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| **1) THE SINE LAW: For triangles that are not right angled, we use the sine law.** |
| **Solving for side** | **Solving for angle** |
| $$\frac{a}{sinA}=\frac{b}{sinB}$$ | $$\frac{\sin(A)}{a}=\frac{sinB}{b}$$ |

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| **TYPE 1: ANGLE - ANGLE - SIDE** | **TYPE 2: ANGLE (NOT CONTAINED) SIDE SIDE** |
| Solve for side b to the nearest one decimal place.  | Solve for angle θ to the nearest degree.85$$θ$$50o |

**2) THE COSINE LAW:** For triangles that are not right angled, we also use the cosine law.

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| **SOLVING FOR SIDE** | **SOLVING FOR ANGLE** |
| $$c^{2} =a^{2} + b^{2} - 2abcosC$$ | $$cosC=\frac{a^{2}+b^{2}-c^{2}}{2ab}$$ |

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| **The cosine law is used to solve any triangle when given:** |
| **SIDE – CONTAINED ANGLE - SIDE – (SAS)** | **SIDE – SIDE – SIDE (SSS)**  |

**The Sine Law Practice**

1. Solve for the given variable (correct to 1 decimal place) in each of the following:

(a)  (b)  (c) 

2. For each of the following diagrams write the equation you would use to solve for the indicated variable:

B

c

b

75°

C

A

B

23.6 *cm*

35°

a

53°

C

A

B

36 *cm*

46°

(a) (b) (c)

15°

A

14.2 *m*

73°

C

3. Solve for each of the required variables from Question #2.

4. For each of the following triangle descriptions you should make a sketch and then find the indicated side rounded correctly to one decimal place.

(a) In ΔABC, given that A = 57°, B = 73°, and AB = 24 cm. Find the length of AC

(b) In ΔABC, given that B = 38°, C = 56°, and BC = 63 cm. Find the length of AB

(c) In ΔABC, given that A = 50°, B = 50°, and AC = 27 m. Find the length of AB

(d) In ΔABC, given that A = 23°, C = 78°, and AB = 15 cm. Find the length of BC

(e) In ΔABC, given that A = 55°, B = 32°, and BC = 77 cm. Find the length of AC

(f) In ΔABC, given that B = 14°, C = 78°, and AC = 36 m. Find the length of BC



**Challenge:** The angle of elevation to the top C of a building from two points A and B on level ground are 50 degrees and 60 degrees respectively. The distance between points A and B is 30 meters. Points A, B and C are in the same vertical plane. Find the height h of the building (round your answer to the nearest unit).

Solutions:

1. (a) 8.9 *units* (b) 50.0 *units* (c) 90.2 *units*

2. (a)  (b)  (c) 

3. (a) 29.1 *cm* (b) 38.7 *cm* (c) 52.5 *m*

4. (a) 30.0 *cm* (b) 52.4 *cm* (c) 34.7 *m* (d) 6.0 *cm* (e) 49.8 *cm* (f) 148.7 *m*

**The Cosine Law Practice**

1. For each of the following diagrams write the equation you would use to solve for the indicated variable:

B

C

A

B

23.6 *cm*

33.2 *cm*

28.4 *cm*

a

53°

C

A

B

36 *cm*

26 *cm*

(a) (b) (c)

c

C

A

B

14.2 *m*

75°

22.4 *m*

2. Solve for each of the required variables from Question #1.

3. For each of the following triangle descriptions you should make a sketch and then find the indicated value.

(a) In ΔABC, given that AB = 24 cm, AC = 34 cm, and A = 67°. Find the length of BC

(b) In ΔABC, given that AB = 15 m, BC = 8 m, and B = 24°. Find the length of AC

(c) In ΔABC, given that AC = 10 cm, BC = 9 cm, and C = 48°. Find the length of AB

(d) In ΔABC, given that A = 24°, AB = 18.6 m, and AC = 13.2 m. Find the length of BC

(e) In ΔABC, given that AB = 9 m, AC = 12 m, and BC = 15 m. Find the measure of B.

(f) In ΔABC, given that AB = 18.4 m, BC = 9.6 m, and AC = 10.8 m. Find the measure of A.

**CHALLENGE:** A ship leaves port at 1 pm traveling north at the speed of 30 miles/hour. At 3 pm, the ship adjusts its course 20 degrees eastward. How far is the ship from the port at 4pm? (round to the nearest unit).

Solutions:

1. (a) a2 = (36)2 + (26)2 – 2(36)(26) · cos 53°

 (b) (28.4)2 = (23.6)2 + (33.2)2 – 2(23.6)(33.2) · cos B

 (c) c2 = (22.4)2 + (14.2)2 – 2(22.4)(14.2) · cos 75°

2. (a) 29.1 *cm* (b) 57° (c) 23.2 *m*

3. (a) 33.1 *cm* (b) 8.4 *m* (c) 7.8 cm (d) 8.5 *m* (e) 53° (f) 24°