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KAMONYI DISTRICT

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MODEL QUATIONS OF MATHEMATICS S4 MCE & S4 MEG

1. Convert the following radian measures to degrees:

a) $\frac{\pi}{5}$ b) $\frac{3\pi}{5}$ c) $\frac{3\pi}{4}$ d) $\frac{\pi}{18}$

e) $\frac{\pi}{9}$ f) $\frac{7\pi}{9}$ g) $\frac{\pi}{10}$ h) $\frac{3\pi}{20}$

i) $\frac{5\pi}{6}$ j) $\frac{\pi}{8}$

2. Copy and complete the tables:

a)

Degrees	0	45	90	135	180	225	270	315	360
Radians									

b)

Degrees	0	30	60	90	120	150	180	210	240	270	300	330	360
Radians													

3. The following are other trigonometric identities. Use the unit circle to prove that the identities are correct.

1. $1 + \tan^2\theta = \sec^2\theta \ (\cos\theta \neq 0)$
2. $1 + \cot^2\theta = \csc^2\theta \ (\sin\theta \neq 0)$
3. $\tan\theta + \cot\theta = \sec\theta \csc\theta$
4. $\sin^2 A - 4\cos^2 A + 1 = 3\sin^2 A - 2\cos^2 A - 1$
5. $\frac{\cos^2 A}{1 + \tan^2 A} - \frac{\sin^2 A}{1 + \tan^2 A} = 1 - 2\sin^2 A$

4.

Simplify the following:

(a) $\sin^2 2A + \cos^2 2A$

(b) $1 + \tan^2 \frac{A}{4}$

(c) $\sin^2 B + \cos^2 B$

(d) $\cos^2 \theta + 1$

(e) $\cos^2 4A + \sin^2 4A$

(f) $\cos^2 1\frac{1}{2} + \sin^2 1\frac{1}{2}$

(g) $\frac{\sin \theta}{\csc \theta} + \frac{\cos \theta}{\sec \theta}$

(h) $(\sin A + \cos A)^2 + (\sin A - \cos A)^2$

(i) $1 - \sin^2 A$

(j) $1 - \cos^2 2B$

(k) $\sec^2 \theta - 1$

(l) $1 - \csc^2 A$

5.

2. Simplify each of the following expressions:

(a) $\sin \theta \cos 2\theta + \cos \theta \sin 2\theta$

(b) $\cos \alpha \cos (90° - \alpha) - \sin \alpha \sin (90° - \alpha)$

(c) $\frac{\tan a + \tan 2a}{1 - \tan a \tan 2a}$

(d) $\frac{\tan 3\beta + \tan 2\beta}{1 + \tan 3\beta \tan 2\beta}$

3. Angle A is an acute angle and $\sin A = \frac{7}{25}$. Angle B is obtuse and $\sin B = \frac{4}{5}$. Find an exact expression for:

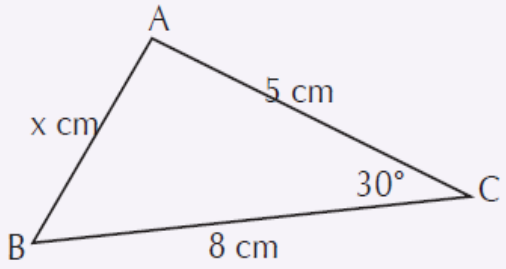
(a) $\sin (A + B)$

(b) $\cos (A + B)$

(c) $\tan (A + B)$.

6. Find the lengths of the unknown side x in the given triangles:

a)



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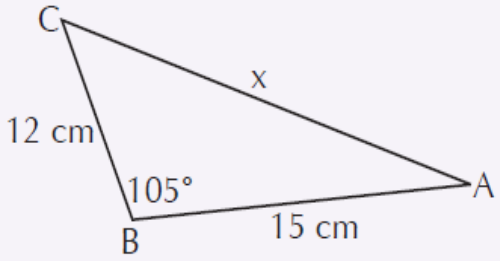

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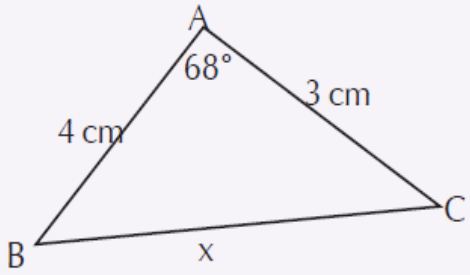
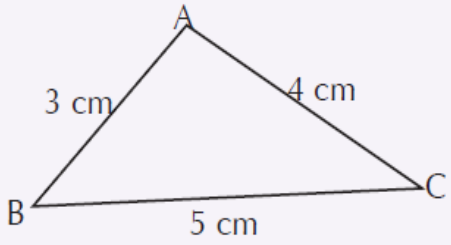


7 A. Find the sizes of all angles in the triangles below:

a)



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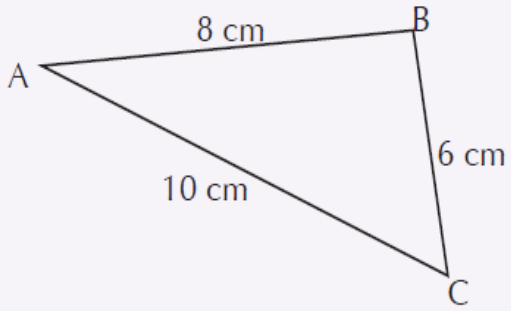


Fig 1.31

7 B. Solve the triangles with the following sides:

a) a = 10 cm, b = 8 cm, c = 12 cm b) a = 6 cm, b = 5 cm, c = 7 cm

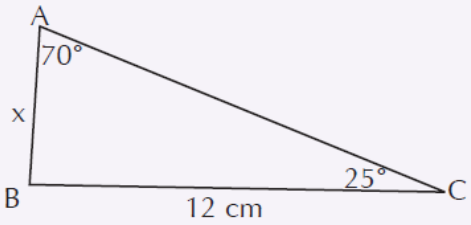
7 C. Solve the triangles with the following measures:

a) a = 5 cm, b = 6 cm, C = 45° b) a = 12 cm, B = 57°, c = 15 cm

c) B = 117°, a = 3.4 cm, c = 2.7 cm d) B = 60° , a = 12 cm, c = 15 cm

1. Find the measures of the unknown sides x in the triangles below.

a)



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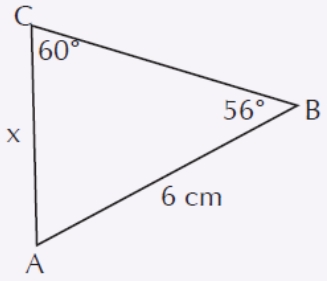

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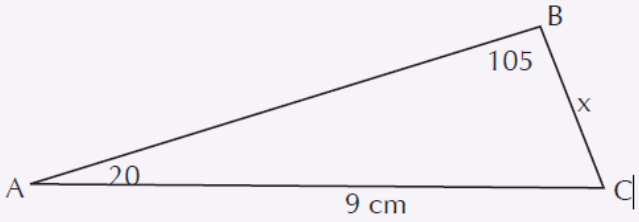
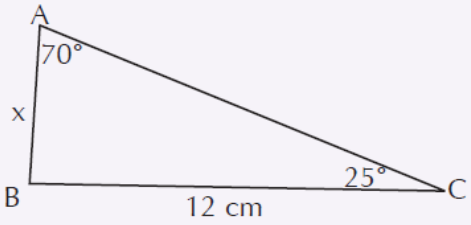


Fig 1.35

1. Find the measures of the unknown sides x in the triangles below.

a)



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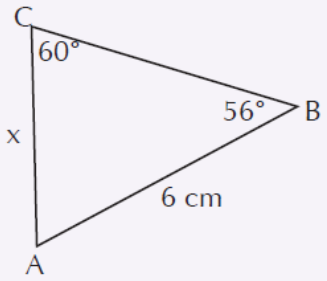

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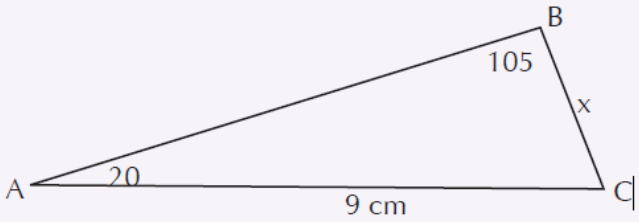
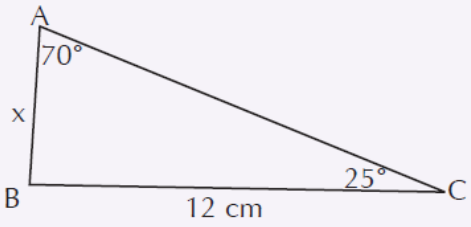


Fig 1.35

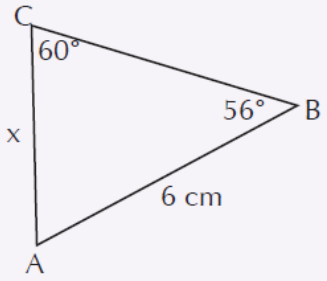
8

Find the measures of the unknown sides x in the triangles below.

a)



b)



c)

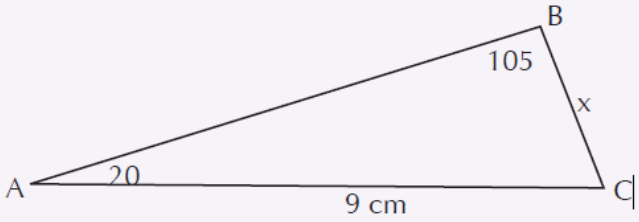
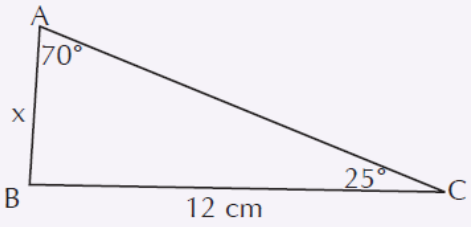


Fig 1.35

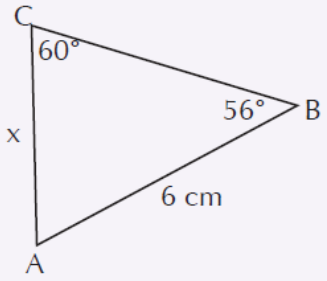
9.

Find the measures of the unknown sides x in the triangles below.

a)



b)



c)

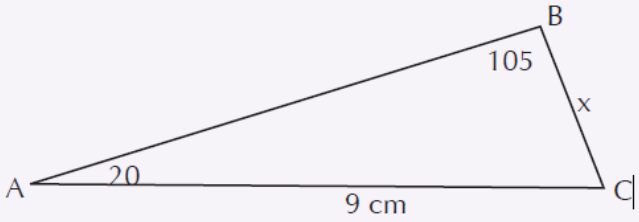


Fig 1.35

10.

Construct a circuit for each of the following statements:

1. $p \vee (q \vee r)$
2. $(p \vee q) \vee r$
3. $p \wedge (q \vee r)$
4. $(p \wedge q) \vee (p \wedge r)$

11.

Solve and graph the following:

1. $y \leq 3$
2. $y = \frac{1}{2}x - 3$
3. $y = -3x + 2$
4. $y \geq -2$
5. $2y - x \leq 6$
6. $\frac{y}{2} + 2 > x$

12.

1. Construct truth tables for each of the following statements:

a) $p \wedge (\sim p)$
b) $\sim [p \wedge (\sim p)]$
c) $p \wedge (\sim q)$
d) $\sim p \vee q$
e) $\sim [p \wedge (\sim q)]$
f) $p \wedge (q \vee r)$
g) $(p \wedge q) \wedge (\sim p)$
h) $\sim [(\sim p) \vee (\sim q)]$
i) $(\sim p \vee q) \wedge ((\sim p \wedge (\sim q))$

13. Discuss about the solution of the equation,where **m is a parameter**

1. Mx+ 56=0

2. (m+1)x = 2x + m+2

3. $\frac{m+5}{x+1} = \frac{m+2}{x}$

4. (m-2)x +3m= 2

5. x + 4=m

6.(m-1)x = x-m

7. $\frac{mx+3}{m} = \frac{1}{2}$

8. $\frac{x}{3m+2} = \frac{2x+2}{m}$

14. Discuss about the following inequalities

1.mx- 34< 0

2.(m-2)x $\leq$ 3x-m+m

3. $\frac{m+3}{x+2} > \frac{m-2}{x}$

4.(m-1)x -2m < 2

5. X -4 $\geq$ m

6. (m-3) x >x-m

7. $\frac{mx-3}{m} \leq \frac{1}{4}$

8. $\frac{x}{m+2} \leq \frac{x-2}{m}$

15. S0lve the following inequalities

1.| 2x-1| > 5

2. 2| $\frac{2x}{3}$ +1 | $\geq$ 4

3. | 3-2x| < 3

16. Rationalize the denominator

1. $\frac{5}{\sqrt{7}}$ 2. $\frac{3-\sqrt{2}}{1-\sqrt{2}}$ 3. $\frac{2\sqrt{6}}{\sqrt{2}+\sqrt{3}+\sqrt{5}}$

4. $\frac{2\sqrt{2}}{4+3\sqrt{3}}$ 5. $\frac{a-\sqrt{b}}{\sqrt{d}}$ 6. $\frac{3\sqrt{3}+2\sqrt{2}}{1+2\sqrt{2}}$ 7. $\frac{2}{\sqrt{2}-\sqrt{3}+\sqrt{5}}$