 26.8^\circ$$



17. Find angle B on the triangle shown. (2 d.p.)

$$a = 6$$

$$c = 7$$

$$B =$$

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

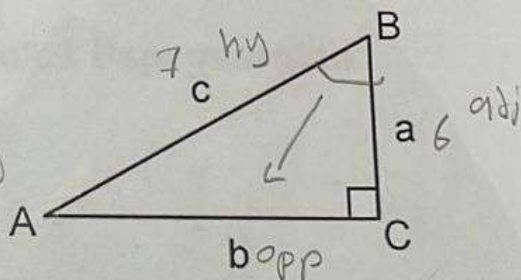
$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$\cos \theta = \frac{6}{7}$$

$$\cos^{-1}\left(\frac{6}{7}\right)$$

$$\cos B = \frac{6}{7} = 0.857 = \cos B = 0.857 \Rightarrow B = 31^\circ$$



$$\begin{array}{r} 0.857 \\ 2 \overline{) 6.010} \\ \underline{56} \\ 410 \\ \underline{350} \\ 600 \\ \underline{594} \\ 60 \\ \underline{56} \\ 40 \\ \underline{35} \\ 50 \\ \underline{49} \\ 10 \end{array}$$

Converting Binary to Decimal (A)

Write each binary number as a decimal number.

1. Binary = 1001

Decimal =

1001
2³2²2¹2⁰
8 + 1 = 9

2. Binary = 100000

Decimal =

100000
2⁵2⁴2³2²2¹2⁰
000020 = 0
= 32

3. Binary = 1100101101

Decimal =

1100101101
2⁹2⁸2⁷2⁶2⁵2⁴2³2²2¹2⁰
512 256 128 64 32 16 8 4 1
512 + 256 + 128 + 64 + 32 + 8 + 4 + 1 = 813

4. Binary = 100001000

Decimal =

100001000
2⁹2⁸2⁷2⁶2⁵2⁴2³2²2¹2⁰
(2⁸ × 1) = 256 + 8 = 264

5. Binary = 10101001

Decimal =

10101001
2⁷2⁶2⁵2⁴2³2²2¹2⁰
128 64 32 16 8 4 2 1
128 + 32 + 8 + 1 = 169

6. Binary = 1010000100

Decimal =

1010000100
2⁹2⁸2⁷2⁶2⁵2⁴2³2²2¹2⁰
512 + 128 + 4 = 644

7. Binary = 1011010111

Decimal =

1011010111
2⁹2⁸2⁷2⁶2⁵2⁴2³2²2¹2⁰
512 128 64 32 16 8 4 2 1
512 + 128 + 64 + 16 + 4 + 2 + 1 = 727

8. Binary = 1010101111

Decimal =

1010101111
2⁹2⁸2⁷2⁶2⁵2⁴2³2²2¹2⁰
512 + 128 + 32 + 8 + 4 + 2 + 1 = 687

9. Binary = 110111110100

Decimal =

110111110100
2⁹2⁸2⁷2⁶2⁵2⁴2³2²2¹2⁰
512 256 128 64 32 16 8 4 2 1
512 + 256 + 128 + 64 + 32 + 16 + 4 = 1008

10. Binary = 110110101111

Decimal =

110110101111
2⁹2⁸2⁷2⁶2⁵2⁴2³2²2¹2⁰
512 256 128 64 32 16 8 4 2 1
512 + 256 + 128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 1008

AVIATION

MATHEMATICS

$$\begin{array}{r} 2204 \\ 34 \overline{) 74936} \\ \underline{68} \\ 69 \\ \underline{68} \\ 136 \end{array}$$

c.

$$2496 \div 62 =$$

$$40.25806452$$

$$72 = 76$$

d.

$$74936 \div 34 =$$

$$2204$$

e.

$$232447 \div 95 =$$

$$20447$$

$$\begin{array}{r} 20447 \\ 95 \overline{) 1932147.0} \\ \underline{190} \\ 3424 \\ \underline{3424} \\ 00 \end{array}$$

Calculate the following and correct to the number of decimal places (dp) where indicated:

a.

$$6.24 \div 2 =$$

$$3.12$$

$$\begin{array}{r} 312 \\ 2 \overline{) 624} \\ \underline{6} \\ 2 \\ \underline{2} \\ 04 \\ \underline{4} \\ 00 \end{array}$$

b.

$$8.94 \div 0.9 \text{ (2 dp)} =$$

$$9.93$$

$$\begin{array}{r} 9933 \\ 9 \overline{) 8941.0} \\ \underline{81} \\ 84 \\ \underline{81} \\ 30 \\ \underline{30} \\ 00 \end{array}$$

c.

$$0.747 \div 0.06 =$$

$$12.45$$

$$\begin{array}{r} 124.5 \\ 6 \overline{) 747} \\ \underline{6} \\ 14 \\ \underline{12} \\ 27 \\ \underline{24} \\ 30 \\ \underline{30} \\ 00 \end{array}$$

d.

$$24.276 \div 5.1 =$$

$$4.76$$

$$\begin{array}{r} 476 \\ 51 \overline{) 24276} \\ \underline{204} \\ 387 \\ \underline{357} \\ 306 \\ \underline{306} \\ 000 \end{array}$$

e.

$$0.7252 \div 0.37 =$$

$$1.96$$

$$\begin{array}{r} 19.6 \\ 37 \overline{) 72520} \\ \underline{37} \\ 358 \\ \underline{333} \\ 2520 \\ \underline{222} \\ 300 \\ \underline{300} \\ 000 \end{array}$$

f.

$$4793 \div 2.34 \text{ (1 dp)} =$$

$$20.5$$

$$\begin{array}{r} 20482 \\ 234 \overline{) 4793} \\ \underline{468} \\ 113 \end{array}$$

Which of the following are proper fractions?

$$\begin{array}{r} 234 \\ 234 \overline{) 468} \\ \underline{468} \\ 000 \end{array}$$

$$\begin{array}{r} 234 \\ 234 \overline{) 468} \\ \underline{468} \\ 000 \end{array}$$

$$\begin{array}{r} 234 \\ 234 \overline{) 468} \\ \underline{468} \\ 000 \end{array}$$

$$\begin{array}{r} 234 \\ 234 \overline{) 468} \\ \underline{468} \\ 000 \end{array}$$

$$\begin{array}{r} 234 \\ 234 \overline{) 468} \\ \underline{468} \\ 000 \end{array}$$

$$\begin{array}{r} 234 \\ 234 \overline{) 468} \\ \underline{468} \\ 000 \end{array}$$

$$\begin{array}{r} 234 \\ 234 \overline{) 468} \\ \underline{468} \\ 000 \end{array}$$

$$\begin{array}{r} 32 \\ - 15 \\ \hline 17 \end{array}$$

$$4 \times 8 - 5 \times 3 + 6 \times 2 =$$

$$32 - 15 + 12 =$$

$$17 + 12 = 29$$

$$\begin{array}{r} 12 \\ \times 18 \\ \hline 96 \\ 120 \\ \hline 216 \end{array}$$

$$4 \times (8 - 5) \times (3 + 6) \times 2 =$$

$$4 \times 3 \times 9 \times 2 =$$

$$12 \times 18 = 216$$

$$4 \times 8 - (5 \times (3 + 6 \times 2)) =$$

$$4 \times 8 - (5 \times (3 + 12)) =$$

$$4 \times 8 - (5 \times 15) =$$

$$4 \times 8 - 75 = 32 - 75 = -43$$

$$\frac{8+7}{4+21} = \frac{15 \div 5}{25 \div 5} = \frac{3}{5}$$

$$\frac{20}{6+9} = \frac{20 \div 5}{15 \div 5} = \frac{4}{3}$$

$$\frac{18-3}{35} = \frac{15 \div 5}{35 \div 5} = \frac{3}{7}$$

Identify the place value of the '1' in the following binary numbers.

$$1. 10_2 =$$

$$2. 1000_2 =$$

$$3. 10000_2 =$$

$$4. 1000000_2 =$$

Identify the place value of the '1' in the following octal numbers.

$$1. 451_8 =$$

$$2. 715_8 =$$

$$3. 135_8 =$$

$$4. 1275_8 =$$

Identify the place value of the '1' in the following hexadecimal numbers.

$$1. A15_{16} =$$

$$2. 2F1_{16} =$$

$$3. 51BD_{16} =$$

$$4. 1C4E_{16} =$$

Convert the following binary numbers into their decimal equivalents.

$$\begin{array}{r} 2^3 2^2 2^1 2^0 \\ 1 1 1 1 \\ \hline 1536 \\ 1280 \\ 51200 \\ \hline 65536 \end{array}$$

Binary $\rightarrow$ decimal

$$\begin{array}{r} 16 \cdot 16 \cdot 16 \\ 256 \times 256 \end{array}$$

$$\begin{array}{r} 1C4E \\ 1 \cdot 16^3 + 12 \cdot 16^2 + 4 \cdot 16^1 + 14 \cdot 16^0 \\ \hline 65536 \end{array}$$

0 → 14

1 → 1

2 → 2

3 → 3

4 → 4

5 → 5

6 → 6

7 → 7

8 → 8

9 → 9

10 → A

11 → B

12 → C

13 → D

14 → E

15 → F

Converting Decimal to Hexadecimal (A)

Write each decimal number as a hexadecimal number.

1.

Decimal = 5

Hexadecimal = 5

$$16 \overline{) 5} \rightarrow 0$$

2.

Decimal = 50

Hexadecimal = 32

$$16 \overline{) 50} \rightarrow R=2$$

$$16 \overline{) 32} \rightarrow R=3$$

3.

Decimal = 528

Hexadecimal = 210

$$16 \overline{) 528} \rightarrow R=0$$

$$16 \overline{) 32} \rightarrow R=1$$

$$16 \overline{) 0} \rightarrow R=2$$

4.

Decimal = 860

Hexadecimal = 35C

$$16 \overline{) 860} \rightarrow R=12=C$$

$$16 \overline{) 53} \rightarrow R=5$$

$$16 \overline{) 0} \rightarrow R=3$$

5.

Decimal = 761

Hexadecimal = 2F9

$$16 \overline{) 761} \rightarrow R=9$$

$$16 \overline{) 47} \rightarrow R=15$$

$$16 \overline{) 0} \rightarrow R=2$$

6.

Decimal = 389

Hexadecimal = 185

$$16 \overline{) 389} \rightarrow R=5$$

$$16 \overline{) 24} \rightarrow R=8$$

$$16 \overline{) 1} \rightarrow R=1$$

7.

Decimal = 605

Hexadecimal = 25D

$$16 \overline{) 605} \rightarrow R=13$$

$$16 \overline{) 37} \rightarrow R=5$$

$$16 \overline{) 0} \rightarrow R=2$$

8.

Decimal = 117

Hexadecimal = 75

$$16 \overline{) 117} \rightarrow R=5$$

$$16 \overline{) 7} \rightarrow R=7$$

9.

Decimal = 4696

Hexadecimal = 1258

$$16 \overline{) 4696} \rightarrow R=8$$

$$16 \overline{) 293} \rightarrow R=5$$

$$16 \overline{) 18} \rightarrow R=2$$

$$16 \overline{) 0} \rightarrow R=1$$

10.

Decimal = 9400

Hexadecimal = 24B8

$$16 \overline{) 9400} \rightarrow R=18$$

$$16 \overline{) 587} \rightarrow R=11$$

$$16 \overline{) 36} \rightarrow R=4$$

$$16 \overline{) 2} \rightarrow R=2$$

Simultaneous Equations

$$3x + 4y = 23$$

$$2x - 4y = 2$$

$$x - 2y = 1$$

$$x = 1 + 2y$$

$$3(1 + 2y) + 4y = 23$$

$$3 + 6y + 4y = 23$$

$$3 + 10y = 23$$

$$10y = 20$$

$$y = 2$$

$$x = 1 + 2y$$

$$= 1 + 2(2)$$

$$= 1 + 4$$

$$x = 5$$

$$3x + 5y = 19$$

$$4x - 2y = -18$$

$$2x - y = -9$$

$$2x = -9 + y$$

$$x = \frac{-9 + y}{2}$$

$$3\left(\frac{-9 + y}{2}\right) + 5y = 19$$

$$-\frac{27}{2} + \frac{3y}{2} + 5y = 19$$

$$\frac{3y}{2} + \frac{10y}{2} = \frac{47}{2}$$

$$3x + 4y = 200$$

$$2x + 3y = 144$$

$$2x = 144 - 3y$$

$$x = \frac{144 - 3y}{2}$$

$$3\left(\frac{144 - 3y}{2}\right) + 4y = 200$$

$$-\frac{9y}{2} + 4y = -\frac{32}{2}$$

$$-\frac{9y}{2} + \frac{8y}{2} = -\frac{32}{2}$$

$$-\frac{1y}{2} = -\frac{32}{2}$$

$$-\frac{1y}{2} = -16$$

$$y = 32$$

$$3x + 2y = 4$$

$$3x = 4 - 2y$$

$$x = \frac{4 - 2y}{3}$$

$$4x + 5y = 17$$

$$\frac{16}{3} - \frac{10y}{3} + 5y = 17$$

$$-\frac{10y}{3} + \frac{15y}{3} = \frac{35}{3}$$

$$x = \frac{4 - 2(5)}{3}$$

$$x = \frac{4 - 10}{3}$$

$$x = -2$$

$$5x + 2y = 11$$

$$4x - 3y = 18$$

$$4x = 18 + 3y$$

$$x = \frac{18 + 3y}{4}$$

$$5\left(\frac{18 + 3y}{4}\right) + 2y = 11$$

$$\frac{90}{4} + \frac{15y}{4} + 2y = 11$$

$$\frac{23}{4} + \frac{15y}{4} = \frac{44}{4}$$

$$-\frac{184}{92} = -\frac{92}{92}$$

$$x = \frac{-18 + 3y}{4}$$

$$x = \frac{18 + 3(-2)}{4}$$

$$x = \frac{18 - 6}{4} = \frac{12}{4}$$

$$x = 3$$

$$x = \frac{144 - 3(32)}{2}$$

$$x = \frac{144 - 96}{2} = \frac{48}{2}$$

$$x = 24$$

Name: _____

Decimal to Binary

Sheet 1

Convert each decimal number to its binary equivalent.

1) $16_{10} = 10000_2$

2	16	R
2	8	→ 0
2	4	→ 0
2	2	→ 0
2	1	→ 0
	1	→ 0

2) $43_{10} = 101011_2$

2	43	
2	21	→ 1
2	10	→ 1
2	5	→ 0
2	2	→ 1
2	1	→ 0
	1	→ 1

3) $39_{10} = 100111_2$

2	39	R
2	19	→ 1
2	9	→ 1
2	4	→ 1
2	2	→ 0
2	1	→ 0
	1	→ 1

4) $27_{10} = 11011_2$

2	27	→ 1
2	13	→ 1
2	6	→ 0
2	3	→ 1
2	1	→ 1
	1	→ 0

5) $11_{10} = 1011_2$

2	11	
2	5	→ 1
2	2	→ 1
2	1	→ 0
	1	→ 1

6) $32_{10} = 100000_2$

2	32	
2	16	→ 0
2	8	→ 0
2	4	→ 0
2	2	→ 0
2	1	→ 0
	1	→ 1

7) $8_{10} = 1000_2$

2	8	
2	4	→ 0
2	2	→ 0
2	1	→ 0
	1	→ 1

8) $14_{10} = 1110_2$

2	14	
2	7	→ 0
2	3	→ 1
2	1	→ 1
	1	→ 1

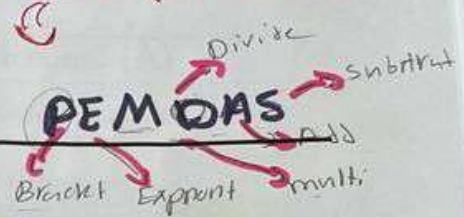
9) $45_{10} = 101101_2$

2	45	
2	22	R=1
2	11	R=0
2	5	R=1
2	2	R=1
2	1	R=0
	1	R=1

10) $5_{10} = 101_2$

2	5	
2	2	→ 1
2	1	→ 0
	1	→ 1

Important:



Order of operations

Solve the following.

$$1) (20 + 12) \div 4 = \frac{20}{12} \div 4 = 8$$

$$2) 50 + 6 \times (11 - 4) = \frac{50 + (6 \times 7)}{7} = \frac{50 + 42}{7} = 192$$

$$3) 50 + 6 \times 11 - 4 = \frac{50 + 66 - 4}{116 - 4} = 112$$

$$4) 9 \times (12 - 8) + 28 \div 7 = \frac{36 + 28 \div 7}{36 + 4} = 46$$

$$18 - (21 - 5) \div (22 - 18) = \frac{18 - 16 \div 4}{18 - 4} = 14$$

$$6) 7 \times 2 - (9 + 2) + 14 = \frac{14 - 11}{3} = 1$$

$$7) (6 \div 3 + 5) \times (11 - 4) = 7 \times 7 = 49$$

$$8) 9 \times 3 + (20 - 18) \times 4 - 8 = \frac{27 + 8 - 8}{35 - 8} = 27$$

$$9) (37 - 17) \times (240 \div 20) - 22 \times 4 = \frac{240 - 88}{20 \times 12 - 22 \times 4} = 152$$

$$10) 11 \times 4 - (6 + 3 + 13) \div 2 = 33$$

$$44 - 11 = 33$$

$$\begin{array}{r} 13 \ 10 \ 22 \\ 12 \times 4 \\ \hline 88 \ 88 \\ \hline 152 \end{array}$$

$$t. \frac{a}{1} = c - \frac{m}{t}$$

Converting Decimal to Octal (A)

Write each decimal number as an octal number.

1.

Decimal = 6

Octal = **6₈**

$$\begin{array}{r} 8 \overline{) 6} \\ 0 \rightarrow R = 6 \end{array}$$

$$\begin{array}{r} 0 \\ 8 \overline{) 6} \\ - 0 \\ \hline 6 \end{array}$$

2.

Decimal = 97

Octal = **141₈**

$$\begin{array}{r} 8 \overline{) 97} \\ 8 \overline{) 12} \rightarrow R = 1 \\ 8 \overline{) 1} \rightarrow R = 1 \\ 0 \rightarrow R = 1 \end{array}$$

$$\begin{array}{r} 12 \\ 8 \overline{) 12} \\ - 8 \\ \hline 4 \end{array} \quad \begin{array}{r} 12 \\ 8 \overline{) 97} \\ - 80 \\ \hline 17 \\ 16 \\ \hline 1 \end{array}$$

3.

Decimal = 252

Octal = **374₈**

$$\begin{array}{r} 8 \overline{) 252} \\ 8 \overline{) 31} \rightarrow R = 4 \\ 8 \overline{) 3} \rightarrow R = 7 \\ 0 \rightarrow R = 3 \end{array}$$

$$\begin{array}{r} 71 \\ 8 \overline{) 252} \\ - 24 \\ \hline 12 \\ 8 \\ \hline 4 \end{array} \quad \begin{array}{r} 3 \\ 8 \overline{) 252} \\ - 24 \\ \hline 12 \\ 8 \\ \hline 4 \end{array} \quad \begin{array}{r} 114 \\ 8 \overline{) 252} \\ - 24 \\ \hline 12 \\ 8 \\ \hline 4 \end{array}$$

$$7 \times 7 = 49 \\ 8 \times 8 = 64$$

5.

Decimal = 386

Octal = **602₈**

$$\begin{array}{r} 8 \overline{) 386} \\ 8 \overline{) 48} \rightarrow R = 2 \\ 8 \overline{) 6} \rightarrow R = 0 \\ 0 \rightarrow R = 6 \end{array}$$

$$\begin{array}{r} 48 \\ 8 \overline{) 386} \\ - 32 \\ \hline 66 \\ 64 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 6 \\ 8 \overline{) 48} \\ - 48 \\ \hline 00 \end{array}$$

6.

Decimal = 179

Octal = **263₈**

$$\begin{array}{r} 8 \overline{) 179} \\ 8 \overline{) 22} \rightarrow R = 3 \\ 8 \overline{) 2} \rightarrow R = 6 \\ 0 \rightarrow R = 2 \end{array}$$

$$\begin{array}{r} 22 \\ 8 \overline{) 179} \\ - 16 \\ \hline 19 \\ 16 \\ \hline 3 \end{array} \quad \begin{array}{r} 2 \\ 8 \overline{) 179} \\ - 16 \\ \hline 19 \\ 16 \\ \hline 3 \end{array}$$

7.

Decimal = 130

Octal = **202₈**

$$\begin{array}{r} 8 \overline{) 130} \\ 8 \overline{) 16} \rightarrow R = 2 \\ 8 \overline{) 2} \rightarrow R = 0 \\ 0 \rightarrow R = 2 \end{array}$$

$$\begin{array}{r} 16 \\ 8 \overline{) 130} \\ - 8 \\ \hline 48 \\ 48 \\ \hline 0 \end{array} \quad \begin{array}{r} 2 \\ 8 \overline{) 130} \\ - 16 \\ \hline 14 \\ 16 \\ \hline 0 \end{array}$$

8.

Decimal = 895

Octal = **1577₈**

$$\begin{array}{r} 8 \overline{) 895} \\ 8 \overline{) 111} \rightarrow R = 7 \\ 8 \overline{) 13} \rightarrow R = 7 \\ 8 \overline{) 1} \rightarrow R = 1 \\ 0 \rightarrow R = 1 \end{array}$$

$$\begin{array}{r} 111 \\ 8 \overline{) 895} \\ - 8 \\ \hline 9 \\ 8 \\ \hline 1 \\ 8 \\ \hline 3 \end{array} \quad \begin{array}{r} 13 \\ 8 \overline{) 895} \\ - 8 \\ \hline 9 \\ 8 \\ \hline 1 \\ 8 \\ \hline 3 \end{array}$$

9.

Decimal = 7757

Octal = **17115₈**

$$\begin{array}{r} 8 \overline{) 7757} \\ 8 \overline{) 969} \rightarrow R = 5 \\ 8 \overline{) 121} \rightarrow R = 1 \\ 8 \overline{) 15} \rightarrow R = 1 \\ 8 \overline{) 1} \rightarrow R = 1 \\ 0 \rightarrow R = 1 \end{array}$$

$$\begin{array}{r} 969 \\ 8 \overline{) 7757} \\ - 72 \\ \hline 455 \\ 48 \\ \hline 77 \\ 72 \\ \hline 5 \end{array}$$

Decimal = 1656

Octal = **3170₈**

$$\begin{array}{r} 8 \overline{) 1656} \\ 8 \overline{) 27} \rightarrow R = 0 \\ 8 \overline{) 25} \rightarrow R = 7 \\ 8 \overline{) 3} \rightarrow R = 1 \\ 0 \rightarrow R = 3 \end{array}$$

$$\begin{array}{r} 207 \\ 8 \overline{) 1656} \\ - 16 \\ \hline 056 \\ - 0 \\ \hline 56 \\ 56 \\ \hline 0 \end{array} \quad \begin{array}{r} 25 \\ 8 \overline{) 1656} \\ - 16 \\ \hline 056 \\ - 0 \\ \hline 56 \\ 56 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 121 \\ 8 \overline{) 969} \\ - 8 \\ \hline 16 \\ 16 \\ \hline 009 \\ 8 \\ \hline 1 \end{array} \quad \begin{array}{r} 15 \\ 8 \overline{) 121} \\ - 8 \\ \hline 41 \\ 40 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 3 \\ 8 \overline{) 25} \\ - 24 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 25 \\ 8 \overline{) 207} \\ - 16 \\ \hline 47 \\ - 40 \\ \hline 7 \end{array}$$

1. a - c - m

1 - 1	7 - 7	
2 - 2	8 - 8	
3 - 3	9 - 9	13 - D
4 - 4	10 - A	14 - E
5 - 5	11 - B	
6 - 6	12 - C	

Converting Hexadecimal to Decimal (A)

Write each hexadecimal number as a decimal number.

1.

Hexadecimal = 2

Decimal = 2_{10}
 $16^0 \rightarrow 1$
 $= 2$ $1 \times 2 = 2$

2.

Hexadecimal = 54

Decimal = 84_{10}
 $3 \times 16 = 48$
 $5 \times 16 = 80$
 $4 \times 1 = 4$
 $80 + 4 = 84$

3.

Hexadecimal = 18E

Decimal = 238_{10}
 $18 \times 16 = 288$
 $E = 14$
 $16^2 16^1 16^0$
 $288 + 128 + 14$

4.

Hexadecimal = 1E0

Decimal = 300_{10}
 $1 \times 256 = 256$
 $E = 14$
 $16^2 16^1 16^0$
 $256 + 224 = 480$
 $256 + 224 = 480$

5.

Hexadecimal = 2B3

Decimal = 691_{10}
 $2 \times 256 = 512$
 $B = 11$
 $16^2 16^1 16^0$
 $512 + 176 + 3 = 691$

6.

Hexadecimal = E8

Decimal = 232_{10}
 $E = 14$
 $16^2 16^1 16^0$
 $224 + 8 = 232$

7.

Hexadecimal = 1C6

Decimal = 454_{10}
 $1 \times 256 = 256$
 $C = 12$
 $16^2 16^1 16^0$
 $256 + 192 + 6 = 454$

8.

Hexadecimal = 1E5

Decimal = 485_{10}
 $1 \times 256 = 256$
 $E = 14$
 $16^2 16^1 16^0$
 $485 = 256 + 224 + 5$

Hexadecimal = 1F7D

Decimal = 8061_{10}
 $1 \times 4096 = 4096$
 $F = 15$
 $7 \times 16 = 112$
 $D = 13$
 $16^3 16^2 16^1 16^0$
 $4096 + 3840 + 112 + 13 = 8061$

10.

Hexadecimal = 106C

Decimal = 4204_{10}
 $1 \times 4096 = 4096$
 $0 \times 256 = 0$
 $6 \times 16 = 96$
 $C = 12$
 $16^3 16^2 16^1 16^0$
 $4096 + 96 + 12 = 4204$

Exercises:

1. Use the logarithm laws to simplify the following:

- (a) $\log_2 xy - \log_2 x^2$ $\frac{\log_2 xy}{\log_2 x^2} \rightarrow \log_2 \frac{xy}{x^2} \frac{y}{x} \rightarrow \log_2 \frac{y}{x}$
- (b) $\log_2 \frac{8x^2}{y} + \log_2 2xy$ $\log_2 \frac{8x^2}{y} \times 2xy \log_2 8x^2 \cdot 2x \rightarrow 16x^3$
- (c) $\log_3 9xy^2 - \log_3 27xy$ $\log_3 \frac{(xy)^3}{xy} = \frac{2}{3} \log_3 x^2 y^2 = \log_3 16x^3$
- (d) $\log_4 (xy)^3 - \log_4 xy$ $\log_4 \frac{(xy)^3}{xy} = \log_4 x^2 y^2$
- (e) $\log_3 9x^4 - \log_3 (3x)^2$ $\log_3 \frac{9x^4}{(3x)^2} = \frac{9x^4}{9x^2} = \log_3 x^2$

2. Find x if:

- (a) $2\log_b 4 + \log_b 5 - \log_b 10 = \log_b x$
- (b) $\log_b 30 - \log_b 5^2 = \log_b x$
- (c) $\log_b 8 + \log_b x^2 = \log_b x$
- (d) $\log_b (x+2) - \log_b 4 = \log_b 3x$
- (e) $\log_b (x-1) + \log_b 3 = \log_b x$

a) $\log_b 4^2 + \log_b 5 - \log_b 10 = \log_b x$

$\log_b 4^2 + \log_b \frac{5}{10} = \log_b x$

$\log_b (6x \frac{5}{10})$

$\log_b (\frac{80}{10})$

$\log_b 8 = \log_b x$

$x = 8$

b) $\log_b \frac{30 \div 5}{25 \div 5} = \log_b x$

$\frac{6}{5} = x$

c) $\log_b 8 = \log_b x - \log_b x^2$

$\log_b 8 = \log_b \frac{x}{x^2}$

$\log_b 8 = \log_b \frac{1}{x}$

$x \cdot 8 = \frac{1}{x} \cdot x$

$8x = \frac{1}{8} \quad x = \frac{1}{2}$

$+1 - 3 = -2$
 $-1 - 3 = -4$

d) $\log_b \frac{x+2}{4} = \log_b 3x$

$4 \cdot \frac{x+2}{4} = 3x \cdot 4$

$x+2 = 12x$

$x - 12x = -2$

$x = \frac{2}{11}$

e) $\log_b 3 = \log_b x - \log_b (x-1)$

$5 - \log_b 3 = \log_b \frac{x}{x-1}$

$(x-1) \cdot 3 = \frac{x}{x-1} \cdot x-1$

$3(x-1) = x$

$3x - 3 = x - 3x$

$-3x - 3 = -2x$

$x = \frac{3}{2} \approx 1.5$

$\frac{1.5}{2} = 0.75$

c. $0.8316 \times 4.3 =$

3.57588

$$\begin{array}{r} 0.8316 \\ \times 4.3 \\ \hline 24948 \\ 332640 \\ \hline 357588 \end{array}$$

d. $37.96 \times 4.5 =$

170.820

$$\begin{array}{r} 37.96 \\ \times 4.5 \\ \hline 18980 \\ 151840 \\ \hline 170820 \end{array}$$

e. $124.03 \times 12 =$

1488.36

$$\begin{array}{r} 124.03 \rightarrow \text{two decimal} \\ \times 12 \rightarrow \text{08 and point} \\ \hline 24806 \\ 124030 \\ \hline 148836 \end{array}$$

f. $0.00312 \times 3.26 =$

0.0101712

$$\begin{array}{r} 0.00312 \\ \times 3.26 \\ \hline 001872 \\ 0006240 \\ 000993600 \\ \hline 000101712 \end{array}$$

g. $568.2 \times 5.94 =$

3375.108

$$\begin{array}{r} 568.2 \\ \times 5.94 \\ \hline 511380 \\ 2841000 \\ 3375108 \end{array}$$

h. $2691.8 \times 1.4 =$

3768.52

$$\begin{array}{r} 2691.8 \\ \times 1.4 \\ \hline 107672 \\ 269180 \\ \hline 376852 \end{array}$$

i. $43.01 \times 0.63 =$

27.0963

$$\begin{array}{r} 43.01 \rightarrow 4 \text{ decimal} \\ \times 0.63 \\ \hline 12903 \\ 258060 \\ 000000 \\ \hline 270963 \end{array}$$

Divide the following, giving quotient with the remainder as a whole number

$$\begin{array}{r} 148.4 \\ 5 \overline{) 742.0} \\ \underline{5} \\ 24 \\ \underline{20} \\ 42 \\ \underline{40} \\ 20 \\ \underline{20} \\ 00 \end{array}$$

a. $742 \div 5 =$

148.4

b. $1385 \div 4 =$

346.25

$$\begin{array}{r} 346.25 \\ 4 \overline{) 1385.00} \\ \underline{12} \\ 18 \\ \underline{16} \\ 25 \\ \underline{24} \\ 10 \\ \underline{8} \\ 20 \\ \underline{20} \\ 00 \end{array}$$

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Expanding Brackets

Question 1: Expand the following brackets

(a) $5(y+3)$

$5y + 15$

(b) $4(a+2)$

$4a + 8$

(c) $8(w+10)$

$8w + 80$

(d) $3(x-7)$

$3x - 21$

(e) $p(2p+5)$

$2p^2 + 5p$

(f) $2w(3w-1)$

$6w^2 - 2w$

(g) $9y(2y+3)$

$18y^2 + 27y$

(h) $4c(2a+5c)$

$8ca + 20c^2$

(g) $8(5+2m) + 3(5-3m)$

$40 + 16m + 15 - 9m$

$16m - 9m + 40 + 15$

$7m + 55$

(h) $4(w+7) - 2(2w+1)$

$4w + 28 - 4w - 2$

$4w - 4w + 28 - 2$

$= 26$

(i) $9(1+2y) + 3(3-y)$

$9 + 18y + 9 - 3y$

$18y - 3y + 9 + 9$

$15y + 18$

Linear equations

Question 2 Solve the following equations

(a) $2x + 3 = 9$

$\frac{2}{2}x = \frac{6}{2}$

$x = 3$

(b) $3w - 1 = 14$

$\frac{3}{3}w = \frac{15}{3}$

$w = 5$

(c) $7y + 2 = 30$

$7y = \frac{28}{7}$

$y = 4$

(d) $\frac{2x}{3} = 6 \cdot 3$

$\frac{2}{2}x = \frac{18}{2}$

$x = 9$

(g) $\frac{2x}{7} + 2 = 12 - 2$

$\frac{2x}{7} = 10 \cdot 7$

$\frac{2}{2}x = \frac{70}{2}$

$x = 35$

(h) $\frac{8x}{3} - 9 = 7$

$\frac{8x}{3} = 16 \cdot 3$

$\frac{8}{8}x = \frac{48}{8}$

$x = 6$

(i) $\frac{3x}{10} - 4 = 8$

$\frac{3x}{10} = 12 \cdot 10$

$\frac{3}{3}x = \frac{120}{3}$

$x = 40$

$$\begin{array}{r} 35 \\ 2 \overline{) 70} \\ \underline{70} \\ 00 \end{array}$$

$$\begin{array}{r} 40 \\ 3 \overline{) 120} \\ \underline{120} \\ 000 \end{array}$$

Converting Octal to Decimal (A)

Write each octal number as a decimal number.

1. Octal = 48

Decimal = 40

4×8^0

2. Octal = 56

Decimal = 46

$(8^1 \times 5) + (8^0 \times 6) = 40 + 6 = 46$

3. Octal = 775

Decimal = 509

$2 \times 64 + 7 = 128 + 7 = 135$

$7 \times 8^2 + 7 \times 8^1 + 5 \times 8^0 = 448 + 56 + 5 = 509$

4. Octal = 1606

Decimal = 902

$512 + 384 + 6 = 902$

$1 \times 8^3 + 6 \times 8^2 + 0 \times 8^1 + 6 \times 8^0 = 512 + 384 + 6 = 902$

5. Octal = 443

Decimal = 291

$256 + 32 + 3 = 291$

$4 \times 8^2 + 4 \times 8^1 + 3 \times 8^0 = 256 + 32 + 3 = 291$

6. Octal = 1743

Decimal = 995

$512 + 448 + 32 + 3 = 995$

$1 \times 8^3 + 7 \times 8^2 + 4 \times 8^1 + 3 \times 8^0 = 512 + 448 + 32 + 3 = 995$

7. Octal = 1113

Decimal = 587

$512 + 64 + 8 + 3 = 587$

$1 \times 8^3 + 1 \times 8^2 + 1 \times 8^1 + 3 \times 8^0 = 512 + 64 + 8 + 3 = 587$

8. Octal = 1401

Decimal = 769

$512 + 256 + 1 = 769$

$1 \times 8^3 + 4 \times 8^2 + 0 \times 8^1 + 1 \times 8^0 = 512 + 256 + 1 = 769$

9. Octal = 3746

Decimal = 2022

$1536 + 448 + 32 + 6 = 2022$

$3 \times 8^3 + 7 \times 8^2 + 4 \times 8^1 + 6 \times 8^0 = 1536 + 448 + 32 + 6 = 2022$

10. Octal = 21770

Decimal = 9208

$8192 + 512 + 448 + 56 = 9208$

$2 \times 8^4 + 1 \times 8^3 + 7 \times 8^2 + 7 \times 8^1 + 0 \times 8^0 = 8192 + 512 + 448 + 56 = 9208$

$$\log_a a^x = x \log_a a = x \cdot 1 = x.$$

$$\boxed{\log_a a = y}$$

$$\boxed{a^y = a} \Rightarrow \boxed{y = 1}$$

$$\log_a a = 1$$

$$\log_a x = y \Leftrightarrow a^y = x$$

$$\ln x = y \Leftrightarrow e^y = x$$

$$\log_a a = y$$

$$\boxed{a^y = a}$$

$$\boxed{y = 1}$$

k. $2\frac{1}{4} \div 3\frac{3}{5} = \frac{4 \cdot 2 + 1}{4} \div \frac{3 \cdot 5 + 3}{5}$
 $\frac{9}{4} \div \frac{18}{5} = \frac{45}{72} = \frac{5}{8}$

l. $1\frac{1}{4} \times 1\frac{7}{9} \div 5\frac{5}{6} = \frac{4 \cdot 1 + 1}{4} \times \frac{9 \cdot 1 + 7}{9} \div \frac{6 \cdot 5 + 5}{6}$
 $\frac{5}{4} \times \frac{17}{9} \div \frac{35}{6} = \frac{85}{36} \div \frac{35}{6} = \frac{85}{36} \times \frac{6}{35} = \frac{85}{210} = \frac{17}{42}$

m. $\frac{10}{8} \div \frac{10}{36} = \frac{10}{8} \times \frac{36}{10} = \frac{180}{80} = \frac{9}{4}$
 $\frac{5}{8} \div \frac{10}{36} = \frac{5}{8} \times \frac{36}{10} = \frac{180}{80} = \frac{9}{4}$

Q

Convert the following decimals to fractions or mixed numbers in their simplest form:

- $0.79 = \frac{79}{100}$
- $0.925 = \frac{925}{1000} = \frac{37}{40}$
- $2.875 = 2\frac{875}{1000} = 2\frac{7}{8}$
- $0.4 = \frac{4}{10} = \frac{2}{5}$
- $0.75 = \frac{75}{100} = \frac{3}{4}$
- $2.9 = 2\frac{9}{10}$
- $3.375 = 3\frac{375}{1000} = 3\frac{3}{8}$
- $1.1875 = 1\frac{1875}{10000} = 1\frac{3}{16}$
- $4.5 = 4\frac{5}{10} = 4\frac{1}{2}$

Solve the following operations involving directed numbers:

a. $3 - 5 = -2$

b. $-8 + 5 = -3$