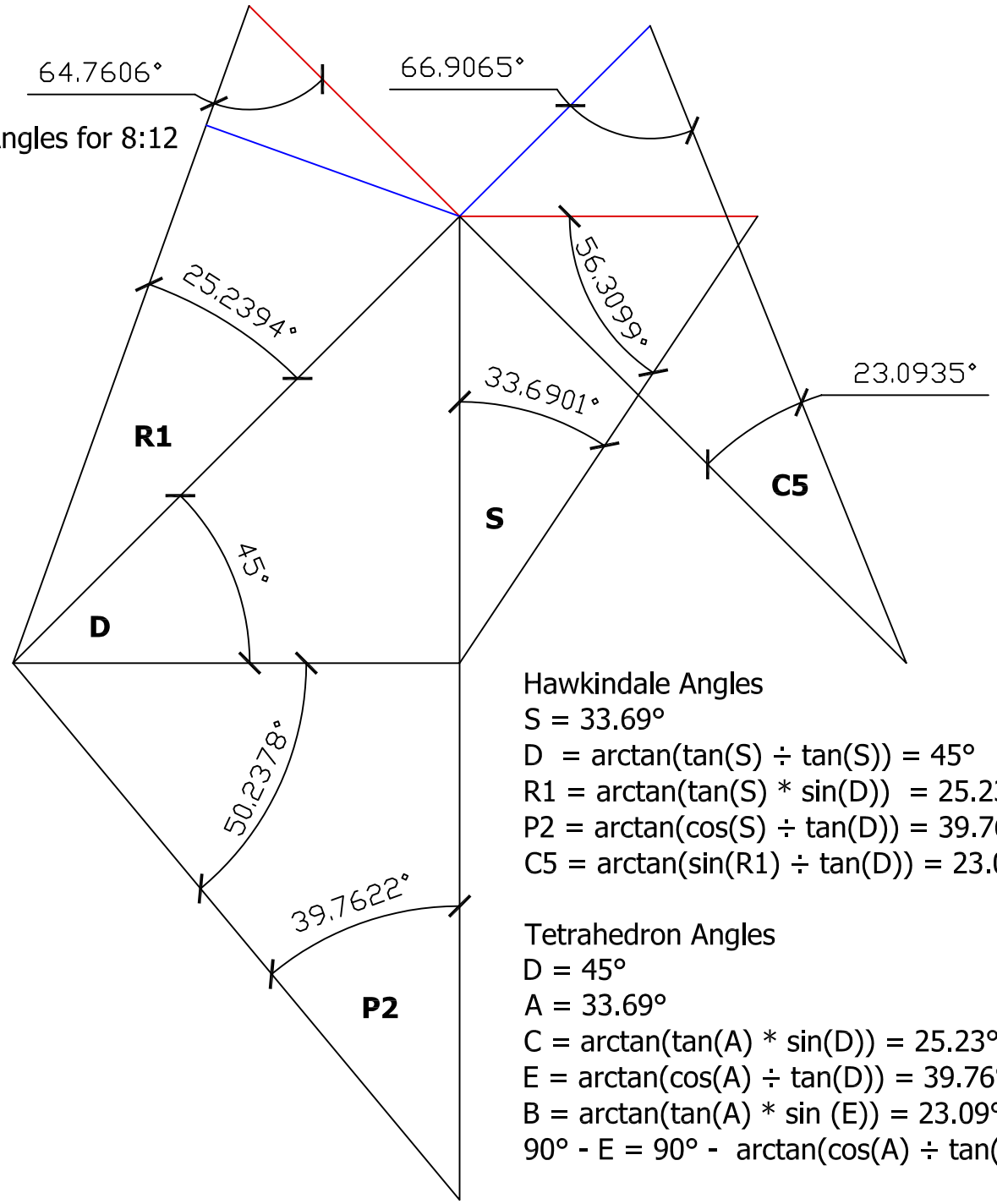
Tetrahedrons for 8:12 Pitched Roof

D	A	C	E	B	Tetrahedron Angles
D	S	R1	P2	C5	Hawkindale Angles

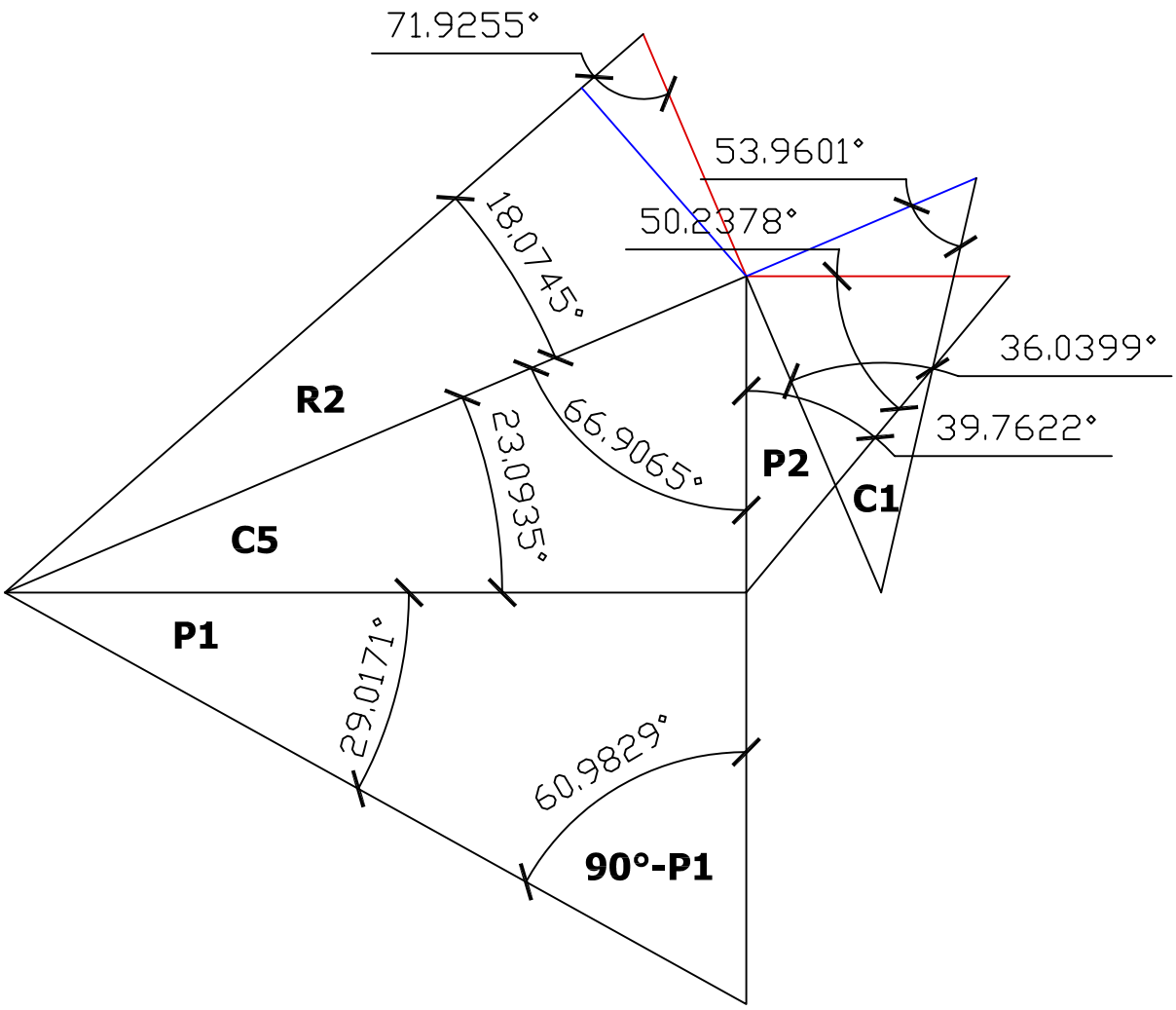


Hawkindale Angles for 8:12
S = 33.69°
D = 45.00°
R1 = 25.24°
R2 = 18.07°
R3 = 37.43°
R4 = 42.13°
R5 = 18.43°
R6 = -80.46°
R7 = 31.29°
P1 = 29.02°
P2 = 39.76°
P3 = 18.15°
P4 = 32.47°
P5 = 39.76°
P6 = 15.26°
C1 = 36.04°
C2 = 14.53°
C3 = 23.09°
C4 = 39.76°
C5 = 23.09°
A5 = 17.55°
A7 = 25.24°
A8 = 7.29°
A9 = 10.48°
Q1 = 65.84°
Q2 = 10.86°
Q3 = 43.31°
Q4 = 4.7°

Hawkindale Angles
S = 33.69°
D = arctan(tan(S) ÷ tan(S)) = 45°
R1 = arctan(tan(S) * sin(D)) = 25.23°
P2 = arctan(cos(S) ÷ tan(D)) = 39.76°
C5 = arctan(sin(R1) ÷ tan(D)) = 23.09°

Tetrahedron Angles
D = 45°
A = 33.69°
C = arctan(tan(A) * sin(D)) = 25.23°
E = arctan(cos(A) ÷ tan(D)) = 39.76°
B = arctan(tan(A) * sin (E)) = 23.09°
90° - E = 90° - arctan(cos(A) ÷ tan(D)) = 50.23°

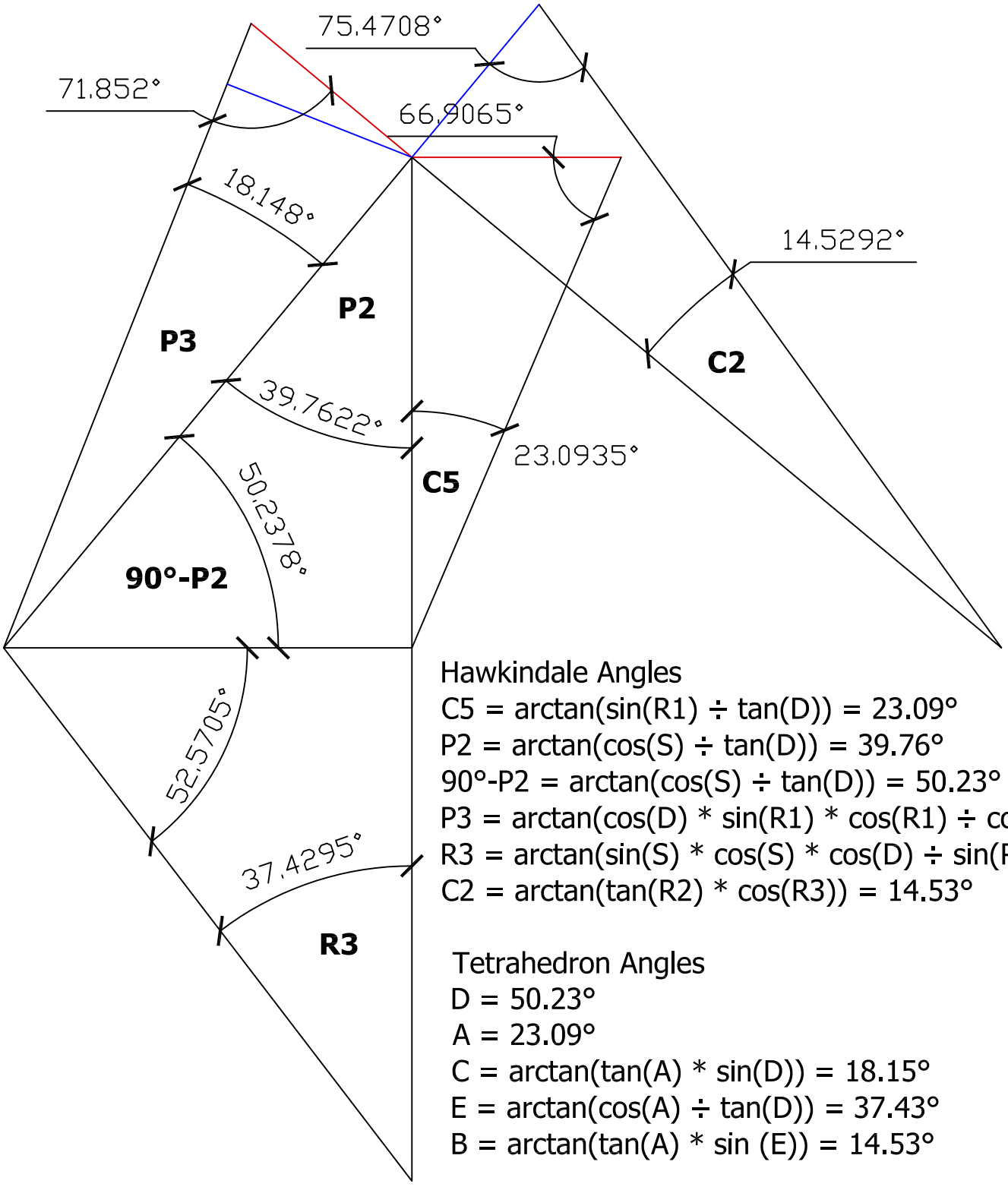
D	A	C	E	B	Tetrahedron Angles
C5	P2	R2	90°-P1	C1	Hawkindale Angles



Hawkindale Angles
C5 = arctan(sin(R1) ÷ tan(D)) = 23.09°
P2 = arctan(cos(S) ÷ tan(D)) = 39.76°
R2 = arctan(sin(S) * cos(S) * cos(D) ÷ tan(D)) = 18.07°
P1 = arctan(sin(S) ÷ tan(D)) = 29.02°
90°- P1= arctan(sin(S) ÷ tan(D)) = 60.98°
C1 = arctan(sin(P1) ÷ tan(S)) = 36.04°

Tetrahedron Angles
D = 23.09°
A = 39.76°
C = arctan(tan(A) * sin(D)) = 18.07°
E = arctan(cos(A) ÷ tan(D)) = 60.98°
B = arctan(tan(A) * sin (E)) = 36.04°
90° - E = 90° - arctan(cos(A) ÷ tan(D)) = 29.02°

D	A	C	E	B	Tetrahedron Angles
90°-P2	C5	P3	R3	C2	Hawkindale Angles



Hawkindale Angles

C5 = arctan(sin(R1) ÷ tan(D)) = 23.09°

P2 = arctan(cos(S) ÷ tan(D)) = 39.76°

90°-P2 = arctan(cos(S) ÷ tan(D)) = 50.23°

P3 = arctan(cos(D) * sin(R1) * cos(R1) ÷ cos(S)) = 18.15°

R3 = arctan(sin(S) * cos(S) * cos(D) ÷ sin(R1)) = 37.43°

C2 = arctan(tan(R2) * cos(R3)) = 14.53°

Tetrahedron Angles

D = 50.23°

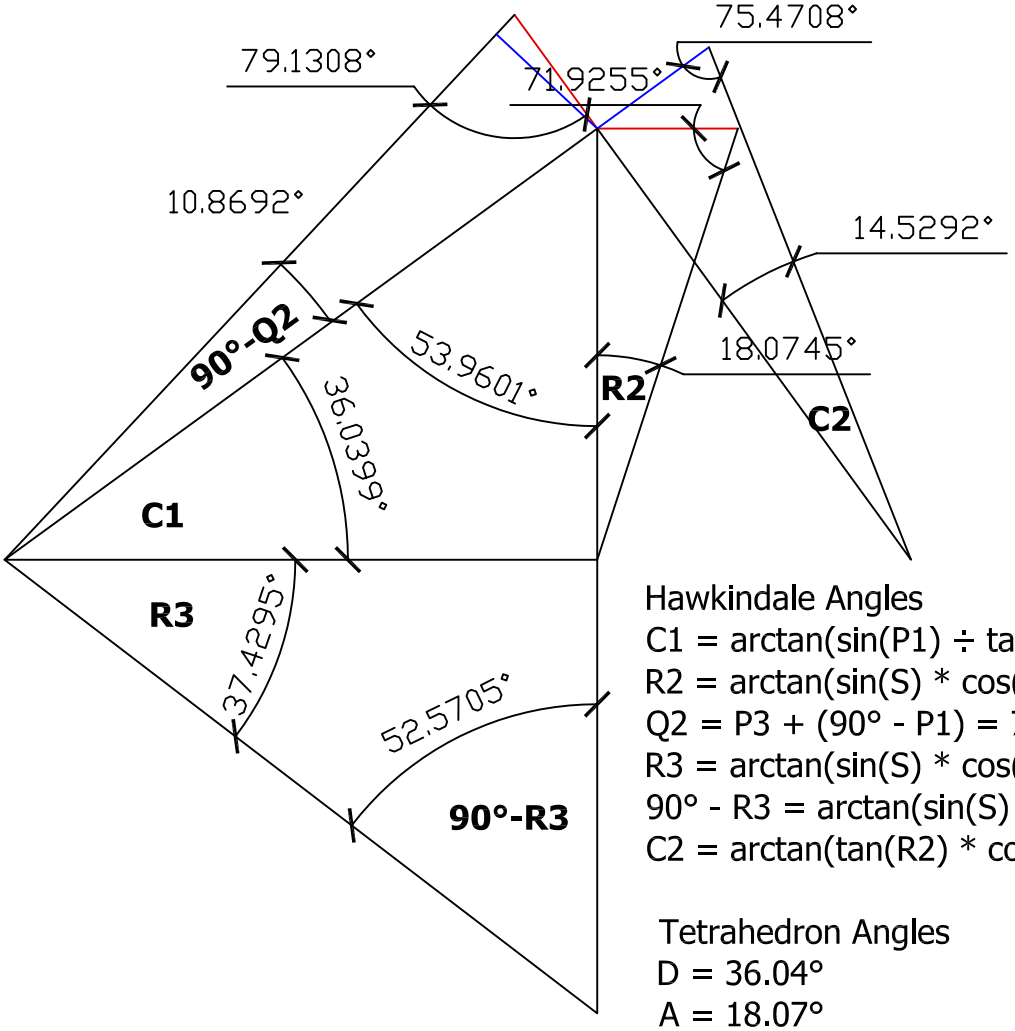
A = 23.09°

C = arctan(tan(A) * sin(D)) = 18.15°

E = arctan(cos(A) ÷ tan(D)) = 37.43°

B = arctan(tan(A) * sin (E)) = 14.53°

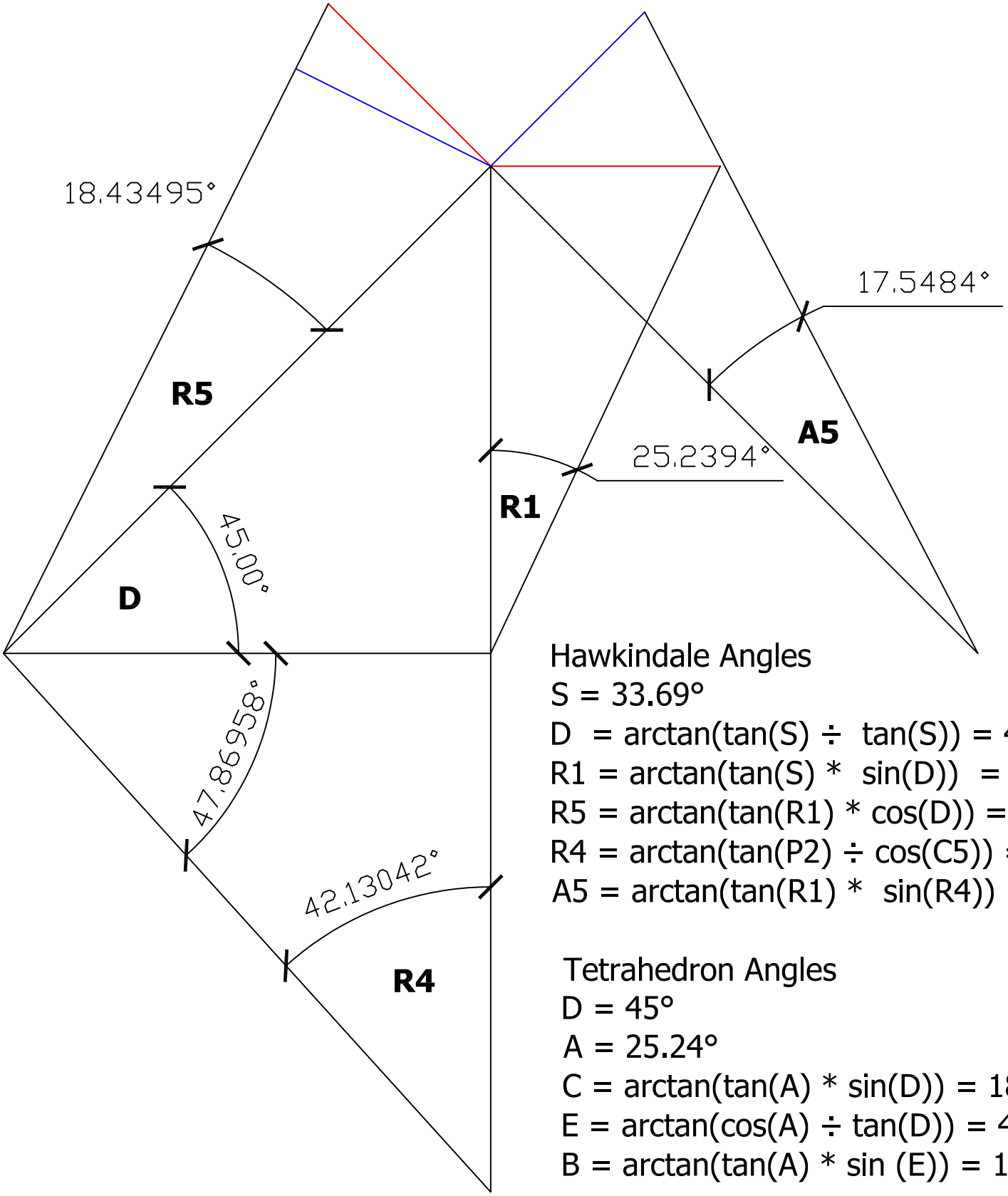
D	A	C	E	B	Tetrahedron Angles
C1	R2	90°-Q2	90°-R3	C2	Hawkindale Angles



Hawkindale Angles
C1 = arctan(sin(P1) ÷ tan(S)) = 36.04°
R2 = arctan(sin(S) * cos(S) * cos(D) ÷ tan(D)) = 18.07°
Q2 = P3 + (90° - P1) = 79.13°
R3 = arctan(sin(S) * cos(S) * cos(D) ÷ sin(R1)) = 37.43°
90° - R3 = arctan(sin(S) * cos(S) * cos(D) ÷ sin(R1)) = 52.57°
C2 = arctan(tan(R2) * cos(R3)) = 14.53°

Tetrahedron Angles
D = 36.04°
A = 18.07°
C = arctan(tan(A) * sin(D)) = 10.86°
E = arctan(cos(A) ÷ tan(D)) = 52.57°
B = arctan(tan(A) * sin (E)) = 14.53°

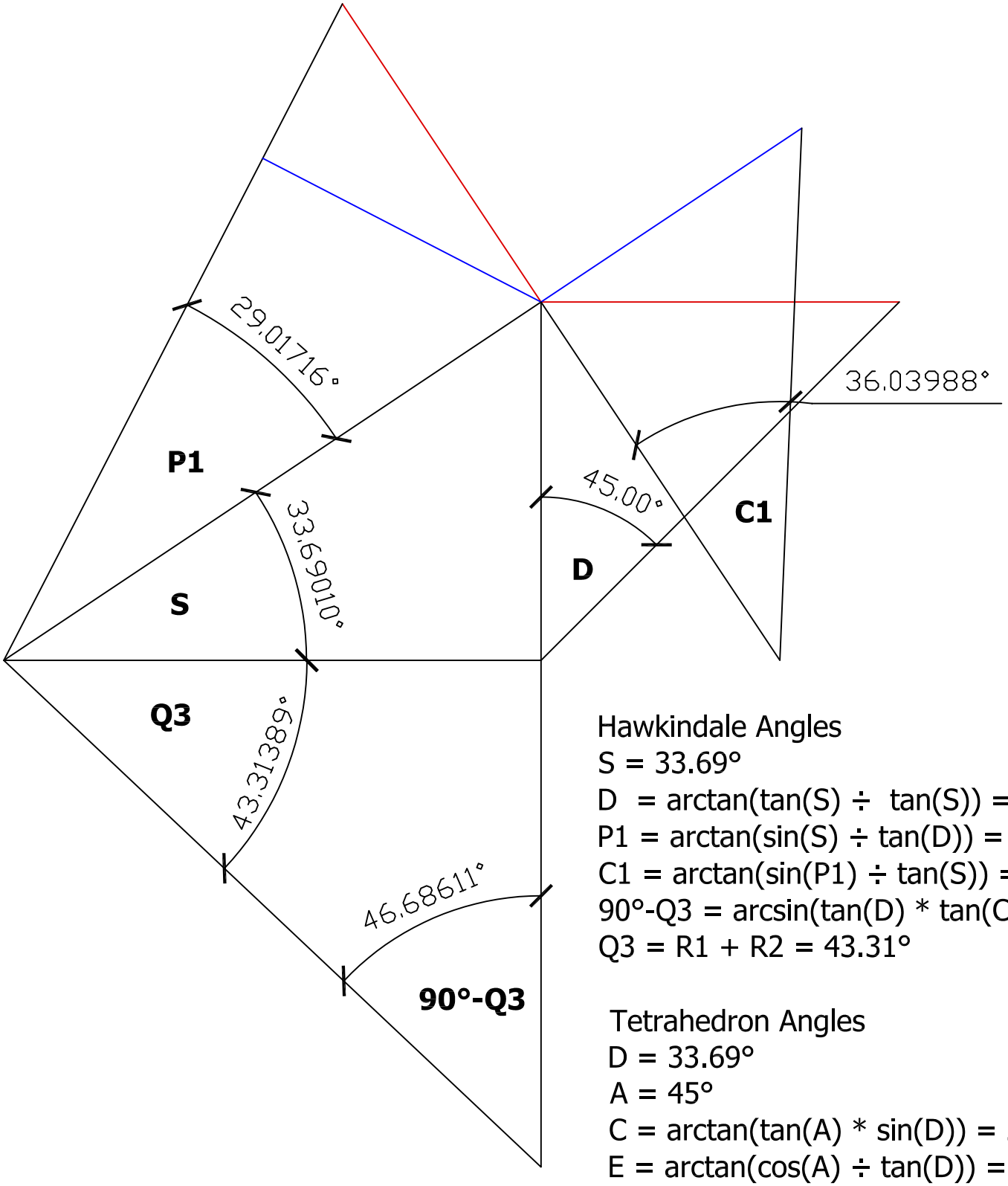
D A C E B Tetrahedron Angles
D R1 R5 R4 A5 Hawkindale Angles



Hawkindale Angles
S = 33.69°
D = arctan(tan(S) ÷ tan(S)) = 45°
R1 = arctan(tan(S) * sin(D)) = 25.23°
R5 = arctan(tan(R1) * cos(D)) = 18.43°
R4 = arctan(tan(P2) ÷ cos(C5)) = 42.13°
A5 = arctan(tan(R1) * sin(R4)) = 17.55°

Tetrahedron Angles
D = 45°
A = 25.24°
C = arctan(tan(A) * sin(D)) = 18.43°
E = arctan(cos(A) ÷ tan(D)) = 42.13°
B = arctan(tan(A) * sin (E)) = 17.55°

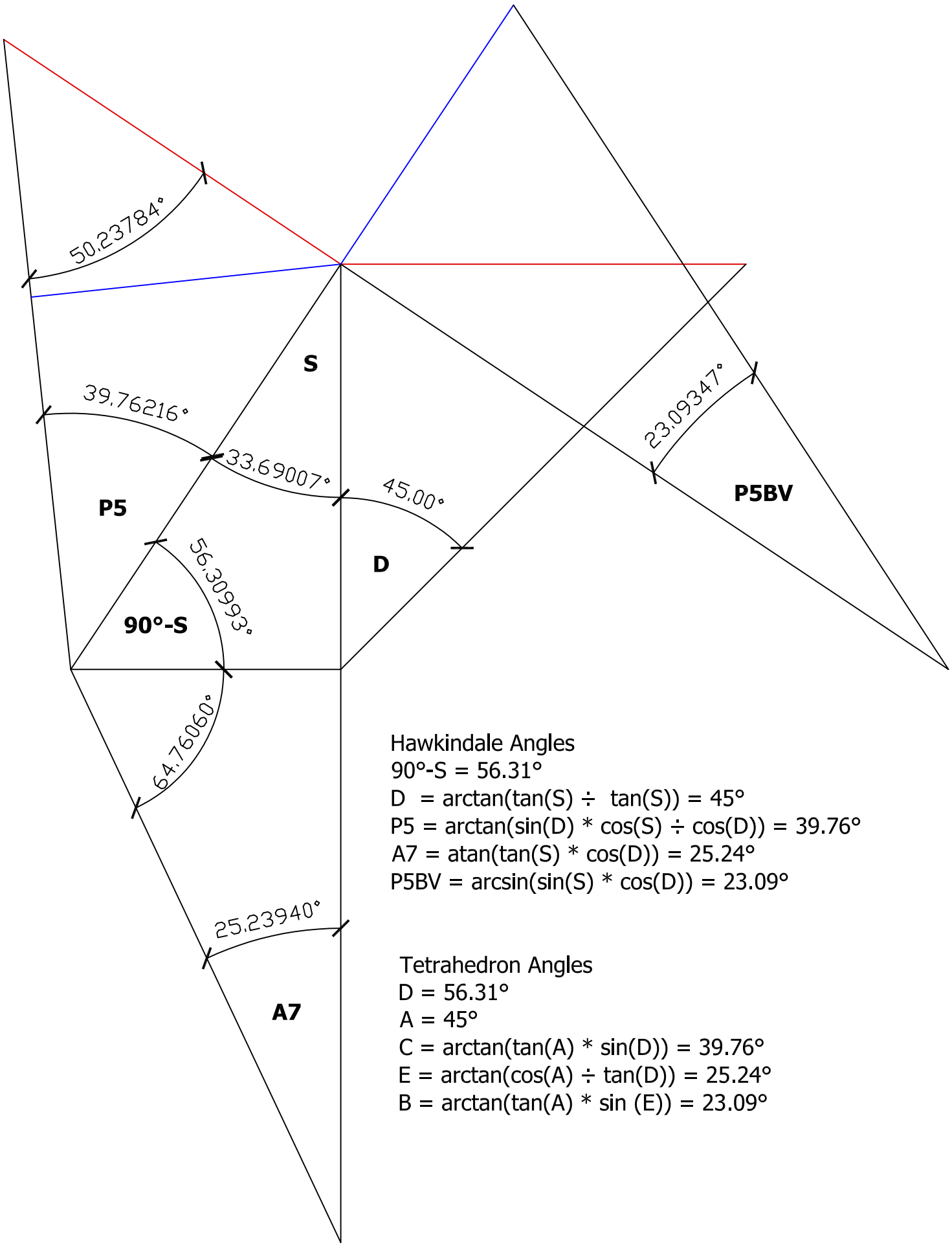
D A C E B Tetrahedron Angles
S D P1 90°-Q3 C1 Hawkindale Angles



Hawkindale Angles
S = 33.69°
D = arctan(tan(S) ÷ tan(S)) = 45°
P1 = arctan(sin(S) ÷ tan(D)) = 29.02°
C1 = arctan(sin(P1) ÷ tan(S)) = 36.04°
90°-Q3 = arcsin(tan(D) * tan(C1)) = 46.69°
Q3 = R1 + R2 = 43.31°

Tetrahedron Angles
D = 33.69°
A = 45°
C = arctan(tan(A) * sin(D)) = 29.02°
E = arctan(cos(A) ÷ tan(D)) = 46.69°
B = arctan(tan(A) * sin (E)) = 36.04°

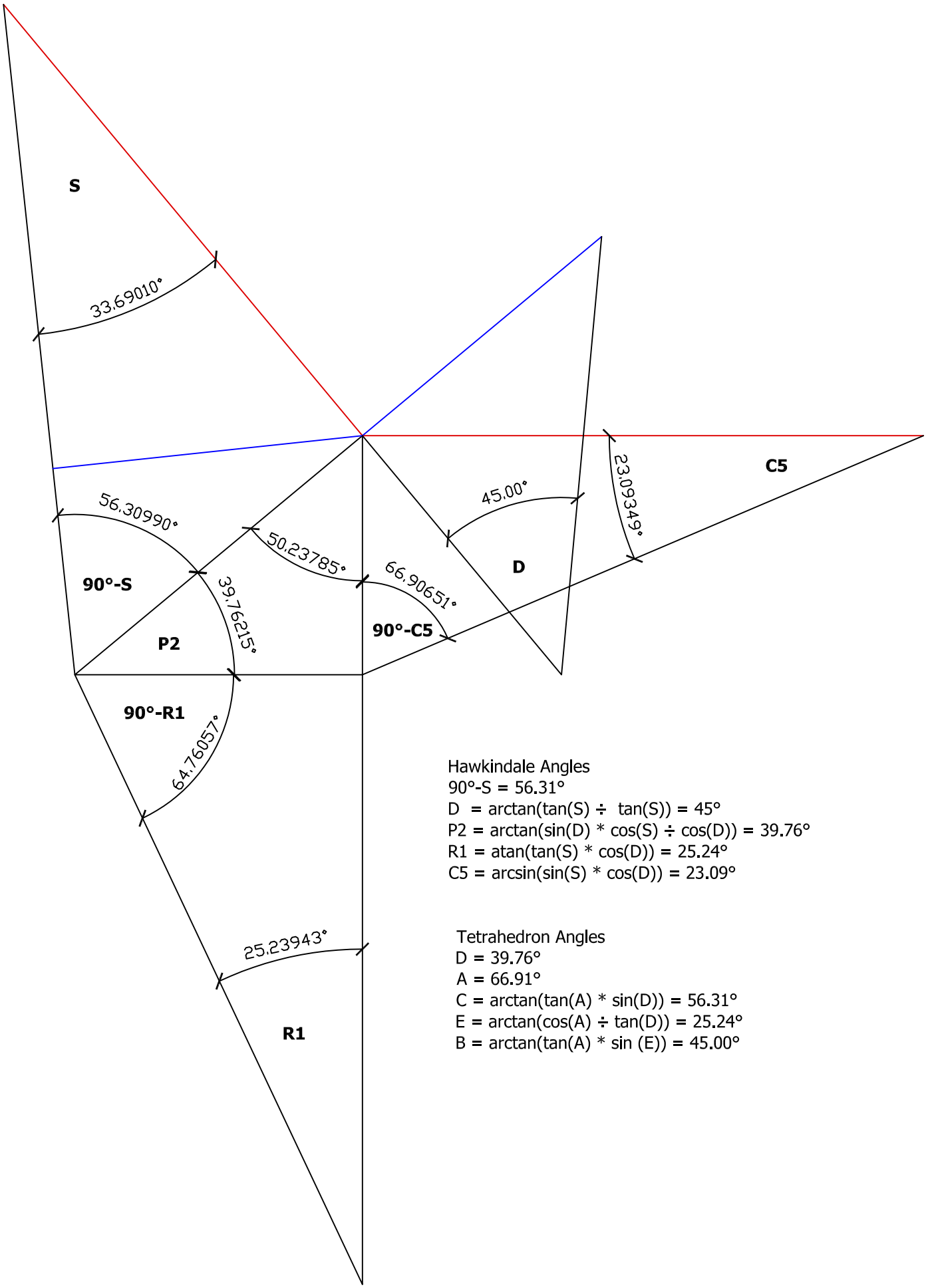
D A C E B Tetrahedron Angles
90°-S D P5 A7 P5BV Hawkindale Angles



Hawkindale Angles
90°-S = 56.31°
D = arctan(tan(S) ÷ tan(S)) = 45°
P5 = arctan(sin(D) * cos(S) ÷ cos(D)) = 39.76°
A7 = atan(tan(S) * cos(D)) = 25.24°
P5BV = arcsin(sin(S) * cos(D)) = 23.09°

Tetrahedron Angles
D = 56.31°
A = 45°
C = arctan(tan(A) * sin(D)) = 39.76°
E = arctan(cos(A) ÷ tan(D)) = 25.24°
B = arctan(tan(A) * sin (E)) = 23.09°

D	A	C	E	B	Tetrahedron Angles
P2	90°-C5	90°-S	R1	D	Hawkindale Angles



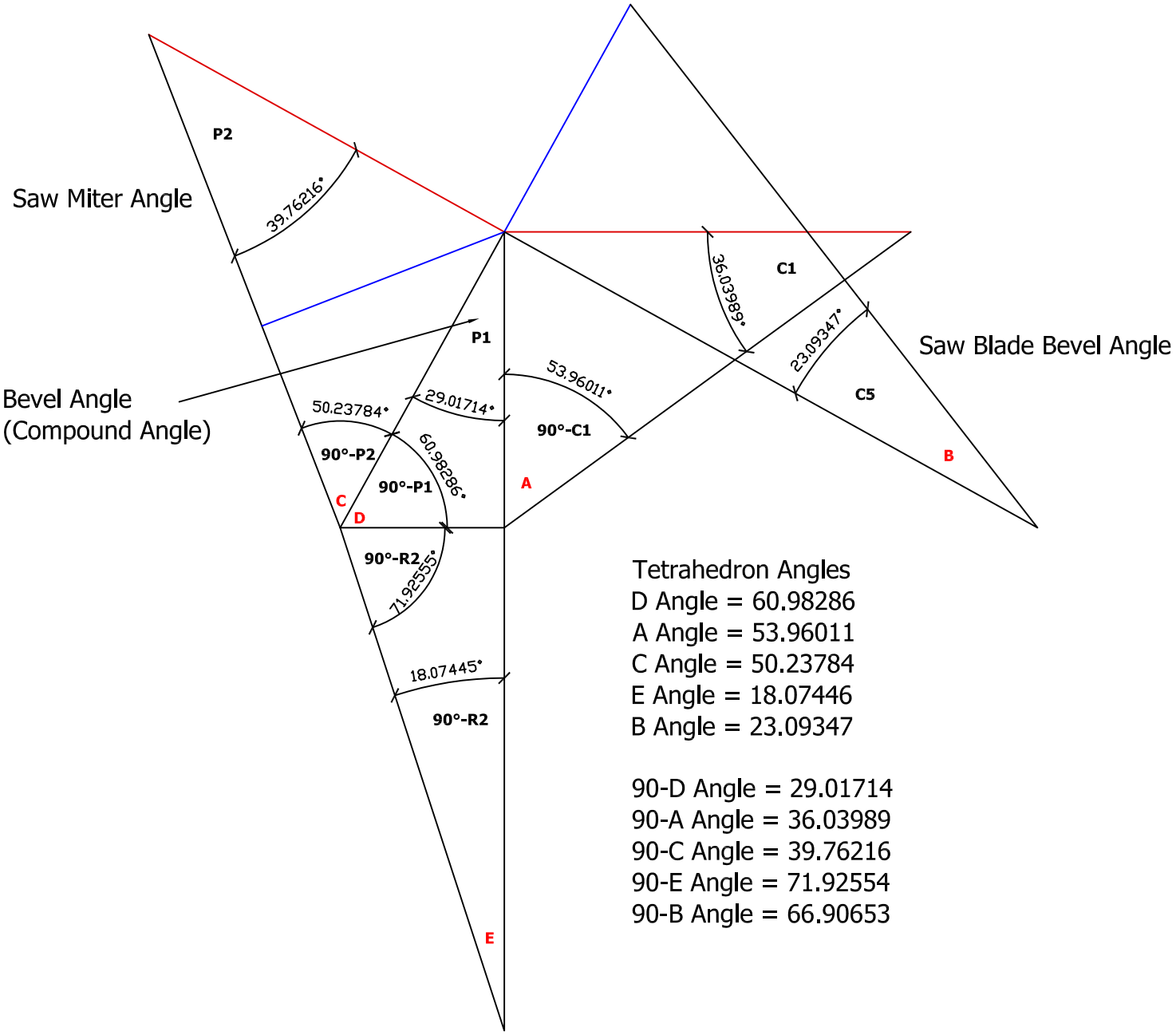
Hawkindale Angles
90°-S = 56.31°
D = arctan(tan(S) ÷ tan(S)) = 45°
P2 = arctan(sin(D) * cos(S) ÷ cos(D)) = 39.76°
R1 = atan(tan(S) * cos(D)) = 25.24°
C5 = arcsin(sin(S) * cos(D)) = 23.09°

Tetrahedron Angles
D = 39.76°
A = 66.91°
C = arctan(tan(A) * sin(D)) = 56.31°
E = arctan(cos(A) ÷ tan(D)) = 25.24°
B = arctan(tan(A) * sin (E)) = 45.00°

Tetrahedron Extracted from Roof Sheathing Cut
Saw Miter Angle = 39.76°
Saw Blade Bevel Angle = 23.09°

Saw Blade Bevel of 23.09° produces 29.02° Bevel Angle

D	A	C	E	B	Tetrahedron Angles
90°-P1	90°-C1	90°-P2	R2	C5	Hawkindale Angles



Tetrahedron Angles
D Angle = 60.98286
A Angle = 53.96011
C Angle = 50.23784
E Angle = 18.07446
B Angle = 23.09347

90-D Angle = 29.01714
90-A Angle = 36.03989
90-C Angle = 39.76216
90-E Angle = 71.92554
90-B Angle = 66.90653

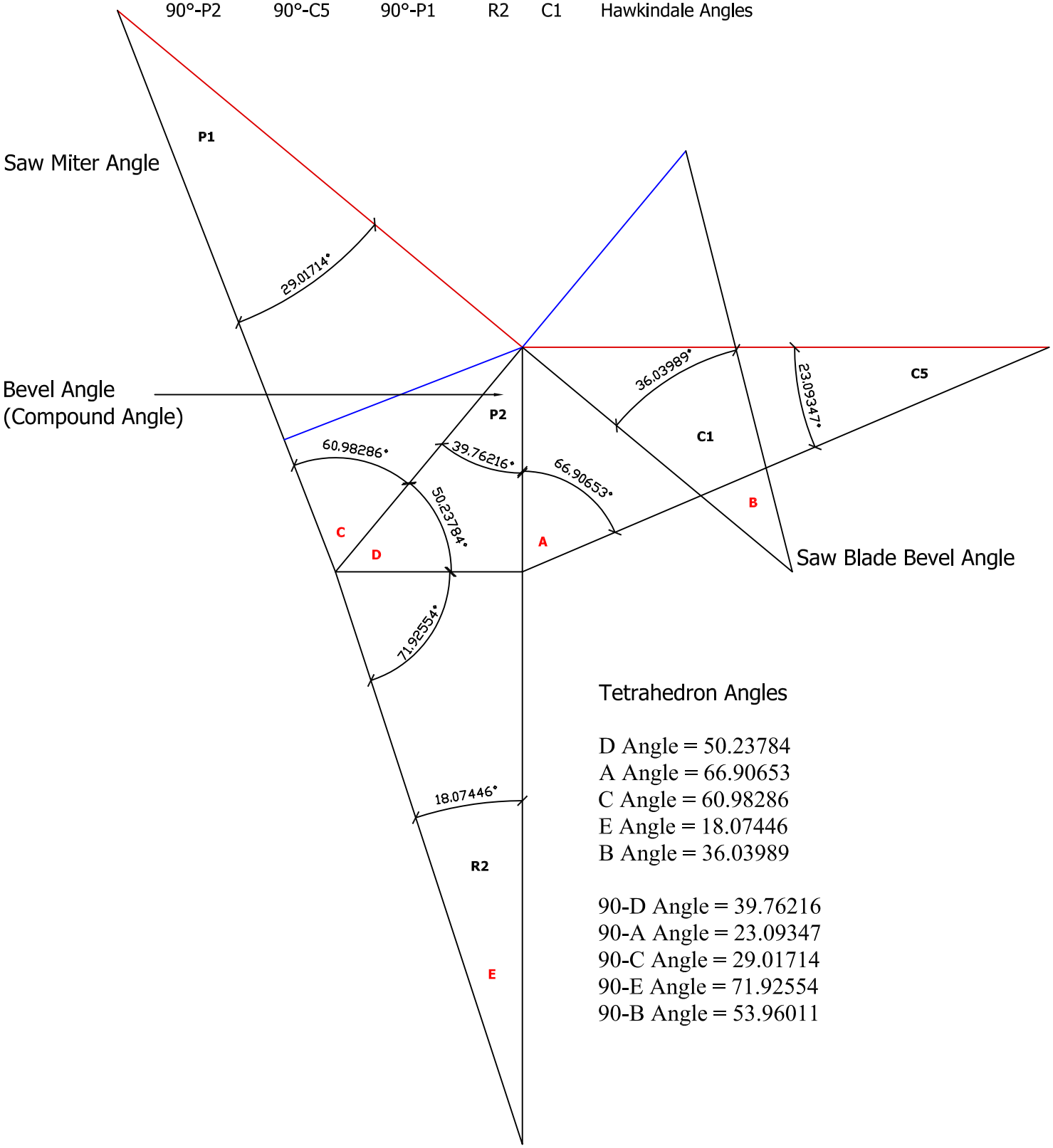
Face set in surface of the roof ...
Saw Miter Angle = **P2** = 39.76216° (Jack Rafter Side Cut Angle)
Saw Blade Bevel Angle = **C5** = 23.09347° (Backing Angle)

Cut produces Bevel Angle (compound angle) = **P1** = 29.02° on face set perpendicluar to roof surface

Tetrahedron Extracted from Roof Sheathing Cut
Saw Miter Angle = 29.02°
Saw Blade Bevel Angle = 36.04°

Saw Blade Bevel of 36.04° produces 39.76° Bevel Angle

D	A	C	E	B	Tetrahedron Angles
90°-P2	90°-C5	90°-P1	R2	C1	Hawkindale Angles



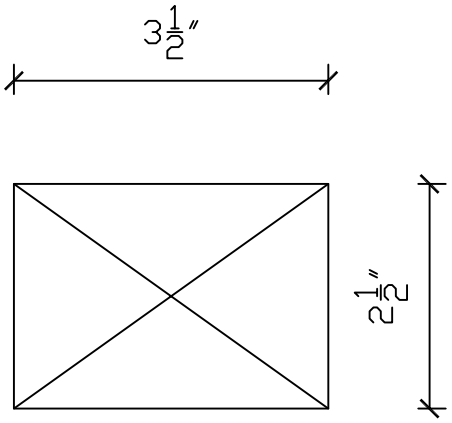
Tetrahedron Angles

D Angle = 50.23784
A Angle = 66.90653
C Angle = 60.98286
E Angle = 18.07446
B Angle = 36.03989

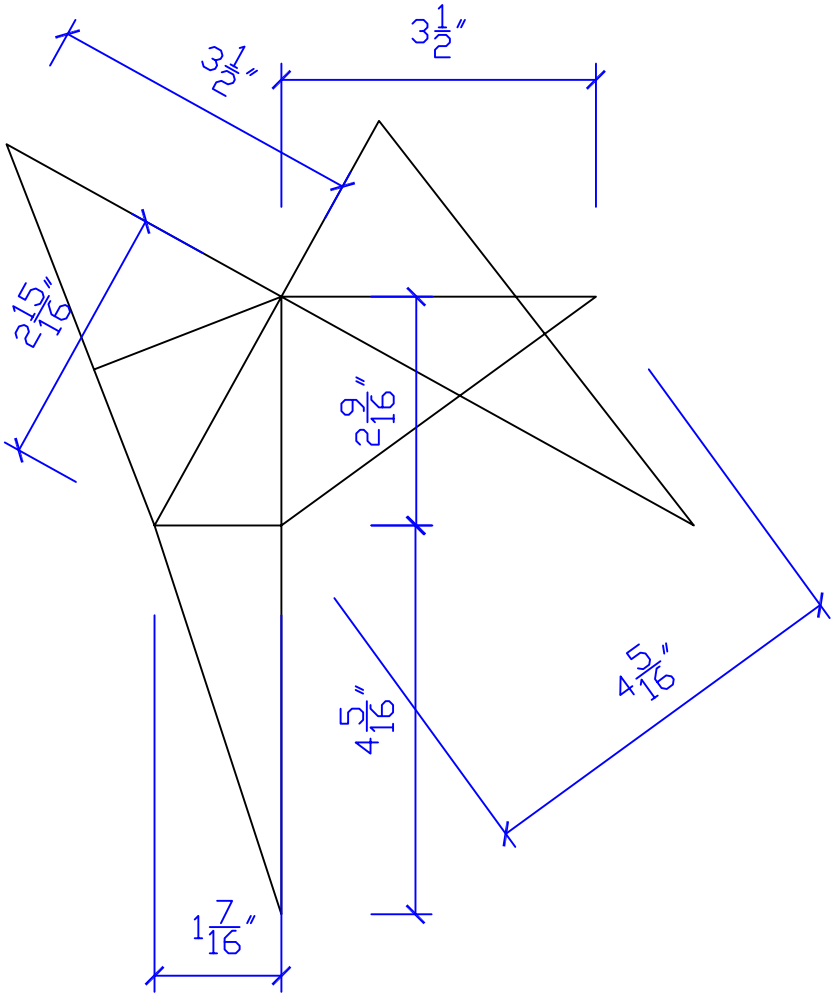
90-D Angle = 39.76216
90-A Angle = 23.09347
90-C Angle = 29.01714
90-E Angle = 71.92554
90-B Angle = 53.96011

Face perpendicular to surface of roof ...
Saw Miter Angle = **P1** = 29.01714° (Frieze Block Miter Angle)
Saw Blade Bevel Angle = **C1** = 36.03989° (Frieze Block Bevel angle)

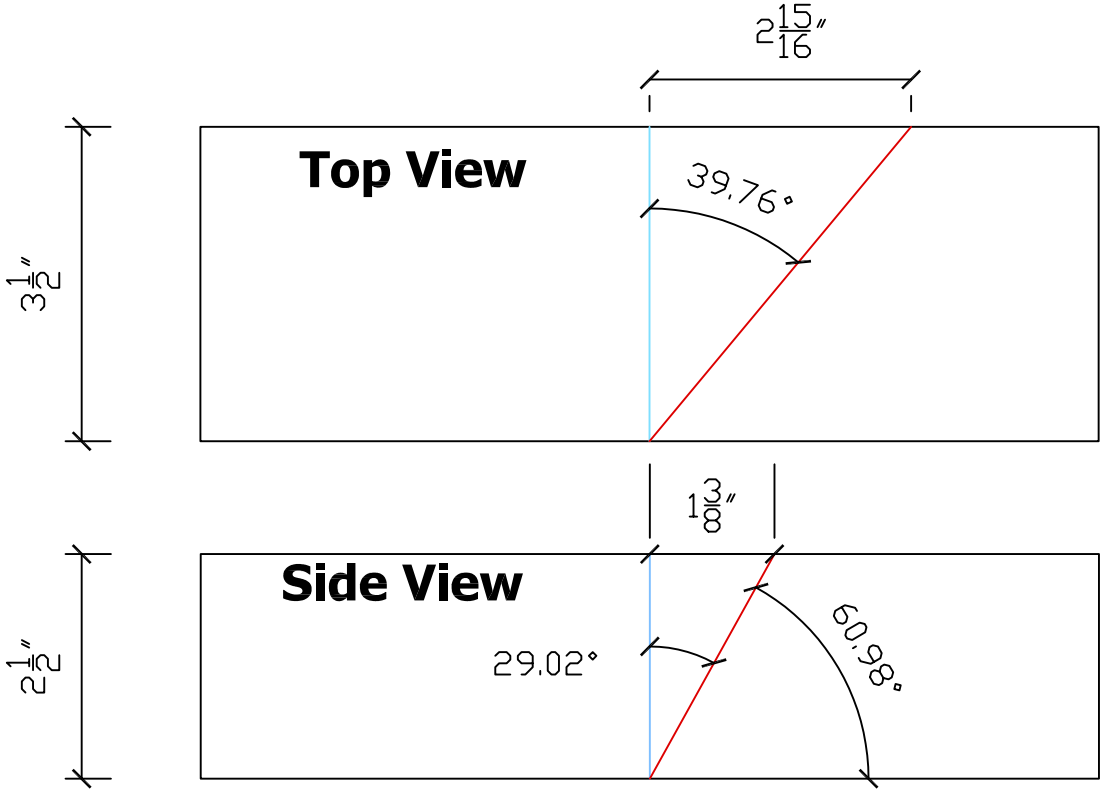
Cut produces Bevel Angle (compound angle) = **P2** = 39.76° on face set in roof surface



Actual Lumber Dimensions



Saw Miter Angle or Scribe Angle



Saw Blade Bevel of 23.09° produces Bevel Angle of 29.02°