# Answers to

1) $-\dfrac{4\pi}{3}$

2) $\dfrac{11\pi}{36}$

3) $\dfrac{\pi}{3}$

4) $-\dfrac{37\pi}{18}$

5) $-\dfrac{11\pi}{6}$

6) $-\dfrac{5\pi}{4}$

7) $\dfrac{5\pi}{3}$

8) $-\dfrac{47\pi}{12}$

9) $-\dfrac{\pi}{4}$

10) $\dfrac{11\pi}{3}$

11) 120°

12) -330°

13) 315°

14) 225°

15) -110°

16) -690°

17) 150°

18) -965°

19) 210°

20) -240°

21) -35°

22) 330°

23) $\dfrac{7\pi}{4}$

24) 140°

25) -90°

26) $\dfrac{\pi}{4}$

27) 780°

28) 245°

29) 270°

30) $\dfrac{43\pi}{36}$

31) -150°

32) $\dfrac{4\pi}{9}$

33) -255°

34) 530°

35) $\dfrac{5\pi}{9}$

36) -60°

37) 480°

38) $\dfrac{35\pi}{18}$

39) 165°

40) $-\dfrac{5\pi}{4}$

41) IV

42) I

43) II

44) I

45) II

46) III

47) II

48) III

49) III

50) IV

51) III

52) III

53) III

54) I

55) I

56) I

57) III

58) I

59) II

60) IV

61) −610°

62) −920°

63) 720°

64) 20°

65) −700°

66) −115°

67) −545°

68) 1060°

69) −860°

70) −590°

71) $\dfrac{9\pi}{2}$

72) $-\dfrac{7\pi}{3}$

73) $-\dfrac{13\pi}{4}$

74) $\dfrac{7\pi}{12}$

75) $\dfrac{13\pi}{12}$

76) $\dfrac{16\pi}{3}$

77) $\dfrac{41\pi}{9}$

78) $\dfrac{7\pi}{3}$

79) $-\dfrac{13\pi}{3}$

80) $\dfrac{25\pi}{6}$

81) $-\dfrac{14\pi}{3}$

82) 670°

83) −830°

84) 160°

85) $\dfrac{10\pi}{3}$

86) −750°

87) $\dfrac{16\pi}{3}$

88) $2\pi$

89) 905°

90) −390°

91) $-\dfrac{9\pi}{4}$

92) 520°

93) $-\dfrac{46\pi}{9}$

94) $-\dfrac{53\pi}{18}$

95) $-\dfrac{67\pi}{18}$

96) 875°

97) 750°

98) 950°

99) $-\dfrac{5\pi}{12}$

100) $\dfrac{25\pi}{12}$

101) 15°

102) 70°

103) 70°

104) 20°

105) 25°

106) 75°

107) 30°

108) 55°

109) 30°

110) 10°

111) $\dfrac{\pi}{3}$

112) $\dfrac{\pi}{4}$

113) $\dfrac{5\pi}{12}$    114) $\dfrac{\pi}{4}$    115) $\dfrac{4\pi}{9}$    116) $\dfrac{\pi}{18}$

117) $\dfrac{2\pi}{9}$    118) $\dfrac{2\pi}{9}$    119) $\dfrac{\pi}{6}$    120) $\dfrac{\pi}{4}$

121) 50°    122) 70°    123) $\dfrac{\pi}{3}$    124) $\dfrac{7\pi}{18}$

125) 60°    126) 40°    127) 85°    128) 65°

129) $\dfrac{\pi}{6}$    130) $\dfrac{\pi}{4}$    131) $\dfrac{\pi}{6}$    132) $\dfrac{\pi}{3}$

133) $\dfrac{5\pi}{12}$    134) $\dfrac{\pi}{12}$    135) 50°    136) $\dfrac{\pi}{12}$

137) 20°    138) $\dfrac{\pi}{4}$    139) 65°    140) 10°

141) 300°    142) 195°    143) 120°    144) 215°
145) 245°    146) 60°    147) 160°    148) 195°
149) 225°    150) 165°    151) $\dfrac{5\pi}{6}$    152) $\dfrac{11\pi}{12}$

153) $\dfrac{71\pi}{36}$    154) $\dfrac{11\pi}{6}$    155) $\dfrac{7\pi}{12}$    156) $\dfrac{14\pi}{9}$

157) $\dfrac{17\pi}{12}$    158) $\dfrac{\pi}{3}$    159) $\dfrac{11\pi}{18}$    160) $\dfrac{97\pi}{90}$

161) 35° and −685°    162) 180° and −180°    163) 25° and −695°    164) 75° and −645°
165) 586° and −134°    166) 45° and −315°    167) 265° and −95°    168) 240° and −480°
169) 140° and −580°    170) 90° and −630°    171) $\dfrac{119\pi}{90}$ and $-\dfrac{241\pi}{90}$

172) $\dfrac{9\pi}{4}$ and $-\dfrac{7\pi}{4}$    173) $\dfrac{7\pi}{6}$ and $-\dfrac{5\pi}{6}$    174) $\dfrac{31\pi}{12}$ and $-\dfrac{17\pi}{12}$    175) $\dfrac{19\pi}{6}$ and $-\dfrac{5\pi}{6}$

176) $\dfrac{95\pi}{36}$ and $-\dfrac{49\pi}{36}$    177) $\dfrac{\pi}{45}$ and $-\dfrac{179\pi}{45}$    178) 3π and −π    179) $\dfrac{5\pi}{2}$ and $-\dfrac{3\pi}{2}$

180) $\dfrac{15\pi}{4}$ and $-\dfrac{\pi}{4}$    181) 5π ft    182) $\dfrac{35\pi}{3}$ m    183) 10π in

184) 24π ft    185) $\dfrac{25\pi}{3}$ in    186) $\dfrac{27\pi}{2}$ km    187) $\dfrac{56\pi}{3}$ yd

188) 21π m    189) $\dfrac{9\pi}{4}$ cm    190) $\dfrac{45\pi}{4}$ m    191) $\dfrac{33\pi}{4}$ cm

192) $\dfrac{8\pi}{3}$ in    193) $\dfrac{13\pi}{4}$ cm    194) $\dfrac{15\pi}{2}$ cm    195) $\dfrac{57\pi}{4}$ cm

196) $\dfrac{44\pi}{3}$ km    197) 18π ft    198) 9π km    199) $\dfrac{65\pi}{4}$ in

200) 13π cm    201) $\dfrac{11\pi}{2}$ ft    202) $\dfrac{55\pi}{12}$ mi    203) 7π yd

204) $\dfrac{45\pi}{4}$ ft    205) $\dfrac{22\pi}{3}$ m    206) 10π cm    207) $\dfrac{55\pi}{4}$ km

208) 3π cm    209) $\dfrac{85\pi}{3}$ ft    210) 16π cm    211) $\dfrac{85\pi}{4}$ mi

212) $\dfrac{27\pi}{2}$ in

213) $\dfrac{55\pi}{6}$ km

214) $\dfrac{56\pi}{3}$ km

215) $\dfrac{9\pi}{2}$ cm

216) $\dfrac{51\pi}{2}$ yd

217) $\dfrac{20\pi}{3}$ mi

218) $5\pi$ in

219) $\dfrac{28\pi}{3}$ yd

220) $20\pi$ mi

221) $\dfrac{375\pi}{4}$ in²

222) $25\pi$ m²

223) $\dfrac{363\pi}{4}$ cm²

224) $\dfrac{243\pi}{4}$ ft²

225) $\dfrac{25\pi}{2}$ mi²

226) $\dfrac{49\pi}{2}$ km²

227) $64\pi$ mi²

228) $\dfrac{25\pi}{8}$ km²

229) $192\pi$ yd²

230) $24\pi$ mi²

231) $\dfrac{297\pi}{8}$ cm²

232) $9\pi$ yd²

233) $\dfrac{28\pi}{3}$ ft²

234) $\dfrac{245\pi}{8}$ ft²

235) $120\pi$ km²

236) $\dfrac{25\pi}{2}$ yd²

237) $\dfrac{75\pi}{8}$ km²

238) $49\pi$ mi²

239) $\dfrac{343\pi}{2}$ mi²

240) $60\pi$ m²

241) $48\pi$ cm²

242) $\dfrac{121\pi}{6}$ km²

243) $75\pi$ mi²

244) $90\pi$ mi²

245) $\dfrac{32\pi}{3}$ cm²

246) $147\pi$ km²

247) $16\pi$ m²

248) $192\pi$ ft²

249) $27\pi$ in²

250) $\dfrac{605\pi}{6}$ km²

251) $\dfrac{363\pi}{4}$ km²

252) $\dfrac{1183\pi}{8}$ mi²

253) $\dfrac{121\pi}{8}$ yd²

254) $160\pi$ m²

255) $\dfrac{98\pi}{3}$ ft²

256) $\dfrac{175\pi}{2}$ m²

257) $49\pi$ km²

258) $\dfrac{200\pi}{3}$ yd²

259) $\dfrac{128\pi}{3}$ ft²

260) $192\pi$ mi²

261) $\dfrac{8}{17}$

262) $\dfrac{5}{3}$

263) $\dfrac{3}{2}$

264) $\dfrac{\sqrt{10}}{10}$

265) $\dfrac{5}{4}$

266) $\dfrac{5\sqrt{19}}{57}$

267) $\dfrac{13}{5}$

268) $\dfrac{3}{5}$

269) $\dfrac{5}{12}$

270) $\dfrac{\sqrt{13}}{2}$

271) $\dfrac{7\sqrt{2}}{12}$

272) $\dfrac{\sqrt{13}}{3}$

273) $\dfrac{25}{7}$

274) $\dfrac{19\sqrt{3}}{24}$

275) $\dfrac{13}{12}$

276) $\dfrac{15}{8}$

277) $\dfrac{4}{5}$

278) $\dfrac{4}{3}$

279) $\dfrac{3}{2}$

280) $\dfrac{15}{8}$

281) $\dfrac{17}{8}$

282) $\dfrac{12}{5}$

283) $\dfrac{12}{13}$

284) $\dfrac{25}{7}$

285) $\dfrac{3}{5}$

286) $\dfrac{13\sqrt{17}}{85}$

287) $\dfrac{3}{4}$

288) $\sqrt{2}$

289) $\dfrac{3}{5}$

290) $\dfrac{3}{5}$

291) $\dfrac{17}{15}$

292) $\dfrac{8}{15}$

293) $\dfrac{6}{5}$

294) $\dfrac{4}{3}$

295) $\dfrac{3}{5}$

296) $\dfrac{4}{3}$

297) $\dfrac{3}{2}$

298) $\dfrac{7}{25}$

299) $\dfrac{19}{11}$

300) $-\dfrac{3}{2}$

301) $\dfrac{\sqrt{3}}{2}$

302) $\dfrac{\sqrt{5}}{3}$

303) $-\dfrac{\sqrt{17}}{9}$

304) $-\dfrac{\sqrt{2}}{2}$

305) $-\dfrac{\sqrt{15}}{7}$

306) $-\dfrac{\sqrt{10}}{3}$

307) $\dfrac{16\sqrt{17}}{85}$

308) $-\dfrac{6\sqrt{11}}{11}$

309) $-\dfrac{4}{3}$

310) $1$

311) $-\dfrac{3}{4}$

312) $\dfrac{8}{9}$

313) $-\sqrt{2}$

314) $-\dfrac{1}{2}$

315) $-\dfrac{4\sqrt{7}}{7}$

316) $\dfrac{3\sqrt{10}}{10}$

317) $-\dfrac{3}{4}$

318) $-\dfrac{3\sqrt{5}}{5}$

319) $-\dfrac{\sqrt{17}}{9}$

320) $2$

321) $\dfrac{9}{8}$

322) $\dfrac{6}{5}$

323) $\dfrac{2}{3}$

324) $-2$

325) $\dfrac{17\sqrt{13}}{65}$

326) $-\dfrac{\sqrt{11}}{6}$

327) $-\dfrac{\sqrt{11}}{6}$

328) $\dfrac{2\sqrt{5}}{5}$

329) $-1$

330) $-\dfrac{\sqrt{15}}{7}$

331) $\dfrac{\sqrt{11}}{6}$

332) $\dfrac{\sqrt{3}}{3}$

333) $\dfrac{8\sqrt{15}}{15}$

334) $\dfrac{2\sqrt{5}}{5}$

335) $\dfrac{4}{5}$

336) $\sqrt{10}$

337) $-\dfrac{3\sqrt{5}}{5}$

338) $-\dfrac{5}{3}$

339) $-\dfrac{2\sqrt{3}}{3}$

340) $\sqrt{3}$

341) $-2$

342) $1$

343) $\dfrac{2\sqrt{3}}{3}$

344) $\sqrt{2}$

345) $-\dfrac{\sqrt{3}}{3}$

346) Undefined

347) $\sqrt{2}$

348) $\dfrac{\sqrt{3}}{3}$

349) $\sqrt{2}$

350) $-1$

351) $-\dfrac{\sqrt{3}}{3}$

352) $1$

353) $\dfrac{2\sqrt{3}}{3}$

354) $\dfrac{\sqrt{3}}{2}$

355) $\sqrt{3}$

356) $0$

357) Undefined

358) $-1$

359) $-1$

360) $\dfrac{\sqrt{3}}{2}$

361) $\dfrac{2\sqrt{3}}{3}$

362) $\sqrt{2}$

363) $-1$

364) $-\sqrt{2}$

365) $\dfrac{\sqrt{3}}{3}$

366) $2$

367) $\dfrac{\sqrt{2}}{2}$

368) $\dfrac{\sqrt{3}}{3}$

369) $-1$

370) $0$

371) Undefined

372) $2$

373) $\dfrac{1}{2}$

374) $-\sqrt{3}$

375) $2$

376) $0$

377) $-1$

378) $-\dfrac{1}{2}$

379) $\left\{\dfrac{\pi}{3}, \dfrac{5\pi}{3}\right\}$

380) $\left\{\dfrac{7\pi}{6}, \dfrac{11\pi}{6}\right\}$

381) No solution.

382) $\left\{\dfrac{\pi}{4}, \dfrac{5\pi}{4}\right\}$

383) $\left\{\dfrac{\pi}{4}, \dfrac{3\pi}{4}\right\}$

384) $\left\{\dfrac{\pi}{3}, \dfrac{5\pi}{3}\right\}$

385) $\{0, \pi\}$

386) $\{0\}$

387) $\left\{\dfrac{5\pi}{4}, \dfrac{7\pi}{4}\right\}$

388) $\left\{\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right\}$

389) $\left\{\dfrac{\pi}{3}, \dfrac{2\pi}{3}\right\}$

390) $\left\{\dfrac{2\pi}{3}, \dfrac{4\pi}{3}\right\}$

391) $\left\{\dfrac{2\pi}{3}, \dfrac{5\pi}{3}\right\}$

392) $\left\{\dfrac{\pi}{3}, \dfrac{4\pi}{3}\right\}$

393) $\left\{\dfrac{\pi}{3}, \dfrac{4\pi}{3}\right\}$

394) $\left\{\dfrac{3\pi}{4}, \dfrac{5\pi}{4}\right\}$

395) $\left\{\dfrac{4\pi}{3}, \dfrac{5\pi}{3}\right\}$

396) No solution.

397) $\left\{\dfrac{3\pi}{4}, \dfrac{7\pi}{4}\right\}$

398) $\left\{\dfrac{\pi}{4}, \dfrac{5\pi}{4}\right\}$

399) $\left\{\dfrac{5\pi}{4}, \dfrac{7\pi}{4}\right\}$

400) $\left\{\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right\}$

401) $\left\{\dfrac{2\pi}{3}, \dfrac{5\pi}{3}\right\}$

402) $\left\{\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right\}$

403) $\left\{\dfrac{5\pi}{6}, \dfrac{7\pi}{6}\right\}$

404) $\left\{\dfrac{2\pi}{3}, \dfrac{4\pi}{3}\right\}$

405) $\left\{\dfrac{4\pi}{3}, \dfrac{5\pi}{3}\right\}$

406) $\{\pi\}$

407) $\{0, \pi\}$

408) $\left\{\dfrac{7\pi}{6}, \dfrac{11\pi}{6}\right\}$

409) $\left\{\dfrac{\pi}{3}, \dfrac{5\pi}{3}\right\}$

410) $\left\{\dfrac{5\pi}{4}, \dfrac{7\pi}{4}\right\}$

411) $\{0, \pi\}$

412) $\left\{\dfrac{5\pi}{4}, \dfrac{7\pi}{4}\right\}$

413) $\left\{\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right\}$

414) $\left\{\dfrac{\pi}{4}, \dfrac{5\pi}{4}\right\}$

415) $\left\{\dfrac{4\pi}{3}, \dfrac{5\pi}{3}\right\}$

416) $\{0, \pi\}$

417) $\{0\}$

418) $\{0\}$

419) $\left\{\dfrac{3\pi}{4}, \dfrac{7\pi}{4}\right\}$

423) $\{0, \pi\}$

420) $\left\{\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right\}$

421) $\left\{\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right\}$

422) $\left\{\dfrac{\pi}{3}, \dfrac{5\pi}{3}\right\}$

424) $\left\{\dfrac{3\pi}{4}, \dfrac{5\pi}{4}\right\}$

425) $\left\{\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right\}$

426) $\left\{\dfrac{\pi}{4}, \dfrac{5\pi}{4}\right\}$

427) $\left\{\dfrac{3\pi}{2}\right\}$

428) $\left\{\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right\}$

429) $\left\{\dfrac{2\pi}{3}, \dfrac{5\pi}{3}\right\}$

430) $\left\{\dfrac{7\pi}{6}, \dfrac{11\pi}{6}\right\}$

431) $\left\{\dfrac{3\pi}{4}, \dfrac{7\pi}{4}\right\}$

432) $\left\{\dfrac{2\pi}{3}, \dfrac{4\pi}{3}\right\}$

433) $\left\{\dfrac{2\pi}{3}, \dfrac{4\pi}{3}\right\}$

434) $\left\{\dfrac{4\pi}{3}, \dfrac{5\pi}{3}\right\}$

435) $\{0\}$

436) $\left\{\dfrac{\pi}{6}, \dfrac{5\pi}{6}\right\}$

437) No solution.

438) $\left\{\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right\}$

439) $\left\{\dfrac{3\pi}{8}, \dfrac{7\pi}{8}, \dfrac{11\pi}{8}, \dfrac{15\pi}{8}\right\}$

440) $\left\{\dfrac{\pi}{12}, \dfrac{\pi}{6}, \dfrac{7\pi}{12}, \dfrac{2\pi}{3}, \dfrac{13\pi}{12}, \dfrac{7\pi}{6}, \dfrac{19\pi}{12}, \dfrac{5\pi}{3}\right\}$

441) $\{0\}$

442) $\{\pi\}$

443) $\left\{\dfrac{\pi}{24}, \dfrac{7\pi}{24}, \dfrac{13\pi}{24}, \dfrac{19\pi}{24}, \dfrac{25\pi}{24}, \dfrac{31\pi}{24}, \dfrac{37\pi}{24}, \dfrac{43\pi}{24}\right\}$

444) No solution.

445) $\left\{\dfrac{\pi}{4}, \dfrac{3\pi}{4}, \dfrac{5\pi}{4}, \dfrac{7\pi}{4}\right\}$

446) $\left\{\dfrac{5\pi}{12}, \dfrac{11\pi}{12}, \dfrac{17\pi}{12}, \dfrac{23\pi}{12}\right\}$

447) $\{\pi\}$

448) $\left\{\dfrac{7\pi}{24}, \dfrac{11\pi}{24}, \dfrac{19\pi}{24}, \dfrac{23\pi}{24}, \dfrac{31\pi}{24}, \dfrac{35\pi}{24}, \dfrac{43\pi}{24}, \dfrac{47\pi}{24}\right\}$

449) $\left\{\dfrac{\pi}{3}, \dfrac{5\pi}{3}\right\}$

450) $\left\{\pi, \dfrac{3\pi}{2}\right\}$

451) $\left\{\dfrac{19\pi}{12}, \dfrac{23\pi}{12}\right\}$

452) $\left\{\dfrac{13\pi}{12}, \dfrac{19\pi}{12}\right\}$

453) No solution.

454) No solution.

455) $\left\{\dfrac{\pi}{3}, \dfrac{4\pi}{3}\right\}$

456) $\left\{0, \dfrac{2\pi}{3}\right\}$

457) $\left\{\dfrac{2\pi}{3}, \pi\right\}$

458) $\left\{\dfrac{5\pi}{6}, \dfrac{3\pi}{2}\right\}$

459) $\left\{\dfrac{11\pi}{12}, \dfrac{23\pi}{12}\right\}$

460) $\left\{\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right\}$

461) $\left\{\dfrac{\pi}{6}\right\}$

462) $\left\{\dfrac{\pi}{6}, \dfrac{5\pi}{6}, \dfrac{7\pi}{6}, \dfrac{11\pi}{6}\right\}$

463) $\left\{\dfrac{7\pi}{12}, \dfrac{11\pi}{12}, \dfrac{19\pi}{12}, \dfrac{23\pi}{12}\right\}$

464) No solution.

465) No solution.

466) $\{0, \pi\}$

467) $\left\{\dfrac{2\pi}{3}\right\}$

468) $\{0\}$

469) $\left\{\dfrac{\pi}{8}, \dfrac{3\pi}{8}, \dfrac{9\pi}{8}, \dfrac{11\pi}{8}\right\}$

470) No solution.

471) $\left\{\dfrac{5\pi}{12}, \dfrac{7\pi}{12}, \dfrac{17\pi}{12}, \dfrac{19\pi}{12}\right\}$

472) $\left\{\dfrac{7\pi}{6}, \dfrac{11\pi}{6}\right\}$

473) $\left\{\dfrac{3\pi}{2}\right\}$

474) $\left\{\dfrac{\pi}{16}, \dfrac{5\pi}{16}, \dfrac{9\pi}{16}, \dfrac{13\pi}{16}, \dfrac{17\pi}{16}, \dfrac{21\pi}{16}, \dfrac{25\pi}{16}, \dfrac{29\pi}{16}\right\}$

475) $\left\{\dfrac{\pi}{4}, \dfrac{5\pi}{4}\right\}$

476) $\left\{\dfrac{\pi}{6}, \dfrac{\pi}{3}, \dfrac{2\pi}{3}, \dfrac{5\pi}{6}, \dfrac{7\pi}{6}, \dfrac{4\pi}{3}, \dfrac{5\pi}{3}, \dfrac{11\pi}{6}\right\}$

477) $\left\{\dfrac{5\pi}{12}, \dfrac{11\pi}{12}, \dfrac{17\pi}{12}, \dfrac{23\pi}{12}\right\}$

478) $\left\{\dfrac{\pi}{4}, \dfrac{3\pi}{4}, \dfrac{5\pi}{4}, \dfrac{7\pi}{4}\right\}$

479) $\left\{\dfrac{7\pi}{36}, \dfrac{19\pi}{36}, \dfrac{31\pi}{36}, \dfrac{43\pi}{36}, \dfrac{55\pi}{36}, \dfrac{67\pi}{36}\right\}$

480) $\left\{\dfrac{\pi}{8}, \dfrac{9\pi}{8}\right\}$

481) $\left\{\dfrac{\pi}{12}, \dfrac{\pi}{3}, \dfrac{7\pi}{12}, \dfrac{5\pi}{6}, \dfrac{13\pi}{12}, \dfrac{4\pi}{3}, \dfrac{19\pi}{12}, \dfrac{11\pi}{6}\right\}$

482) $\left\{\dfrac{\pi}{9}, \dfrac{5\pi}{9}, \dfrac{7\pi}{9}, \dfrac{11\pi}{9}, \dfrac{13\pi}{9}, \dfrac{17\pi}{9}\right\}$

483) $\left\{\dfrac{13\pi}{48}, \dfrac{19\pi}{48}, \dfrac{37\pi}{48}, \dfrac{43\pi}{48}, \dfrac{61\pi}{48}, \dfrac{67\pi}{48}, \dfrac{85\pi}{48}, \dfrac{91\pi}{48}\right\}$

484) $\left\{\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right\}$

485) $\left\{\dfrac{5\pi}{8}, \dfrac{7\pi}{8}, \dfrac{13\pi}{8}, \dfrac{15\pi}{8}\right\}$

486) $\left\{\dfrac{5\pi}{24}, \dfrac{17\pi}{24}, \dfrac{29\pi}{24}, \dfrac{41\pi}{24}\right\}$

487) $\left\{\dfrac{5\pi}{18}, \dfrac{11\pi}{18}, \dfrac{17\pi}{18}, \dfrac{23\pi}{18}, \dfrac{29\pi}{18}, \dfrac{35\pi}{18}\right\}$

488) $\left\{\dfrac{\pi}{6}, \dfrac{2\pi}{3}, \dfrac{7\pi}{6}, \dfrac{5\pi}{3}\right\}$

489) $\left\{0, \dfrac{\pi}{2}, \dfrac{2\pi}{3}, \dfrac{7\pi}{6}, \dfrac{4\pi}{3}, \dfrac{11\pi}{6}\right\}$

490) $\left\{\dfrac{\pi}{8}, \dfrac{3\pi}{8}, \dfrac{5\pi}{8}, \dfrac{7\pi}{8}, \dfrac{9\pi}{8}, \dfrac{11\pi}{8}, \dfrac{13\pi}{8}, \dfrac{15\pi}{8}\right\}$

491) $\left\{\dfrac{\pi}{4}, \dfrac{3\pi}{4}, \dfrac{5\pi}{4}, \dfrac{7\pi}{4}\right\}$

492) $\left\{\dfrac{5\pi}{36}, \dfrac{13\pi}{36}, \dfrac{29\pi}{36}, \dfrac{37\pi}{36}, \dfrac{53\pi}{36}, \dfrac{61\pi}{36}\right\}$

493) $\left\{\dfrac{\pi}{4}, \dfrac{5\pi}{12}, \dfrac{3\pi}{4}, \dfrac{11\pi}{12}, \dfrac{5\pi}{4}, \dfrac{17\pi}{12}, \dfrac{7\pi}{4}, \dfrac{23\pi}{12}\right\}$

494) $\left\{\dfrac{\pi}{24}, \dfrac{19\pi}{24}, \dfrac{25\pi}{24}, \dfrac{43\pi}{24}\right\}$

495) $\left\{\dfrac{7\pi}{24}, \dfrac{11\pi}{24}, \dfrac{31\pi}{24}, \dfrac{35\pi}{24}\right\}$

496) $\left\{\dfrac{3\pi}{2}\right\}$

497) No solution.

498) $\left\{\dfrac{5\pi}{6}\right\}$

499) $\{0\}$

500) $\left\{\dfrac{\pi}{8}, \dfrac{9\pi}{8}\right\}$

501) $\left\{0, \dfrac{\pi}{4}, \dfrac{\pi}{2}, \dfrac{3\pi}{4}, \pi, \dfrac{5\pi}{4}, \dfrac{3\pi}{2}, \dfrac{7\pi}{4}\right\}$

502) $\left\{\dfrac{\pi}{4}, \dfrac{7\pi}{12}, \dfrac{11\pi}{12}, \dfrac{5\pi}{4}, \dfrac{19\pi}{12}, \dfrac{23\pi}{12}\right\}$

503) $\left\{\dfrac{\pi}{6}, \dfrac{\pi}{2}, \dfrac{5\pi}{6}, \dfrac{7\pi}{6}, \dfrac{3\pi}{2}, \dfrac{11\pi}{6}\right\}$

504) $\left\{\dfrac{\pi}{4}, \dfrac{7\pi}{12}, \dfrac{5\pi}{4}, \dfrac{19\pi}{12}\right\}$

505) No solution.

506) $\left\{\dfrac{\pi}{24}, \dfrac{7\pi}{24}, \dfrac{13\pi}{24}, \dfrac{19\pi}{24}, \dfrac{25\pi}{24}, \dfrac{31\pi}{24}, \dfrac{37\pi}{24}, \dfrac{43\pi}{24}\right\}$

507) $\left\{\dfrac{5\pi}{12}, \dfrac{3\pi}{4}, \dfrac{17\pi}{12}, \dfrac{7\pi}{4}\right\}$

508) $\{0\}$

509) $\{0\}$

510) $\left\{\dfrac{5\pi}{6}, \dfrac{11\pi}{6}\right\}$

511) $\left\{\dfrac{7\pi}{18}, \dfrac{\pi}{2}, \dfrac{19\pi}{18}, \dfrac{7\pi}{6}, \dfrac{31\pi}{18}, \dfrac{11\pi}{6}\right\}$

512) $\left\{\dfrac{\pi}{2}, \dfrac{11\pi}{6}\right\}$

513) $\left\{\dfrac{\pi}{9}, \dfrac{7\pi}{9}, \dfrac{13\pi}{9}\right\}$

514) $\{0\}$

515) No solution.

516) $\left\{\dfrac{5\pi}{18}, \dfrac{11\pi}{18}, \dfrac{17\pi}{18}, \dfrac{23\pi}{18}, \dfrac{29\pi}{18}, \dfrac{35\pi}{18}\right\}$

517) $\left\{\dfrac{\pi}{24}, \dfrac{13\pi}{24}, \dfrac{25\pi}{24}, \dfrac{37\pi}{24}\right\}$

518) $\left\{\dfrac{2\pi}{3}, \dfrac{5\pi}{3}\right\}$

519) $\dfrac{5}{4}$

520) $\sqrt{2}$

521) $-\dfrac{\pi}{6}$

522) 0

523) $\dfrac{3}{16}$

524) $\dfrac{\pi}{4}$

525) $\dfrac{\sqrt{5}}{5}$

526) $\dfrac{\sqrt{19}}{10}$

527) $\dfrac{5}{12}$

528) $\dfrac{3\sqrt{34}}{34}$

529) $\dfrac{12}{13}$

530) $\dfrac{1}{2}$

531) $\dfrac{\sqrt{13}}{2}$

532) 4

533) $\dfrac{\sqrt{7}}{4}$

534) $\pi$

535) $-\dfrac{\pi}{2}$

536) $\dfrac{5}{3}$

537) $\dfrac{3\sqrt{3}}{14}$

538) 1

539) $-\dfrac{\pi}{6}$

540) 1

541) $\dfrac{3}{4}$

542) $\dfrac{5}{4}$

543) $-\dfrac{\pi}{3}$

544) $\dfrac{4}{3}$

545) $\dfrac{\sqrt{10}}{10}$

546) $\dfrac{\pi}{2}$

547) $\dfrac{5}{4}$

548) 1

549) $-\dfrac{\pi}{4}$

550) $\dfrac{19}{16}$

551) $\dfrac{\pi}{6}$

552) $\dfrac{16\sqrt{247}}{247}$

553) $-\dfrac{\pi}{4}$

554) $\dfrac{3\pi}{4}$

555) $-\dfrac{\pi}{2}$

556) $\dfrac{\pi}{2}$

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559)

Amplitude: 1
Period: 2π

560)

Amplitude: 1
Period: 2π
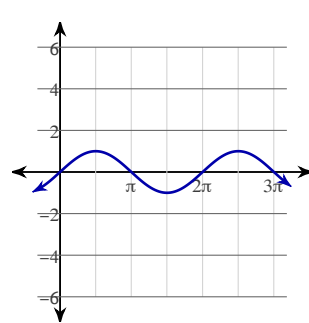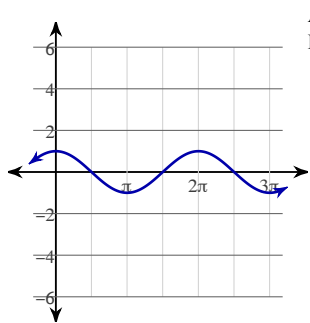
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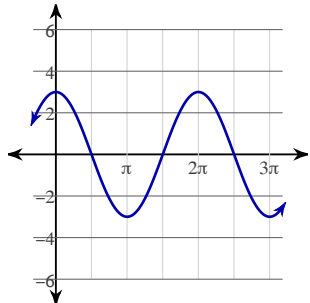
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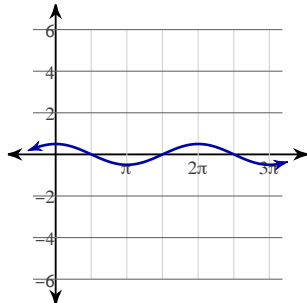
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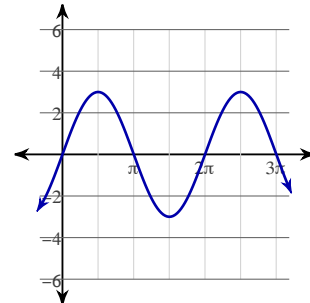
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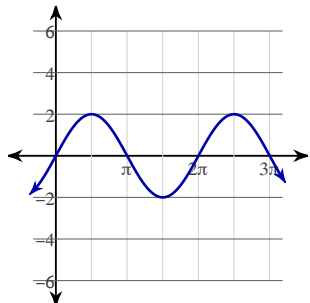
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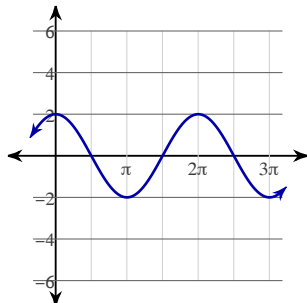
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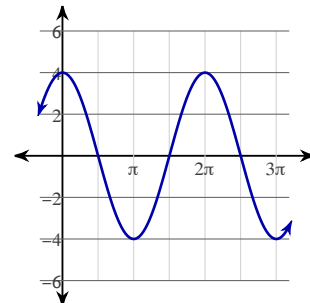
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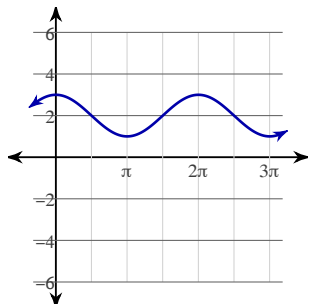
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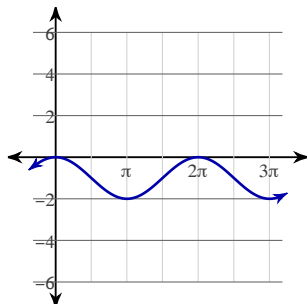
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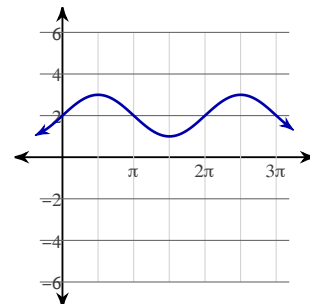
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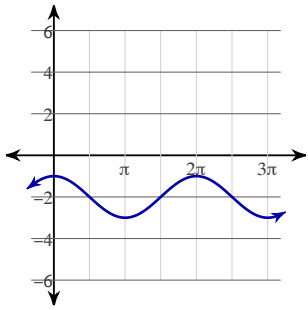
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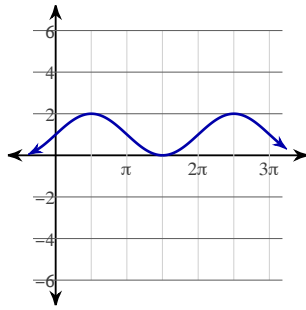
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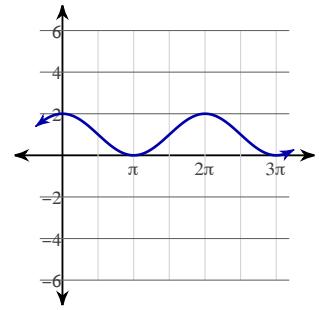
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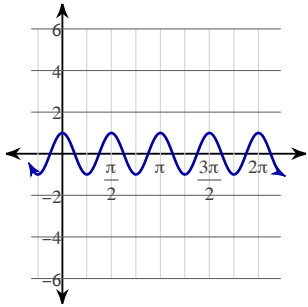
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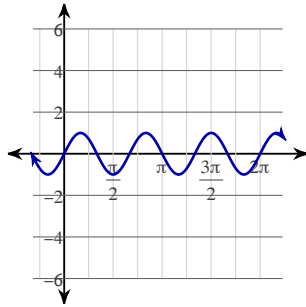
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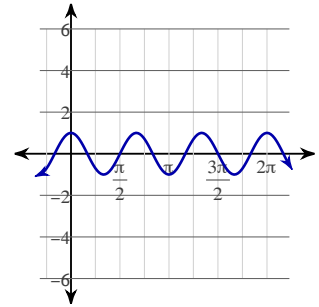
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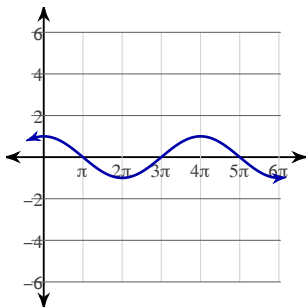
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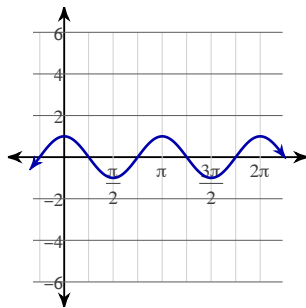
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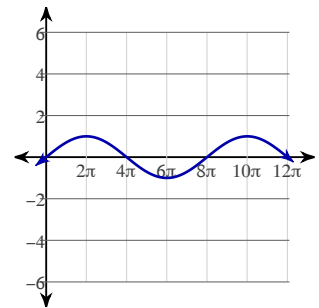
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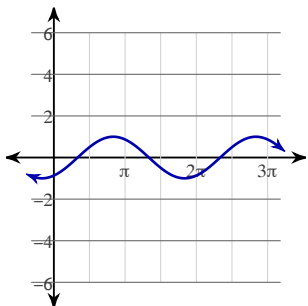
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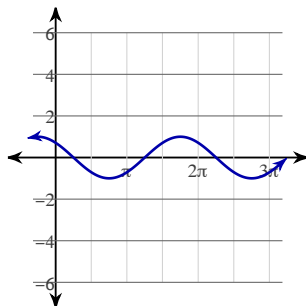
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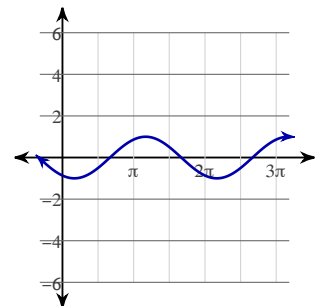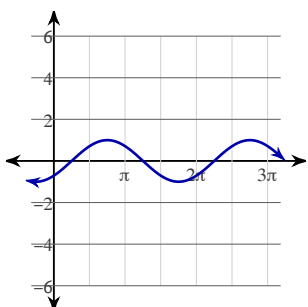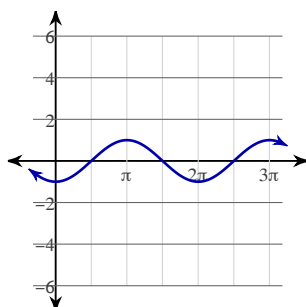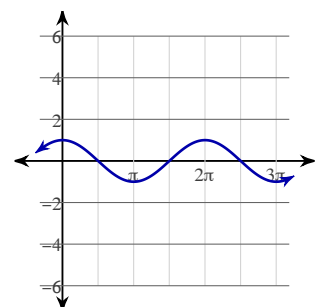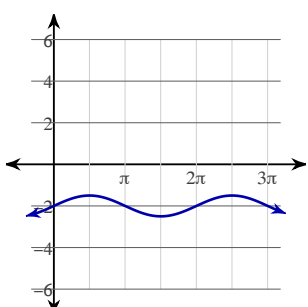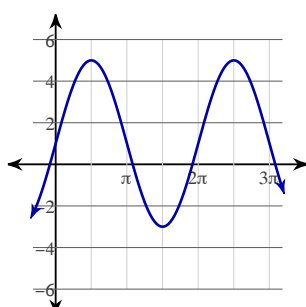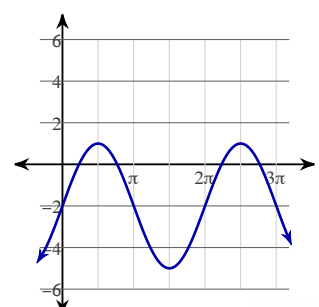
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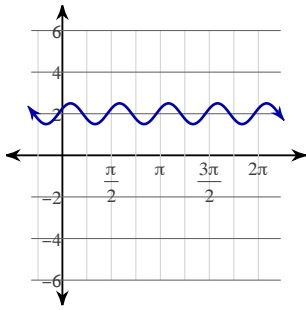
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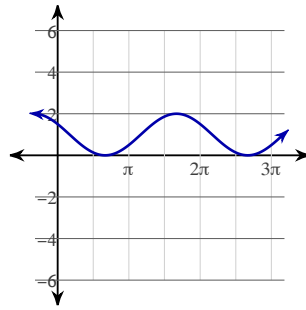
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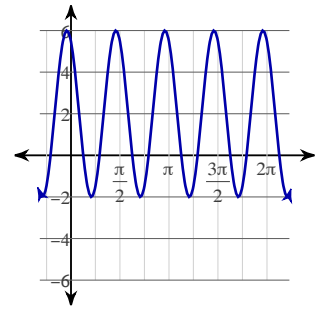
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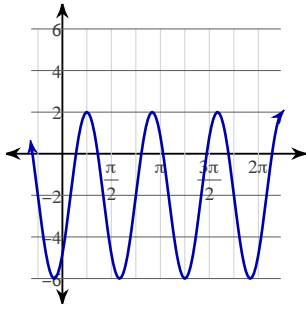
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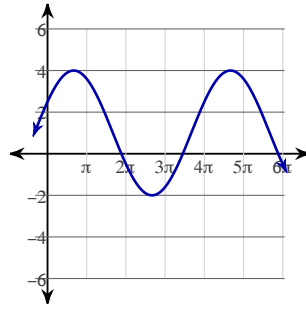
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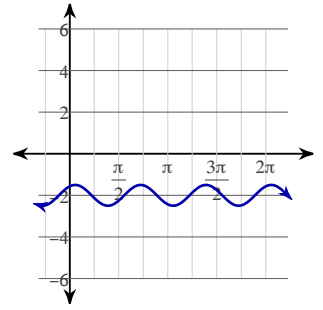
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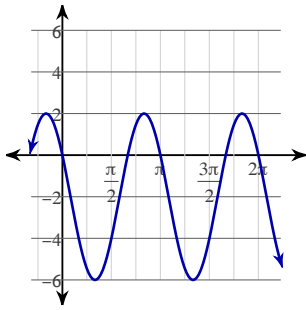
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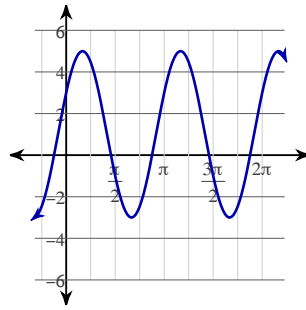
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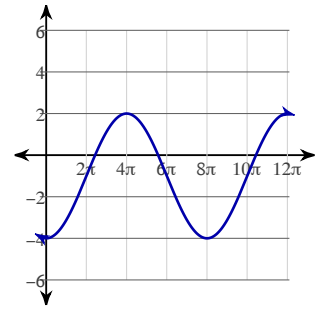
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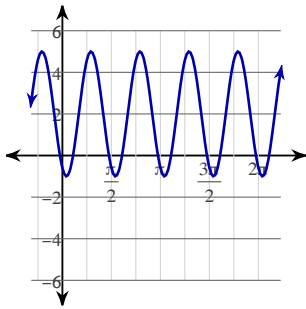
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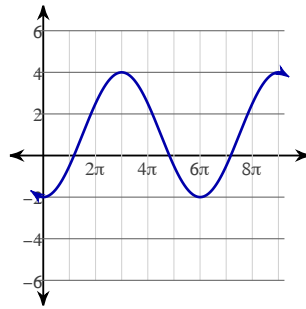
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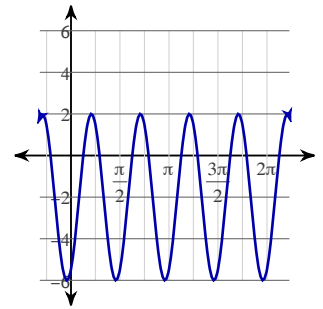
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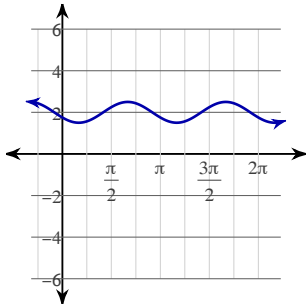
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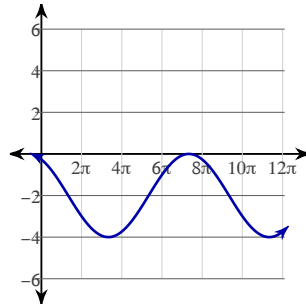
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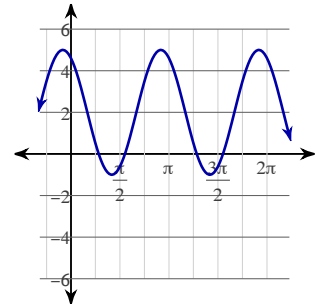
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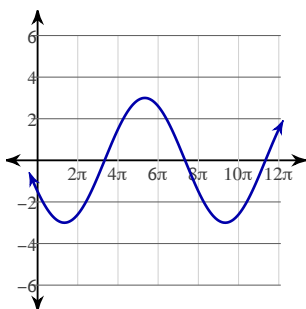
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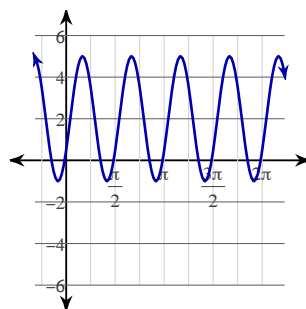
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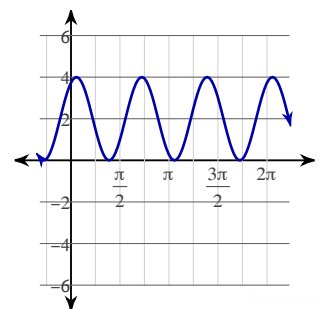
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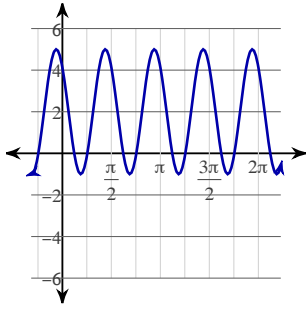


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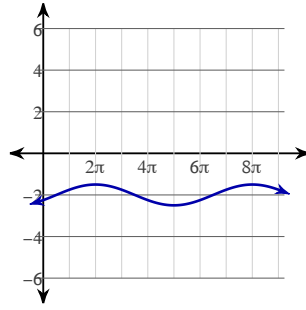


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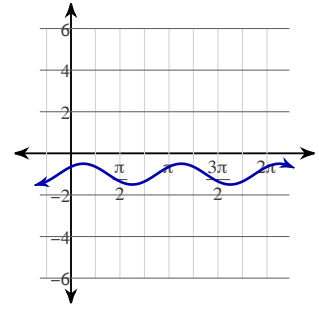


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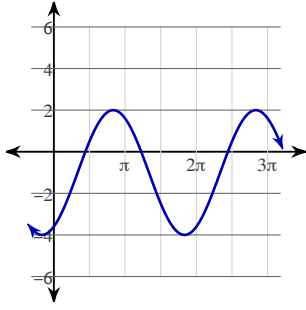


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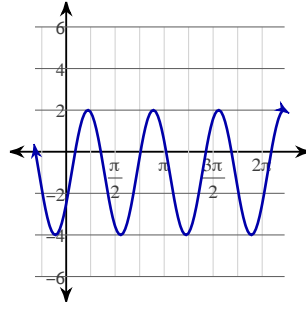


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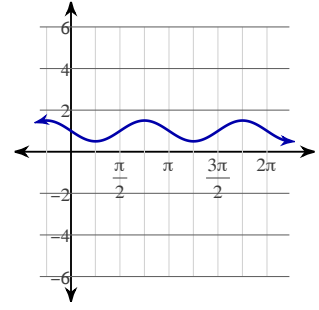


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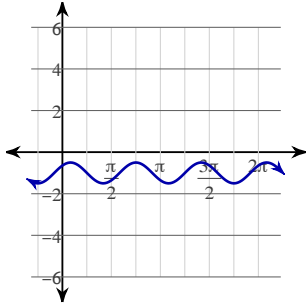


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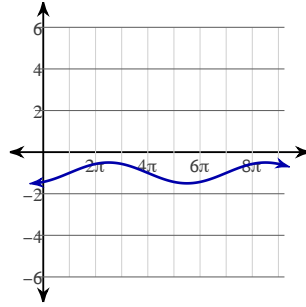


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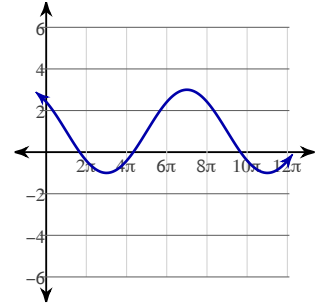


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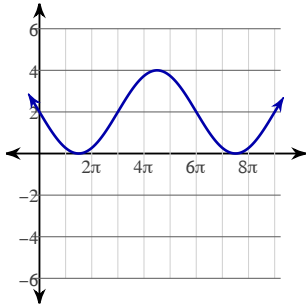


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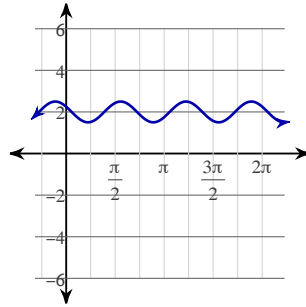


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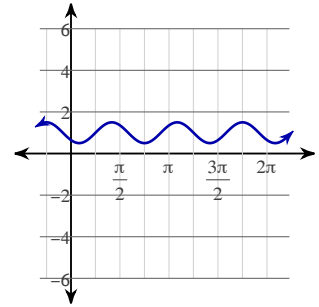


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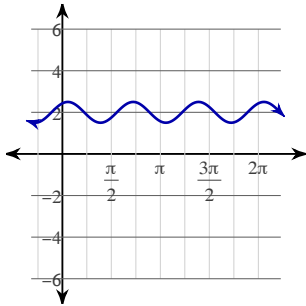


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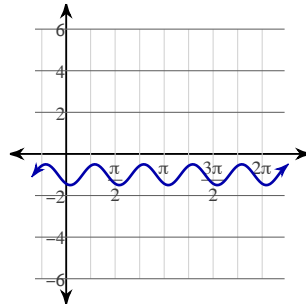


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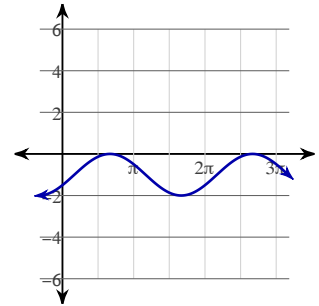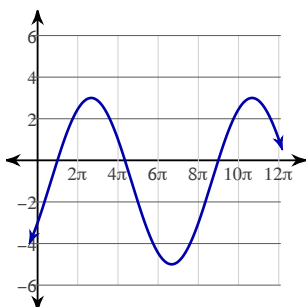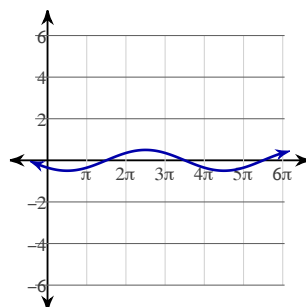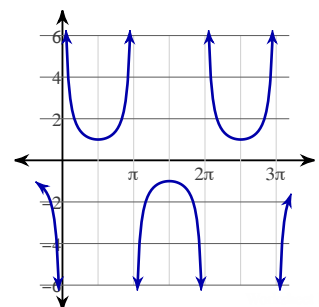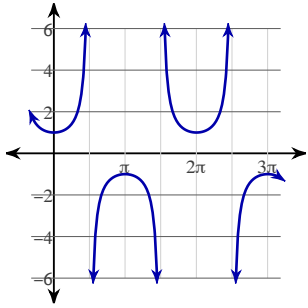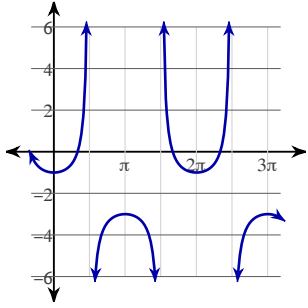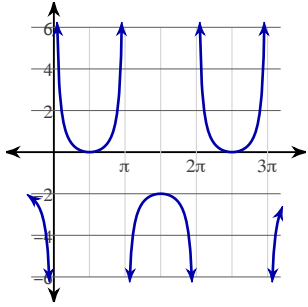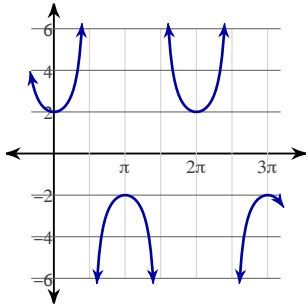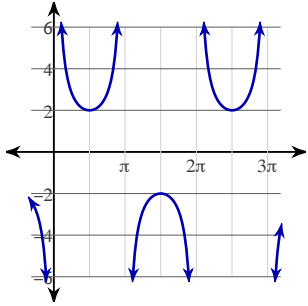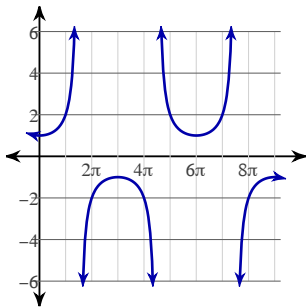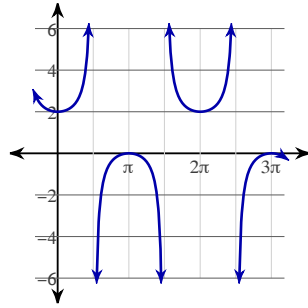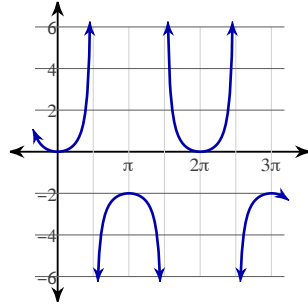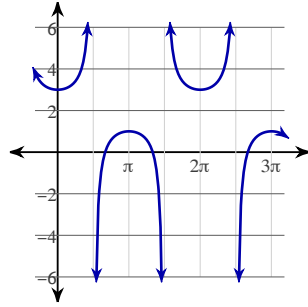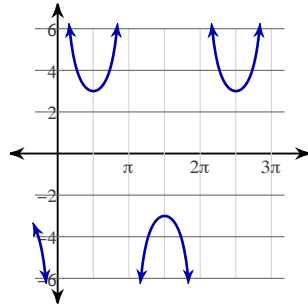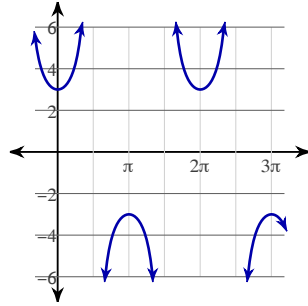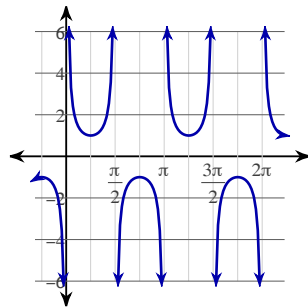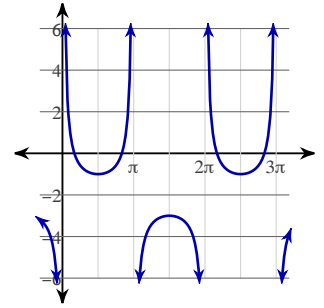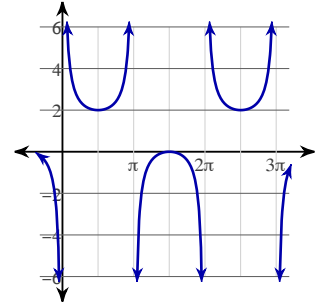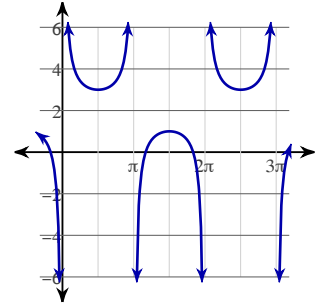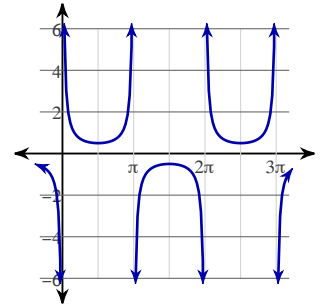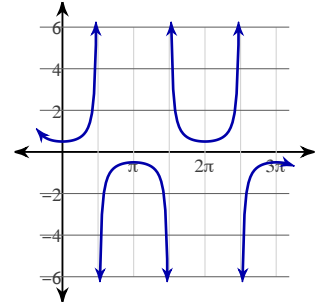
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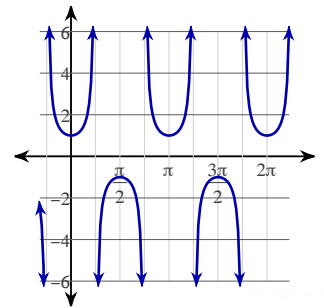
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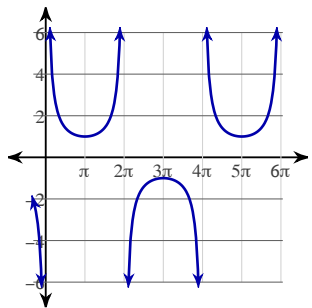
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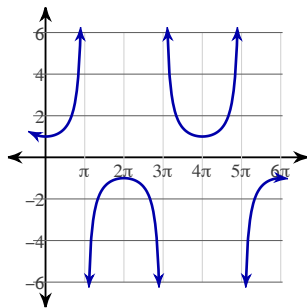
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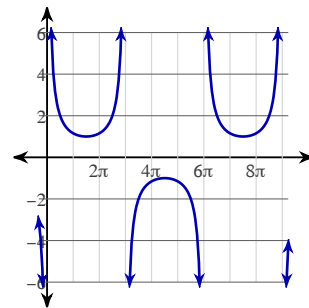
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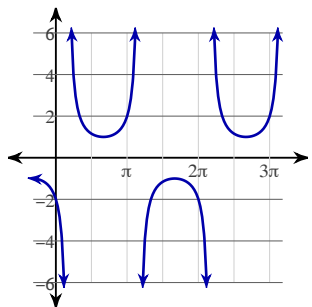
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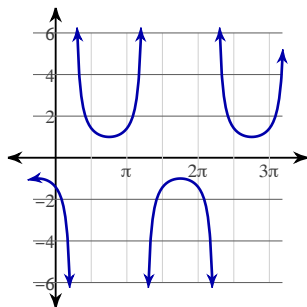
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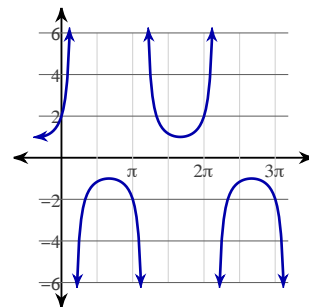
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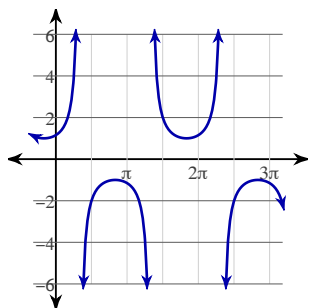
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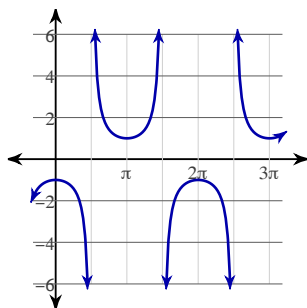
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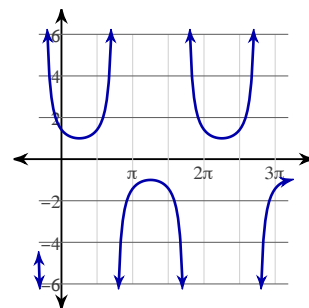
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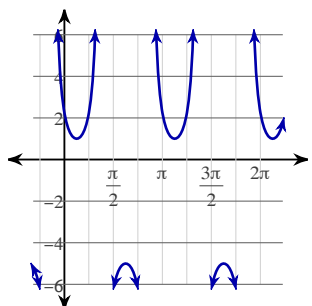
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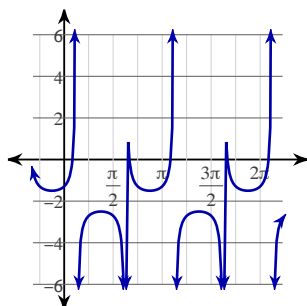
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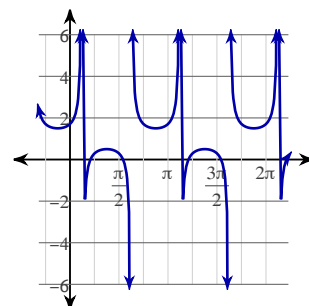
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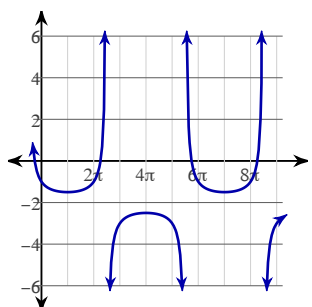
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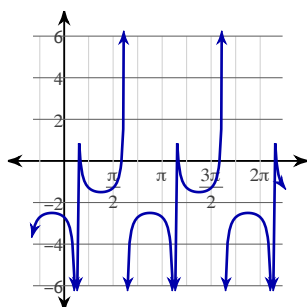
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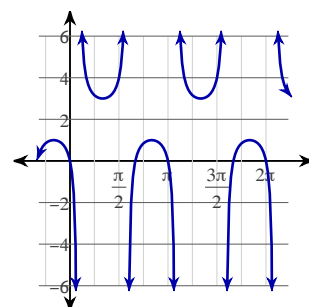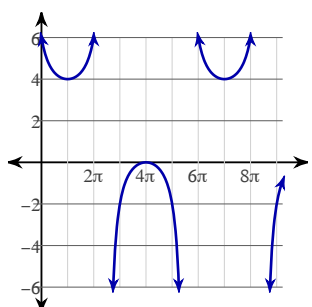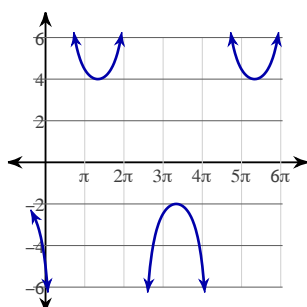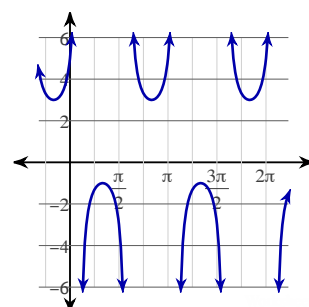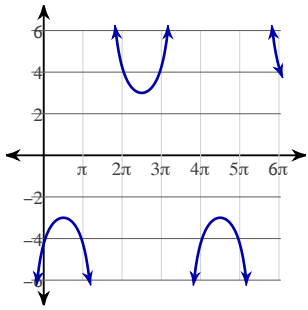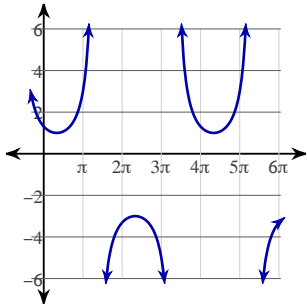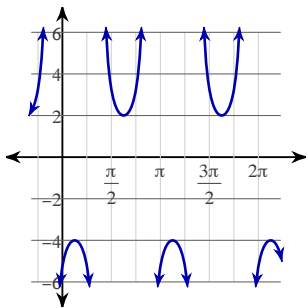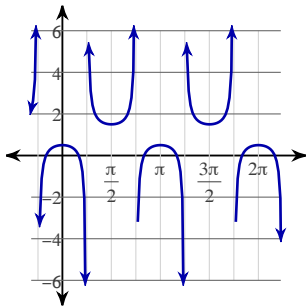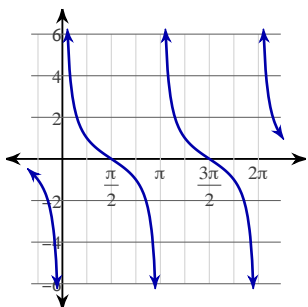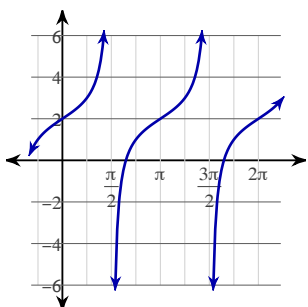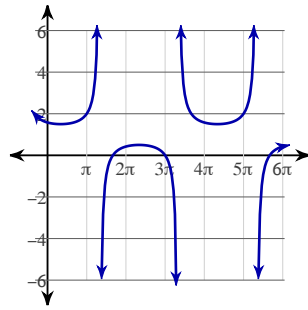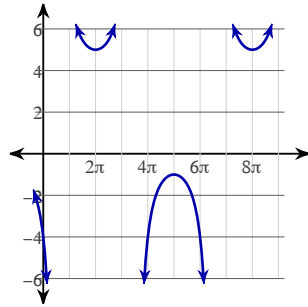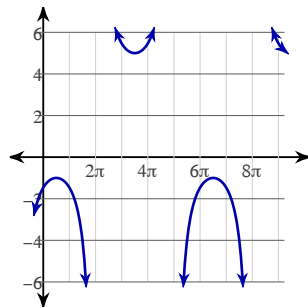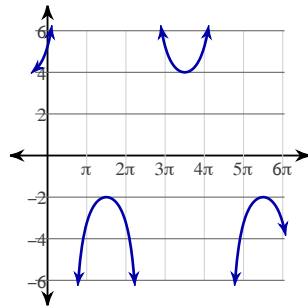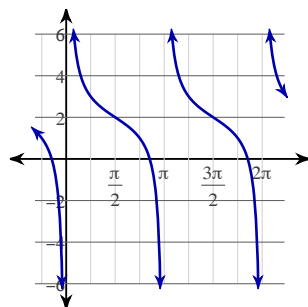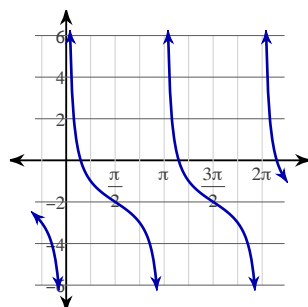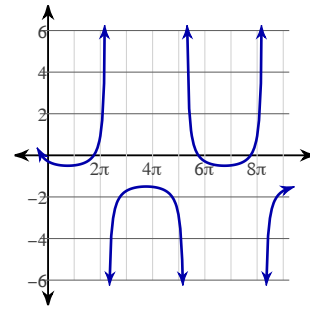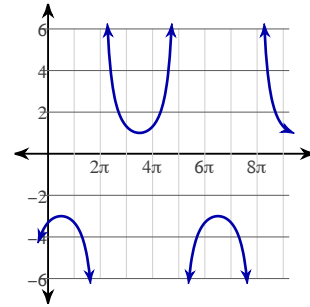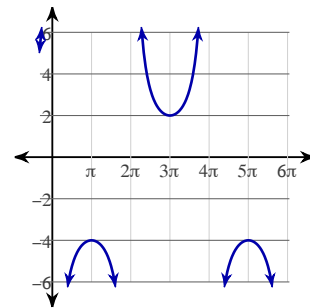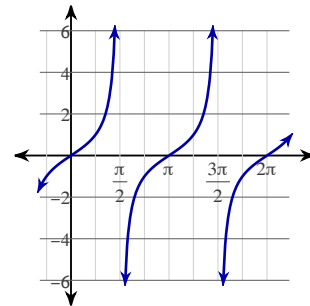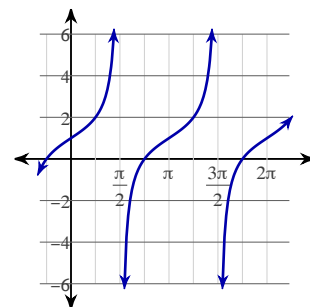
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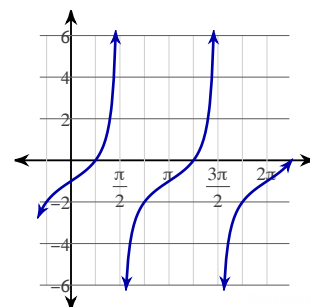
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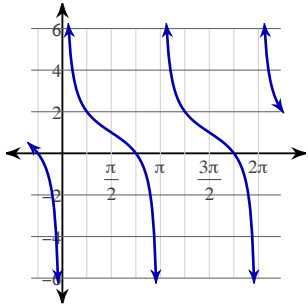
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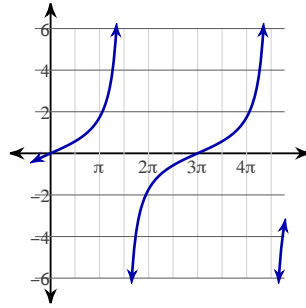
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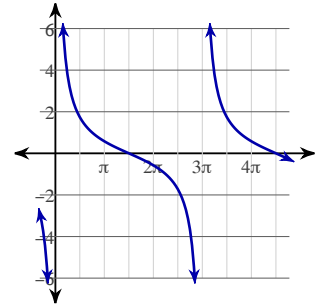
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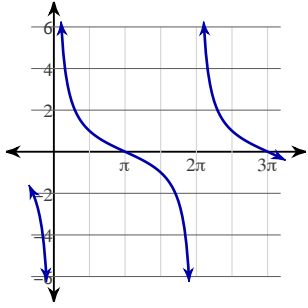
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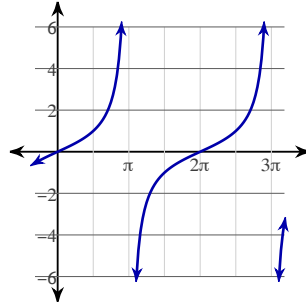
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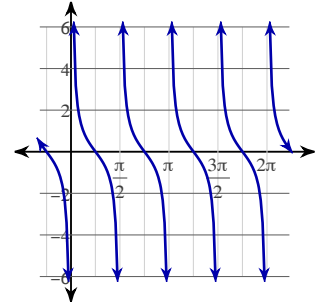
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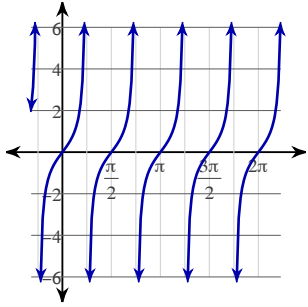
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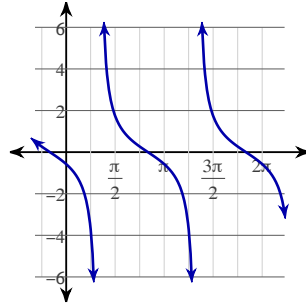
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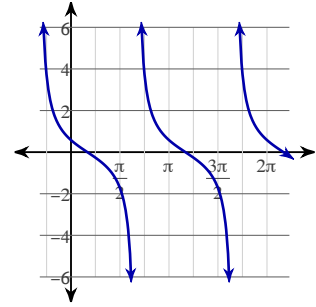
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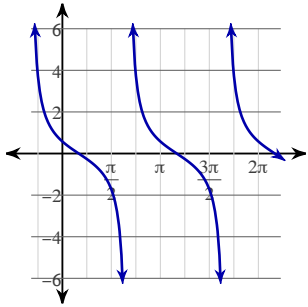
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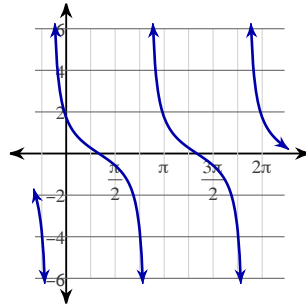
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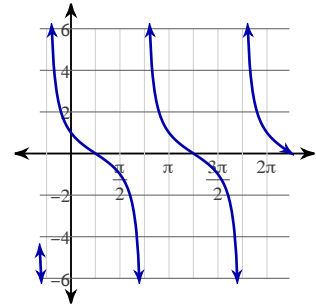
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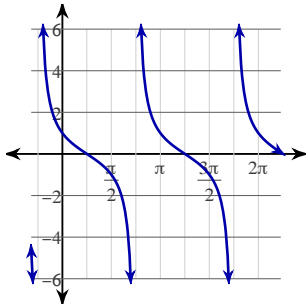
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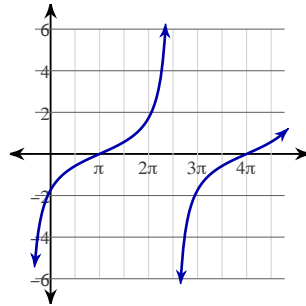
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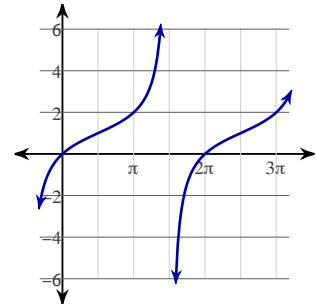
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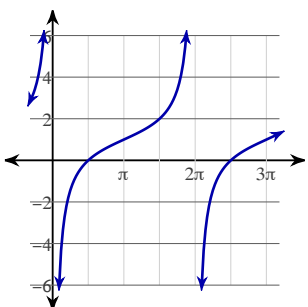
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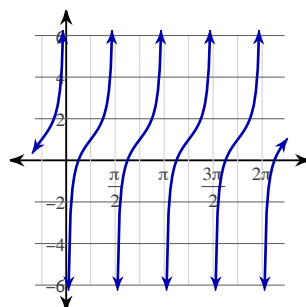
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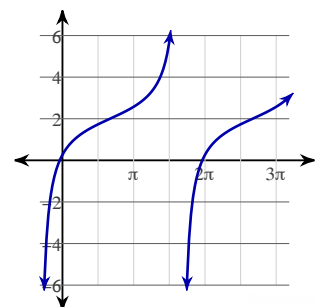
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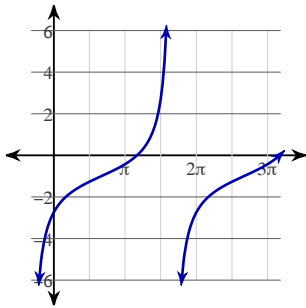
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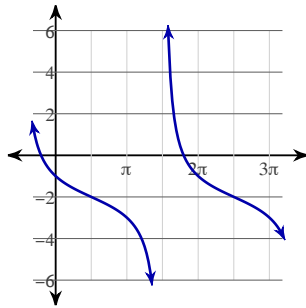
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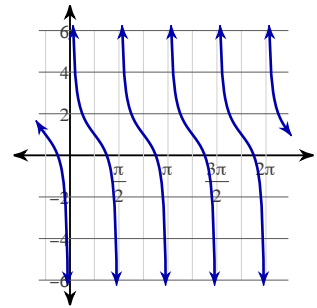
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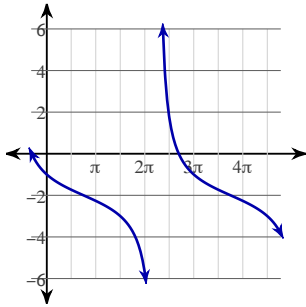
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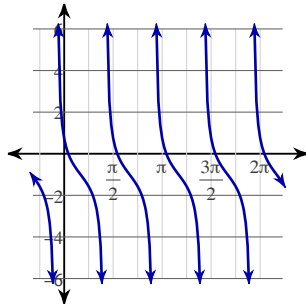
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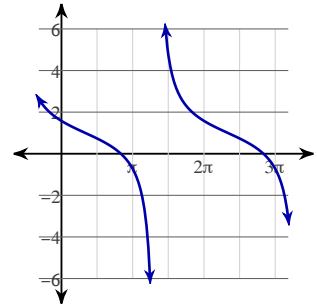
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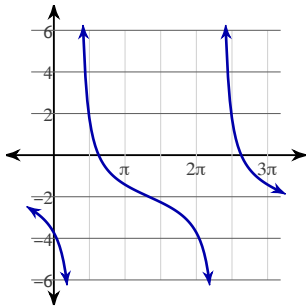
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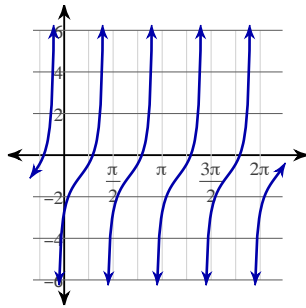
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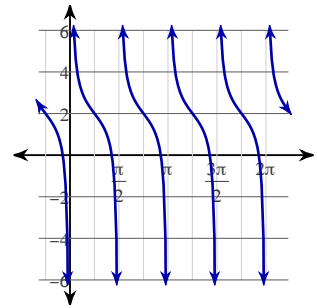
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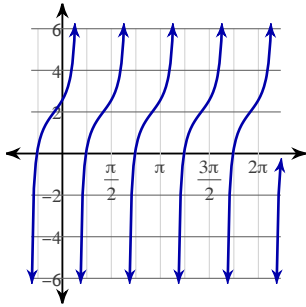
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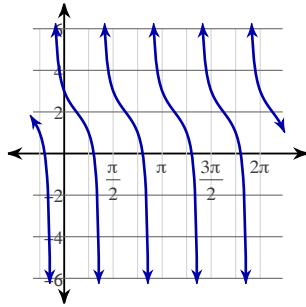
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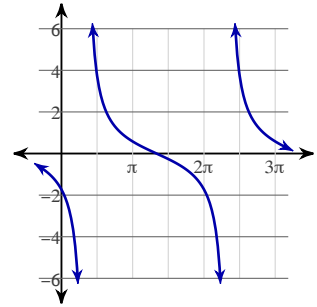
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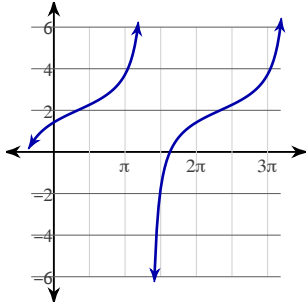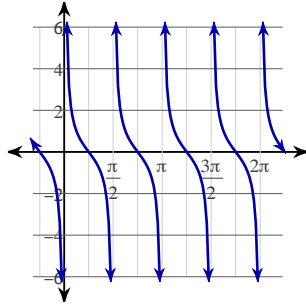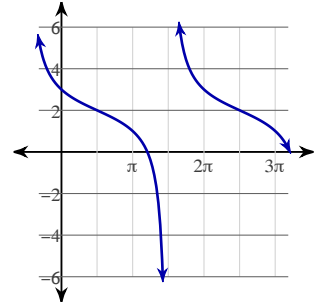
729) h(t) $\frac{135}{2}$ cos($\frac{\pi}{15}$ (t-15)) $\frac{139}{2}$ or

h(t) $\frac{135}{2}$ sin($\frac{\pi}{15}$ (t-$\frac{15}{2}$)) $\frac{139}{2}$

730) h(t ) 35 cos$\frac{\pi}{90}$ (t-90) 45 or

h(t ) 35 sin$\frac{\pi}{90}$ (t-45) 45

731) $D(t) = 7\sin\dfrac{\pi}{12}(t-12) + 50$ or

$\quad\ \ D(t) = 7\cos\dfrac{\pi}{12}(t+6) + 50$

732) $D(t) = 12\sin\dfrac{\pi}{12}(t-12) + 68$ or

$\quad\ \ D(t) = 12\cos\dfrac{\pi}{12}(t+6) + 68$

733) a) amplitude $\dfrac{25}{2}$, midline $\dfrac{27}{2}$, period 10 min

$\quad$ b) $h(t) = \dfrac{25}{2}\cos\dfrac{\pi}{5}(t-5) + \dfrac{27}{2}$ or

$\quad\ \ h(t) = \dfrac{25}{2}\sin\dfrac{\pi}{5}\left(t-\dfrac{5}{2}\right) + \dfrac{27}{2}$

$\quad$ c) 26 m

734) a) amplitude $\dfrac{35}{2}$, midline $\dfrac{41}{2}$, period 8 min

$\quad$ b) $h(t) = \dfrac{35}{2}\sin\dfrac{\pi}{4}(t-2) + \dfrac{41}{2}$ or

$\quad\ \ h(t) = \dfrac{35}{2}\cos\dfrac{\pi}{4}(t-4) + \dfrac{41}{2}$

$\quad$ c) 38 m

735) at 2am and 10am

736) $h(x) = 14\cos\dfrac{1}{14}(x - 14\pi) + 14$ or

$\quad\ \ h(x) = 14\sin\dfrac{1}{14}(x - 7\pi) + 14$

737) $D(t) = 13\cos\dfrac{\pi}{12}(t + 7) + 50$ or

$\quad\ \ D(t) = 13\sin\dfrac{\pi}{12}(t - 11) + 50$

738) $D(t) = 7\cos\dfrac{\pi}{12}(t + 8) + 85$ or

$\quad\ \ D(t) = 7\sin\dfrac{\pi}{12}(t - 10) + 85$

739) a) $P(t) = 25\cos\dfrac{\pi}{6}(t - 6) + 129$

$\quad\ \ P(t) = 25\sin\dfrac{\pi}{6}(t - 3) + 129$

$\quad$ b) $P(t) = 25\cos\dfrac{\pi}{6}(t + 3) + 129$

$\quad\ \ P(t) = 25\sin\dfrac{\pi}{6}(t - 6) + 129$

740) a) $P(t) = 150\cos\dfrac{\pi}{6}(t - 6)t + 720$ or

$\quad\ \ P(t) = 150\sin\dfrac{\pi}{6}(t - 3)t + 720$

$\quad$ b) $P(t) = 150\cos\dfrac{\pi}{6}(t + 4) + 720$

$\quad\ \ P(t) = 150\sin\dfrac{\pi}{6}(t - 5) + 720$

741) 75

742) $70 - 7\sqrt{3}$

743) 8 AM

744) From minute 1 to minute 5 = 4 minutes

745) 5 minutes

746) $2\sin(\dfrac{\pi}{3}(x-\dfrac{1}{2}))+1$ or $2\cos(\dfrac{\pi}{3}(x-2))+1$

747) $7\sin(\dfrac{2\pi}{5}(x+\dfrac{7}{4}))+5$ or

$\quad\ \ 7\cos(\dfrac{2\pi}{5}(x+\dfrac{1}{2}))+5$

748) $y=2\sin(2\pi(t-\dfrac{1}{4}))$ or

$\quad\ \ y=2\cos(2\pi(t-\dfrac{1}{2}))$

749) $2\cos\dfrac{\pi}{6}(t-5)+12$

750) $d=2\cos(\dfrac{\pi}{6}(t-4))+6$

$\quad$ 8 AM, 12 PM

751) $d=0.9\sin\dfrac{\pi}{10}(t - 5) + 2.7$ or

$\quad\ \ d=0.9\cos\dfrac{\pi}{10}(t - 10) + 2.7$

$\quad$ 1.8 m

752) $h=49\cos(\dfrac{\pi}{15}(t-15))+50$ or

$\quad\ \ h=49\sin(\dfrac{\pi}{15}(t-\dfrac{15}{2}))+50$

753) $3\cos(\dfrac{\pi}{6}(t+3))+6$ or

$\quad\ \ 3\sin(\dfrac{\pi}{6}(t-6))+6$

754) 3 months

755) $b(t)=0.6\cos\dfrac{\pi}{50}(t + 45) + 1.2$ or

$\quad\ \ b(t)=0.6\sin\dfrac{\pi}{50}(t - 30) + 1.2$

756) a) $h(t)=5 \cos \frac{\pi}{6}(t-1)+5$

$h(t)=5 \sin \frac{\pi}{6}(t+2)+5$

b) $h(11)=7.5$

757) $p(t)=18 \cos 146\pi t + 103$

758) $n=2 \cos \frac{\pi}{6}(t-5)+12$

$n = 13$

759) $h(t)=2 \cos 2\pi\left(t-\frac{1}{2}\right)$ or

$h(t)=2 \sin 2\pi\left(t-\frac{1}{4}\right)$

$\frac{3}{8}$ sec and $\frac{5}{8}$ sec

760) $d(t)=2 \cos \frac{\pi}{6}(t-4)+6$

8AM and 12AM

761) $n(t)=50 \cos \frac{2\pi}{11}(t-2003)+60$

762) a) $d=0.9 \cos \frac{\pi}{6}(t-8)+2.7$ or

$d=0.9 \cos \frac{\pi}{6}(t+4)+2.7$ or

$d=0.9 \sin \frac{\pi}{6}(t-5)+2.7$

b) approximately 3.5 m

763) period $=\frac{2\pi}{3}$

frequency $=\frac{3}{2\pi}$,

maximum displacement = 8 ft

764) $y=3\cos\frac{\pi}{2}(x-2)$ or

$y=\sin\frac{\pi}{2}(x-1)$

$\frac{2}{3}$ sec, $\frac{10}{3}$ sec

$\frac{14}{3}$ sec, $\frac{22}{3}$ sec

765) a) 0

b) 7

c) $\frac{2}{3}$

766) $h=49 \cos \frac{\pi}{15}(t-15)+50$ or

$h=49 \sin \frac{\pi}{15}(t-\frac{15}{2})+50$

$\frac{25}{2}$ sec, $\frac{35}{2}$ sec

767) $h=3\cos\frac{\pi}{6}(t-9)+6$, or

$h=3\cos\frac{\pi}{6}(t+3)+6$, or

$h=3\sin\frac{\pi}{6}(t-6)+6$

6 feet

768) $\dfrac{\tan^2 x}{\cos^2 x}$  Use $\sec x = \dfrac{1}{\cos x}$

$\tan^2 x \sec^2 x$  Use $\cot x = \dfrac{1}{\tan x}$

$\dfrac{\sec^2 x}{\cot^2 x}$  ∎

769) $\cot^2 x \tan x$    Decompose into sine and cosine

$$\left(\frac{\cos x}{\sin x}\right)^2 \cdot \frac{\sin x}{\cos x}$$    Simplify

$$\frac{\cos x}{\sin x}$$    ■

770) $\cot x - 1$    Decompose into sine and cosine

$$\frac{\cos x}{\sin x} - 1$$    Simplify

$$\frac{\cos x - \sin x}{\sin x}$$    ■

771) $\dfrac{\cos x}{\csc^2 x \cot x}$    Decompose into sine and cosine

$$\frac{\cos x}{\left(\dfrac{1}{\sin x}\right)^2 \cdot \dfrac{\cos x}{\sin x}}$$    Simplify

$$\sin^3 x$$    ■

772) $-\sec x \sin x$    Use $\sec x = \dfrac{1}{\cos x}$

$$-\frac{\sin x}{\cos x}$$    Use $\tan x = \dfrac{\sin x}{\cos x}$

$$-\tan x$$    ■

773) $\dfrac{\sin^2 x}{\sec^2 x}$    Use $\csc x = \dfrac{1}{\sin x}$

$$\frac{1}{\sec^2 x \csc^2 x}$$    Use $\sec x = \dfrac{1}{\cos x}$

$$\frac{\cos^2 x}{\csc^2 x}$$    ■

774) $\dfrac{\cos x}{\tan x}$    Use $\sec x = \dfrac{1}{\cos x}$

$$\frac{1}{\tan x \sec x}$$    Use $\cot x = \dfrac{1}{\tan x}$

$$\frac{\cot x}{\sec x}$$    ■

775) $\dfrac{\cot x}{\cos^2 x}$    Use $\cot x = \dfrac{1}{\tan x}$

$$\frac{1}{\cos^2 x \tan x}$$    Use $\sec x = \dfrac{1}{\cos x}$

$$\frac{\sec^2 x}{\tan x}$$    ■

776) $\cot^2 x \sec^2 x$     Decompose into sine and cosine

$$\left(\frac{\cos x}{\sin x}\right)^2 \cdot \left(\frac{1}{\cos x}\right)^2$$     Simplify

$$\frac{1}{\sin^2 x}$$     ■

777) $\csc x + \cot^2 x$     Decompose into sine and cosine

$$\frac{1}{\sin x} + \left(\frac{\cos x}{\sin x}\right)^2$$     Simplify

$$\frac{\sin x + \cos^2 x}{\sin^2 x}$$     ■

778) $\dfrac{1}{\csc^2 x \cos^2 x}$     Use $\csc x = \dfrac{1}{\sin x}$

$$\frac{\sin^2 x}{\cos^2 x}$$     Use $\cot x = \dfrac{\cos x}{\sin x}$

$$\frac{1}{\cot^2 x}$$     ■

779) $\sec x \cdot \left(\sec x \cos^2 x + 1\right)$     Decompose into sine and cosine

$$\frac{1}{\cos x}\left(\frac{1}{\cos x} \cdot \cos^2 x + 1\right)$$     Simplify

$$\frac{1 + \cos x}{\cos x}$$     ■

780) $\dfrac{\csc x}{\tan x + \sec x}$     Decompose into sine and cosine

$$\frac{\dfrac{1}{\sin x}}{\dfrac{\sin x}{\cos x} + \dfrac{1}{\cos x}}$$     Simplify

$$\frac{\cos x}{\sin x \cdot \left(\sin x + 1\right)}$$     ■

781) $\dfrac{\sec x}{\cos x + \tan x}$  Decompose into sine and cosine

$\dfrac{\dfrac{1}{\cos x}}{\cos x + \dfrac{\sin x}{\cos x}}$  Simplify

$\dfrac{1}{\sin x + \cos^2 x}$  ■

782) $\sin x\sec^3 x$  Use $\sec x = \dfrac{1}{\cos x}$

$\dfrac{\sin x}{\cos^3 x}$  Use $\tan x = \dfrac{\sin x}{\cos x}$

$\dfrac{\tan x}{\cos^2 x}$  ■

783) $\dfrac{1}{\cot x\csc^2 x}$  Use $\cot x = \dfrac{1}{\tan x}$

$\dfrac{\tan x}{\csc^2 x}$  Use $\csc x = \dfrac{1}{\sin x}$

$\tan x\sin^2 x$  ■

784) $\csc x \cdot (1 + \csc x)$  Decompose into sine and cosine

$\dfrac{1}{\sin x}\left(1 + \dfrac{1}{\sin x}\right)$  Simplify

$\dfrac{\sin x + 1}{\sin^2 x}$  ■

785) $\dfrac{\cos^2 x}{\csc x}$  Use $\sec x = \dfrac{1}{\cos x}$

$\dfrac{1}{\sec^2 x\csc x}$  Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{\sin x}{\sec^2 x}$  ■

786) $1 + \cot x$  Decompose into sine and cosine

$1 + \dfrac{\cos x}{\sin x}$  Simplify

$\dfrac{\cos x + \sin x}{\sin x}$  ■

787) $\dfrac{\tan^2 x}{\sin^2 x}$  Decompose into sine and cosine

$\dfrac{\left(\dfrac{\sin x}{\cos x}\right)^2}{\sin^2 x}$  Simplify

$\dfrac{1}{\cos^2 x}$  ■

788) $\dfrac{\tan x}{\sec^2 x - 1}$  Use $\tan^2 x + 1 = \sec^2 x$

$\dfrac{\tan x}{\tan^2 x}$  Cancel common factors

$\dfrac{1}{\tan x}$  Use $\tan x = \dfrac{\sin x}{\cos x}$

$\dfrac{\cos x}{\sin x}$  ■

789) $\cos^2 x\sec x + 1$      Decompose into sine and cosine

$\cos^2 x \cdot \dfrac{1}{\cos x} + 1$      Simplify

$\cos x + 1$      Use $\tan^2 x + 1 = \sec^2 x$

$\cos x - \tan^2 x + \sec^2 x$    ∎

790) $\dfrac{\sec x}{\tan x + \cot x}$      Decompose into sine and cosine

$\dfrac{\dfrac{1}{\cos x}}{\dfrac{\sin x}{\cos x} + \dfrac{\cos x}{\sin x}}$      Simplify

$\dfrac{\sin x}{\sin^2 x + \cos^2 x}$      Use $\sin^2 x + \cos^2 x = 1$

$\sin x$      Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{1}{\csc x}$    ∎

791) $\sec^2 x + \csc^2 x$      Decompose into sine and cosine

$\left(\dfrac{1}{\cos x}\right)^2 + \left(\dfrac{1}{\sin x}\right)^2$      Simplify

$\dfrac{\sin^2 x + \cos^2 x}{\cos^2 x\sin^2 x}$      Use $\sin^2 x + \cos^2 x = 1$

$\dfrac{1}{\sin^2 x\cos^2 x}$      Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{\csc^2 x}{\cos^2 x}$    ∎

792) $\dfrac{\sec^2 x + \csc^2 x}{\csc^2 x}$      Use $\cot^2 x + 1 = \csc^2 x$

$\dfrac{\sec^2 x + \csc^2 x}{\cot^2 x + 1}$      Decompose into sine and cosine

$\dfrac{\left(\dfrac{1}{\cos x}\right)^2 + \left(\dfrac{1}{\sin x}\right)^2}{\left(\dfrac{\cos x}{\sin x}\right)^2 + 1}$      Simplify

$\dfrac{1}{\cos^2 x}$      Use $\sec x = \dfrac{1}{\cos x}$

$\dfrac{\sec x}{\cos x}$      ∎

793) $\cot x - \tan x \csc^2 x$      Use $\cot^2 x + 1 = \csc^2 x$

$\cot x - \tan x \cot^2 x - \tan x$      Decompose into sine and cosine

$\dfrac{\cos x}{\sin x} - \dfrac{\sin x}{\cos x}\cdot\left(\dfrac{\cos x}{\sin x}\right)^2 - \dfrac{\sin x}{\cos x}$      Simplify

$-\dfrac{\sin x}{\cos x}$      Use $\sec x = \dfrac{1}{\cos x}$

$-\sin x \sec x$      ∎

794) $\dfrac{\csc^2 x - 1}{\sin^2 x}$      Use $\cot^2 x + 1 = \csc^2 x$

$\dfrac{\cot^2 x}{\sin^2 x}$      Use $\cot x = \dfrac{1}{\tan x}$

$\dfrac{1}{\tan^2 x \sin^2 x}$      Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{\csc^2 x}{\tan^2 x}$      ∎

795) $\sin x \cdot \left(\tan^2 x + 1\right)$      Use $\tan^2 x + 1 = \sec^2 x$

$\sin x \sec^2 x$      Use $\sec x = \dfrac{1}{\cos x}$

$\dfrac{\sec x \sin x}{\cos x}$      Use $\cot x = \dfrac{\cos x}{\sin x}$

$\dfrac{\sec x}{\cot x}$      ∎

796) $\dfrac{\tan x}{1 - \sec^2 x}$     Use $\tan^2 x + 1 = \sec^2 x$

$\dfrac{\tan x}{-\tan^2 x}$     Decompose into sine and cosine

$\dfrac{\dfrac{\sin x}{\cos x}}{-\left(\dfrac{\sin x}{\cos x}\right)^2}$     Simplify

$-\dfrac{\cos x}{\sin x}$     Use $\csc x = \dfrac{1}{\sin x}$

$-\csc x \cos x$     ∎

797) $\dfrac{\cot^2 x}{\cot^2 x + 1}$     Use $\cot^2 x + 1 = \csc^2 x$

$\dfrac{\cot^2 x}{\csc^2 x}$     Decompose into sine and cosine

$\dfrac{\left(\dfrac{\cos x}{\sin x}\right)^2}{\left(\dfrac{1}{\sin x}\right)^2}$     Simplify

$\cos^2 x$     ∎

798) $\dfrac{\tan x}{\sin x}$     Use $\tan x = \dfrac{\sin x}{\cos x}$

$\dfrac{\dfrac{\sin x}{\cos x}}{\sin x \cos x}$     Cancel common factors

$\dfrac{1}{\cos x}$     Use $\sin^2 x + \cos^2 x = 1$

$\dfrac{\cos^2 x + \sin^2 x}{\cos x}$     ∎

799) $\cot x - \tan x \csc^2 x$     Use $\cot^2 x + 1 = \csc^2 x$

$\cot x - \tan x \cot^2 x - \tan x$     Decompose into sine and cosine

$\dfrac{\cos x}{\sin x} - \dfrac{\sin x}{\cos x} \cdot \left(\dfrac{\cos x}{\sin x}\right)^2 - \dfrac{\sin x}{\cos x}$     Simplify

$-\dfrac{\sin x}{\cos x}$     Use $\tan x = \dfrac{\sin x}{\cos x}$

$-\tan x$     ∎

800) $\dfrac{1 - \sec^2 x}{\sec^2 x}$    Use $\tan^2 x + 1 = \sec^2 x$

$-\dfrac{\tan^2 x}{\tan^2 x + 1}$    Use $\tan^2 x + 1 = \sec^2 x$

$-\dfrac{\tan^2 x}{\sec^2 x}$    Decompose into sine and cosine

$-\dfrac{\left(\dfrac{\sin x}{\cos x}\right)^2}{\left(\dfrac{1}{\cos x}\right)^2}$    Simplify

$-\sin^2 x$    ∎

801) $\dfrac{\sin^2 x}{1 - \sec^2 x}$    Use $\tan^2 x + 1 = \sec^2 x$

$\dfrac{\sin^2 x}{-\tan^2 x}$    Decompose into sine and cosine

$\dfrac{\sin^2 x}{-\left(\dfrac{\sin x}{\cos x}\right)^2}$    Simplify

$-\cos^2 x$    ∎

802) $\tan x\sec^2 x\cot^2 x$    Use $\cot x = \dfrac{1}{\tan x}$

$\dfrac{\tan x\sec^2 x}{\tan^2 x}$    Cancel common factors

$\dfrac{\sec^2 x}{\tan x}$    Use $\tan^2 x + 1 = \sec^2 x$

$\dfrac{\tan^2 x + 1}{\tan x}$    ∎

803) $\csc x\sin^2 x$    Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{\csc x}{\csc^2 x}$    Cancel common factors

$\dfrac{1}{\csc x}$    Use $\tan^2 x + 1 = \sec^2 x$

$\dfrac{\sec^2 x - \tan^2 x}{\csc x}$    ∎

804) $\csc^2 x\sin x$    Decompose into sine and cosine

$\left(\dfrac{1}{\sin x}\right)^2\sin x$    Simplify

$\dfrac{1}{\sin x}$    Use $\tan^2 x + 1 = \sec^2 x$

$\dfrac{\sec^2 x - \tan^2 x}{\sin x}$    ∎

805) $\dfrac{1}{\csc^2 x + \sec^2 x}$     Decompose into sine and cosine

$\dfrac{1}{\left(\dfrac{1}{\sin x}\right)^2 + \left(\dfrac{1}{\cos x}\right)^2}$     Simplify

$\dfrac{\sin^2 x\cos^2 x}{\cos^2 x + \sin^2 x}$     Use $\sin^2 x + \cos^2 x = 1$

$\sin^2 x\cos^2 x$     Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{\cos^2 x}{\csc^2 x}$     ∎

806) $\sec^2 x\cot^2 x$     Decompose into sine and cosine

$\left(\dfrac{1}{\cos x}\right)^2 \cdot \left(\dfrac{\cos x}{\sin x}\right)^2$     Simplify

$\dfrac{1}{\sin^2 x}$     Use $\csc x = \dfrac{1}{\sin x}$

$\csc^2 x$     Use $\cot^2 x + 1 = \csc^2 x$

$1 + \cot^2 x$     ∎

807) $\dfrac{\sec x}{\tan x}$     Decompose into sine and cosine

$\dfrac{\dfrac{1}{\cos x}}{\dfrac{\sin x}{\cos x}}$     Simplify

$\dfrac{1}{\sin x}$     Use $\tan^2 x + 1 = \sec^2 x$

$\dfrac{\sec^2 x - \tan^2 x}{\sin x}$     ∎

808) $\cos\left(\theta - \pi\right)$
$= \cos\theta\cos\pi + \sin\theta\sin\pi$
$= \cos\theta \cdot -1 + \sin\theta \cdot 0$
$= -\cos\theta$

809) $\cos\left(\dfrac{\pi}{2} - \theta\right)$

$= \cos\dfrac{\pi}{2}\cos\theta + \sin\dfrac{\pi}{2}\sin\theta$
$= 0\cos\theta + \sin\theta$
$= \sin\theta$

810) $\tan\left(\dfrac{3\pi}{4} - \theta\right)$

$= \dfrac{\tan\dfrac{3\pi}{4} - \tan\theta}{1 + \tan\dfrac{3\pi}{4}\tan\theta}$

$= \dfrac{-1 - \tan\theta}{1 - \tan\theta}$

$= \dfrac{-1 - \tan\theta}{1 - \tan\theta}$

811) $\tan(\pi - \theta)$

$= \dfrac{\tan\pi - \tan\theta}{1 + \tan\pi\tan\theta}$

$= \dfrac{0 - \tan\theta}{1 + 0\tan\theta}$

$= -\tan\theta$

812) $\tan\left(\dfrac{\pi}{4} - \theta\right)$

$= \dfrac{\tan\dfrac{\pi}{4} - \tan\theta}{1 + \tan\dfrac{\pi}{4}\tan\theta}$

$= \dfrac{1 - \tan\theta}{1 + \tan\theta}$

$= \dfrac{1 - \tan\theta}{1 + \tan\theta}$

813) $\sin\left(\theta + \dfrac{\pi}{2}\right)$

$= \sin\theta\cos\dfrac{\pi}{2} + \cos\theta\sin\dfrac{\pi}{2}$

$= \sin\theta \cdot 0 + \cos\theta \cdot 1$

$= \cos\theta$

814) $\sin\left(\dfrac{3\pi}{2} - \theta\right)$

$= \sin\dfrac{3\pi}{2}\cos\theta - \cos\dfrac{3\pi}{2}\sin\theta$

$= -\cos\theta - 0\sin\theta$

$= -\cos\theta$

815) $\cos(\pi + \theta)$

$= \cos\pi\cos\theta - \sin\pi\sin\theta$

$= -\cos\theta - 0\sin\theta$

$= -\cos\theta$

816) $\sin\left(\dfrac{\pi}{2} - \theta\right)$

$= \sin\dfrac{\pi}{2}\cos\theta - \cos\dfrac{\pi}{2}\sin\theta$

$= \cos\theta - 0\sin\theta$

$= \cos\theta$

817) $\sin\left(\dfrac{3\pi}{2} + \theta\right)$

$= \sin\dfrac{3\pi}{2}\cos\theta + \cos\dfrac{3\pi}{2}\sin\theta$

$= -\cos\theta + 0\sin\theta$

$= -\cos\theta$

818) $\sin(\theta - \pi)$

$= \sin\theta\cos\pi - \cos\theta\sin\pi$

$= \sin\theta \cdot -1 - \cos\theta \cdot 0$

$= -\sin\theta$

819) $\cos\left(\theta + \dfrac{3\pi}{2}\right)$

$= \cos\theta\cos\dfrac{3\pi}{2} - \sin\theta\sin\dfrac{3\pi}{2}$

$= \cos\theta \cdot 0 - \sin\theta \cdot -1$

$= \sin\theta$

820) $\sin(\pi + \theta)$

$= \sin\pi\cos\theta + \cos\pi\sin\theta$

$= 0\cos\theta - \sin\theta$

$= -\sin\theta$

821) $\tan\left(\theta + \dfrac{3\pi}{4}\right)$

$= \dfrac{\tan\theta + \tan\dfrac{3\pi}{4}}{1 - \tan\theta\tan\dfrac{3\pi}{4}}$

$= \dfrac{\tan\theta - 1}{1 - \tan\theta \cdot -1}$

$= \dfrac{\tan\theta - 1}{1 + \tan\theta}$

822) $\cos\left(\theta - \dfrac{3\pi}{2}\right)$

$= \cos\theta\cos\dfrac{3\pi}{2} + \sin\theta\sin\dfrac{3\pi}{2}$

$= \cos\theta \cdot 0 + \sin\theta \cdot -1$

$= -\sin\theta$

823) $\tan(\pi + \theta)$

$= \dfrac{\tan\pi + \tan\theta}{1 - \tan\pi\tan\theta}$

$= \dfrac{0 + \tan\theta}{1 - 0\tan\theta}$

$= \tan\theta$

824) $\tan\left(\theta + \dfrac{\pi}{4}\right)$

$= \dfrac{\tan\theta + \tan\dfrac{\pi}{4}}{1 - \tan\theta\tan\dfrac{\pi}{4}}$

$= \dfrac{\tan\theta + 1}{1 - \tan\theta \cdot 1}$

$= \dfrac{\tan\theta + 1}{1 - \tan\theta}$

825) $\cos\left(\dfrac{\pi}{2} + \theta\right)$

$= \cos\dfrac{\pi}{2}\cos\theta - \sin\dfrac{\pi}{2}\sin\theta$

$= 0\cos\theta - \sin\theta$

$= -\sin\theta$

826) $\tan\left(\theta - \dfrac{3\pi}{4}\right)$

$= \dfrac{\tan\theta - \tan\dfrac{3\pi}{4}}{1 + \tan\theta\tan\dfrac{3\pi}{4}}$

$= \dfrac{\tan\theta - -1}{1 + \tan\theta \cdot -1}$

$= \dfrac{\tan\theta + 1}{1 - \tan\theta}$

827) $\sin(\pi - \theta)$

$= \sin\pi\cos\theta - \cos\pi\sin\theta$

$= 0\cos\theta - -\sin\theta$

$= \sin\theta$

828) $\dfrac{\sin x}{1 - \cos 2x}$    Use $\cos 2x = 1 - 2\sin^2 x$

$\dfrac{\sin x}{2\sin^2 x}$    Cancel common factors

$\dfrac{1}{2\sin x}$    ■

829) $\cot^2 x + 2\sin^2 x$    Use $\cot^2 x + 1 = \csc^2 x$

$-1 + 2\sin^2 x + \csc^2 x$    Use $\cos 2x = 1 - 2\sin^2 x$

$-\cos 2x + \csc^2 x$    ■

830) $\dfrac{2\cos^2 x}{1 - \cos 2x}$    Use $\sin^2 x = \dfrac{1 - \cos 2x}{2}$

$\dfrac{\cos^2 x}{\sin^2 x}$    Use $\tan x = \dfrac{\sin x}{\cos x}$

$\dfrac{1}{\tan^2 x}$    ■

831) $\sin^2 x + \csc^2 x - 1 + \cos 2x$    Use $\cos 2x = \cos^2 x - \sin^2 x$

$\csc^2 x - 1 + \cos^2 x$    Use $\cot^2 x + 1 = \csc^2 x$

$\cot^2 x + \cos^2 x$    ■

832) $\dfrac{2}{1 - \cos 2x}$    Use $\sin^2 x = \dfrac{1 - \cos 2x}{2}$

$\dfrac{1}{\sin^2 x}$    Use $\csc x = \dfrac{1}{\sin x}$

$\csc^2 x$    ■

833) $\sin 2x \cdot \left(1 - \cos 2x\right)$    Use $\sin 2x = 2\sin x \cos x$

$2\sin x \cos x \cdot \left(1 - \cos 2x\right)$    Use $\cos 2x = 1 - 2\sin^2 x$

$4\sin^3 x \cos x$    ■

834) $2\cos^2 x \csc^2 x$     Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{2\cos^2 x}{\sin^2 x}$     Use $\cos 2x = 2\cos^2 x - 1$

$\dfrac{1 + \cos 2x}{\sin^2 x}$   ∎

835) $2\sin^2 x + \cos 2x + \sec^2 x$     Use $\cos 2x = 1 - 2\sin^2 x$

$1 + \sec^2 x$     Use $\tan^2 x + 1 = \sec^2 x$

$2 + \tan^2 x$   ∎

836) $\dfrac{\sin 2x}{\cos x}$     Use $\sin 2x = 2\sin x \cos x$

$\dfrac{2\sin x \cos x}{\cos x}$     Cancel common factors

$2\sin x$   ∎

837) $\dfrac{\sin 2x}{\sin 2x + \sin x}$     Use $\sin 2x = 2\sin x \cos x$

$\dfrac{2\sin x \cos x}{\sin x \cdot (2\cos x + 1)}$     Cancel common factors

$\dfrac{2\cos x}{2\cos x + 1}$   ∎

838) $2\sin^2 x \cos x$     Use $\sin 2x = 2\sin x \cos x$

$\sin x \sin 2x$     Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{\sin 2x}{\csc x}$   ∎

839) $\sin x \cdot (1 + \cos 2x)$     Use $\cos 2x = 2\cos^2 x - 1$

$2\sin x \cos^2 x$     Use $\sin 2x = 2\sin x \cos x$

$\cos x \sin 2x$   ∎

840) $2\cos^2 x(1 - \cos 2x)$     Use $\cos 2x = 1 - 2\sin^2 x$

$4\cos^2 x \sin^2 x$     Use $\sin 2x = 2\sin x \cos x$

$\sin^2 2x$   ∎

841) $\dfrac{1 - \cos 2x}{\cos^2 x}$     Use $\cos^2 x = \dfrac{1 + \cos 2x}{2}$

$\dfrac{2(1 - \cos 2x)}{1 + \cos 2x}$     Use $\tan^2 x = \dfrac{1 - \cos 2x}{1 + \cos 2x}$

$2\tan^2 x$   ∎

842) $\dfrac{1}{\sec^2 x}$     Use $\sec x = \dfrac{1}{\cos x}$

$\cos^2 x$     Use $\cos 2x = \cos^2 x - \sin^2 x$

$\sin^2 x + \cos 2x$   ∎

843) $\dfrac{2\sin^2 x}{1 + \cos 2x}$     Use $\cos^2 x = \dfrac{1 + \cos 2x}{2}$

$\dfrac{\sin^2 x}{\cos^2 x}$     Use $\tan x = \dfrac{\sin x}{\cos x}$

$\tan^2 x$   ∎

844) $\dfrac{2\cos^2 x}{\csc^2 x}$      Use $\csc x = \dfrac{1}{\sin x}$

$2\sin^2 x\cos^2 x$      Use $\cos 2x = 2\cos^2 x - 1$

$\sin^2 x(1 + \cos 2x)$   ∎

845) $1 + \cos 2x - 2\sin x\cos x$      Use $\cos 2x = 2\cos^2 x - 1$

$2\cos x \cdot (\cos x - \sin x)$      Use $\sin 2x = 2\sin x\cos x$

$2\cos^2 x - \sin 2x$      ∎

846) $\dfrac{2\sin x\cos x}{\cos 2x}$      Use $\sin 2x = 2\sin x\cos x$

$\dfrac{\sin 2x}{\cos 2x}$      Use $\tan 2x = \dfrac{\sin 2x}{\cos 2x}$

$\tan 2x$      ∎

847) $2\cos^2 x + \tan^2 x$      Use $\tan^2 x + 1 = \sec^2 x$

$\sec^2 x + 2\cos^2 x - 1$      Use $\cos 2x = 2\cos^2 x - 1$

$\sec^2 x + \cos 2x$      ∎

848) $\dfrac{\tan^2 x}{\sin^2 x + \cos^2 x}$      Use $\sin^2 x + \cos^2 x = 1$

$\tan^2 x$      Use $\tan x = \dfrac{\sin x}{\cos x}$

$\dfrac{\sin^2 x}{\cos^2 x}$      Use $\cos^2 x = \dfrac{1 + \cos 2x}{2}$

$\dfrac{2\sin^2 x}{1 + \cos 2x}$      ∎

849) $\dfrac{\tan x}{2\sin^2 x}$      Use $\tan x = \dfrac{\sin x}{\cos x}$

$\dfrac{\sin x}{2\sin^2 x\cos x}$      Cancel common factors

$\dfrac{1}{2\cos x\sin x}$      Use $\sin 2x = 2\sin x\cos x$

$\dfrac{1}{\sin 2x}$      ∎

850) $\cos x \cdot (2\sin x - \cos x\sec x)$      Decompose into sine and cosine

$\cos x \cdot \left(2\sin x - \cos x \cdot \dfrac{1}{\cos x}\right)$      Simplify

$\cos x \cdot (2\sin x - 1)$      Use $\sin 2x = 2\sin x\cos x$

$\sin 2x - \cos x$      ∎

851) $\dfrac{\cos^2 x}{\sin 2x}$      Use sin $2x$ = 2sin $x$cos $x$

$\dfrac{\cos^2 x}{2\sin x\cos x}$      Cancel common factors

$\dfrac{\cos x}{2\sin x}$      Use cot $x$ = $\dfrac{\cos x}{\sin x}$

$\dfrac{\cot x}{2}$      ■

852) $\cos^2 x\left(1 - \tan^2 x\right)$      Decompose into sine and cosine

$\cos^2 x\left(1 - \left(\dfrac{\sin x}{\cos x}\right)^2\right)$      Simplify

$\cos^2 x - \sin^2 x$      Use cos $2x$ = $\cos^2 x - \sin^2 x$

$\cos 2x$      ■

853) $\dfrac{1 - \cos 2x}{2\cos^3 x}$      Use $\sin^2 x$ = $\dfrac{1 - \cos 2x}{2}$

$\dfrac{\sin^2 x}{\cos^3 x}$      Use tan $x$ = $\dfrac{\sin x}{\cos x}$

$\dfrac{\tan^2 x}{\cos x}$      Use sec $x$ = $\dfrac{1}{\cos x}$

$\sec x\tan^2 x$      ■

854) $\cos x \cdot \left(2\sin x - \tan x\right)$      Decompose into sine and cosine

$\cos x \cdot \left(2\sin x - \dfrac{\sin x}{\cos x}\right)$      Simplify

$\sin x \cdot \left(2\cos x - 1\right)$      Use sin $2x$ = 2sin $x$cos $x$

$\sin 2x - \sin x$      ■

855) $\dfrac{2\sin^2 x}{\sec x}$　　Use $\sec x = \dfrac{1}{\cos x}$

$2\sin^2 x\cos x$　　Use $\sin 2x = 2\sin x\cos x$

$\sin 2x\sin x$　　Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{\sin 2x}{\csc x}$　■

856) $\dfrac{2}{1 - \tan^2 x}$　　Decompose into sine and cosine

$\dfrac{2}{1 - \left(\dfrac{\sin x}{\cos x}\right)^2}$　　Simplify

$\dfrac{2\cos^2 x}{\cos^2 x - \sin^2 x}$　　Use $\cos 2x = \cos^2 x - \sin^2 x$

$\dfrac{2\cos^2 x}{\cos 2x}$　■

857) $\dfrac{\tan^2 x}{1 - \tan^2 x}$　　Decompose into sine and cosine

$\dfrac{\left(\dfrac{\sin x}{\cos x}\right)^2}{1 - \left(\dfrac{\sin x}{\cos x}\right)^2}$　　Simplify

$\dfrac{\sin^2 x}{\cos^2 x - \sin^2 x}$　　Use $\cos 2x = \cos^2 x - \sin^2 x$

$\dfrac{\sin^2 x}{\cos 2x}$　■

858) $\dfrac{\sin 2x}{\sin^2 x}$    Use $\sin 2x = 2\sin x\cos x$

$\dfrac{2\sin x\cos x}{\sin^2 x}$    Cancel common factors

$\dfrac{2\cos x}{\sin x}$    Use $\tan x = \dfrac{\sin x}{\cos x}$

$\dfrac{2}{\tan x}$    ■

859) $\dfrac{\csc^2 x(1 + \cos 2x)}{\cos^2 x}$    Use $\cos^2 x = \dfrac{1 + \cos 2x}{2}$

$\dfrac{2\csc^2 x(1 + \cos 2x)}{1 + \cos 2x}$    Cancel common factors

$2\csc^2 x$    Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{2}{\sin^2 x}$    ■

860) $\dfrac{\sec^2 x}{1 - \tan^2 x}$    Decompose into sine and cosine

$\dfrac{\left(\dfrac{1}{\cos x}\right)^2}{1 - \left(\dfrac{\sin x}{\cos x}\right)^2}$    Simplify

$\dfrac{1}{\cos^2 x - \sin^2 x}$    Use $\cos 2x = \cos^2 x - \sin^2 x$

$\dfrac{1}{\cos 2x}$    ■

861) $\dfrac{\sin 4x}{\cos 2x}$    Use $\sin 4x = 2\sin 2x\cos 2x$

$\dfrac{2\sin 2x\cos 2x}{\cos 2x}$    Cancel common factors

$2\sin 2x$    Use $\sin 2x = 2\sin x\cos x$

$4\sin x\cos x$    ■

862) $\dfrac{\sin^2 x}{\sin 2x}$    Use $\sin 2x = 2\sin x\cos x$

$\dfrac{\sin^2 x}{2\sin x\cos x}$    Cancel common factors

$\dfrac{\sin x}{2\cos x}$    Use $\tan x = \dfrac{\sin x}{\cos x}$

$\dfrac{\tan x}{2}$    ■

863) $\cos 4x\tan 4x$    Use $\tan 4x = \dfrac{\sin 4x}{\cos 4x}$

$\dfrac{\cos 4x\sin 4x}{\cos 4x}$    Cancel common factors

$\sin 4x$    Use $\cos 2x = 1 - 2\sin^2 x$

$\dfrac{\sin 4x}{2\sin^2 x + \cos 2x}$    ■

**864)** $\dfrac{\sin x}{\tan 2x}$  Use $\tan 2x = \dfrac{\sin 2x}{\cos 2x}$

$\dfrac{\sin x\cos 2x}{\sin 2x}$  Use $\sin 2x = 2\sin x\cos x$

$\dfrac{\sin x\cos 2x}{2\sin x\cos x}$  Cancel common factors

$\dfrac{\cos 2x}{2\cos x}$  ∎

**865)** $\dfrac{1 - \tan^2 x}{2}$  Decompose into sine and cosine

$\dfrac{1 - \left(\dfrac{\sin x}{\cos x}\right)^2}{2}$  Simplify

$\dfrac{\cos^2 x - \sin^2 x}{2\cos^2 x}$  Use $\cos 2x = \cos^2 x - \sin^2 x$

$\dfrac{\cos 2x}{2\cos^2 x}$  ∎

**866)** $\dfrac{\tan^2 x}{1 - \cos 2x}$  Use $\tan^2 x = \dfrac{1 - \cos 2x}{1 + \cos 2x}$

$\dfrac{1 - \cos 2x}{(1 - \cos 2x)(1 + \cos 2x)}$  Use $\cos 2x = 2\cos^2 x - 1$

$\dfrac{2(1 - \cos^2 x)}{4\cos^2 x(1 - \cos^2 x)}$  Cancel common factors

$\dfrac{1}{2\cos^2 x}$  ∎

**867)** $\dfrac{\sin 2x}{\sin^2 x}$  Use $\sin 2x = 2\sin x\cos x$

$\dfrac{2\sin x\cos x}{\sin^2 x}$  Cancel common factors

$\dfrac{2\cos x}{\sin x}$  Use $\csc x = \dfrac{1}{\sin x}$

$2\cos x\csc x$  ∎

868) $1 - \cos 2x - \tan^2 x$     Use $\cos 2x = 1 - 2\sin^2 x$

$2\sin^2 x - \tan^2 x$     Decompose into sine and cosine

$2\sin^2 x - \left(\dfrac{\sin x}{\cos x}\right)^2$     Simplify

$\dfrac{\sin^2 x\left(2\cos^2 x - 1\right)}{\cos^2 x}$     Use $\cos 2x = 2\cos^2 x - 1$

$\dfrac{\sin^2 x \cos 2x}{\cos^2 x}$     Use $\tan x = \dfrac{\sin x}{\cos x}$

$\tan^2 x \cos 2x$     ■

869) $\dfrac{\tan x \cdot \left(1 - \cos 2x\right)}{\sec^2 x}$     Use $\cos 2x = 1 - 2\sin^2 x$

$\dfrac{2\tan x \sin^2 x}{\sec^2 x}$     Decompose into sine and cosine

$\dfrac{2 \cdot \dfrac{\sin x}{\cos x} \cdot \sin^2 x}{\left(\dfrac{1}{\cos x}\right)^2}$     Simplify

$2\sin^3 x \cos x$     Use $\sin 2x = 2\sin x \cos x$

$\sin^2 x \sin 2x$     ■

870) $\tan x \cdot \left(1 + \cos 2x\right)$     Use $\cos 2x = 2\cos^2 x - 1$

$2\tan x \cos^2 x$     Use $\tan x = \dfrac{\sin x}{\cos x}$

$\dfrac{2\sin x \cos^2 x}{\cos x}$     Cancel common factors

$2\sin x \cos x$     Use $\sin 2x = 2\sin x \cos x$

$\sin 2x$     ■

871) $\dfrac{1 - \cos 2x}{\sin x}$     Use $\cos 2x = 1 - 2\sin^2 x$

$\dfrac{2\sin^2 x}{\sin x}$     Cancel common factors

$2\sin x$     Create a common factor

$\dfrac{2\sin x \cos x}{\cos x}$     Use $\sec x = \dfrac{1}{\cos x}$

$2\sin x \cos x \sec x$     ■

872) $\sin^2 x - \tan x \sin 2x$    Use $\sin 2x = 2\sin x \cos x$

$\sin x \cdot (\sin x - 2\tan x \cos x)$    Decompose into sine and cosine

$\sin x \cdot \left(\sin x - 2 \cdot \dfrac{\sin x}{\cos x} \cdot \cos x\right)$    Simplify

$-\sin^2 x$    Use $\cos 2x = \cos^2 x - \sin^2 x$

$\cos 2x - \cos^2 x$    ■

873) $\dfrac{\sin 2x}{\tan^2 x}$    Use $\sin 2x = 2\sin x \cos x$

$\dfrac{2\sin x \cos x}{\tan^2 x}$    Use $\tan x = \dfrac{\sin x}{\cos x}$

$\dfrac{2\cos^3 x \sin x}{\sin^2 x}$    Cancel common factors

$\dfrac{2\cos^3 x}{\sin x}$    Use $\cot x = \dfrac{\cos x}{\sin x}$

$2\cos^2 x \cot x$    ■

874) $\dfrac{\sin 2x + \tan 2x}{2\cos^2 x}$    Use $\cos 2x = 2\cos^2 x - 1$

$\dfrac{\sin 2x + \tan 2x}{1 + \cos 2x}$    Decompose into sine and cosine

$\dfrac{\sin 2x + \dfrac{\sin 2x}{\cos 2x}}{1 + \cos 2x}$    Simplify

$\dfrac{\sin 2x}{\cos 2x}$    Use $\tan 2x = \dfrac{\sin 2x}{\cos 2x}$

$\tan 2x$    ■

875) $2\sin^2 x - \tan^2 x$     Decompose into sine and cosine

$2\sin^2 x - \left(\dfrac{\sin x}{\cos x}\right)^2$     Simplify

$\dfrac{\sin^2 x\left(2\cos^2 x - 1\right)}{\cos^2 x}$     Use $\cos 2x = 2\cos^2 x - 1$

$\dfrac{\sin^2 x\cos 2x}{\cos^2 x}$     Use $\tan x = \dfrac{\sin x}{\cos x}$

$\tan^2 x\cos 2x$     ■

876) $\dfrac{\sin 2x}{2\tan^2 x\cos^2 x}$     Use $\sin 2x = 2\sin x\cos x$

$\dfrac{2\sin x\cos x}{2\tan^2 x\cos^2 x}$     Decompose into sine and cosine

$\dfrac{2\sin x\cos x}{2\cdot\left(\dfrac{\sin x}{\cos x}\right)^2\cdot\cos^2 x}$     Simplify

$\dfrac{\cos x}{\sin x}$     Use $\sec x = \dfrac{1}{\cos x}$

$\dfrac{1}{\sin x\sec x}$     ■

877) $\cot x + \sin 2x$     Use $\sin 2x = 2\sin x\cos x$

$\cot x + 2\sin x\cos x$     Decompose into sine and cosine

$\dfrac{\cos x}{\sin x} + 2\sin x\cos x$     Simplify

$\dfrac{\cos x\cdot\left(1 + 2\sin^2 x\right)}{\sin x}$     Use $\tan x = \dfrac{\sin x}{\cos x}$

$\dfrac{1 + 2\sin^2 x}{\tan x}$     ■

878) $\csc^2 x - 2$ — Decompose into sine and cosine

$\left(\dfrac{1}{\sin x}\right)^2 - 2$ — Simplify

$\dfrac{-2\sin^2 x + 1}{\sin^2 x}$ — Use $\cos 2x = 1 - 2\sin^2 x$

$\dfrac{\cos 2x}{\sin^2 x}$ — Use $\csc x = \dfrac{1}{\sin x}$

$\cos 2x \csc^2 x$ ∎

879) $\dfrac{\cot x}{\csc^2 x(1 + \cos 2x)}$ — Use $\cos 2x = 2\cos^2 x - 1$

$\dfrac{\cot x}{2\csc^2 x \cos^2 x}$ — Use $\cot x = \dfrac{\cos x}{\sin x}$

$\dfrac{\cos x}{2\csc^2 x \sin x \cos^2 x}$ — Cancel common factors

$\dfrac{1}{2\csc^2 x \sin x \cos x}$ — Use $\sin 2x = 2\sin x \cos x$

$\dfrac{1}{\sin 2x \csc^2 x}$ — Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{\sin^2 x}{\sin 2x}$ ∎

880) $\dfrac{1 - \tan^2 x}{\sin 2x}$ — Decompose into sine and cosine

$\dfrac{1 - \left(\dfrac{\sin x}{\cos x}\right)^2}{\sin 2x}$ — Simplify

$\dfrac{\cos^2 x - \sin^2 x}{\cos^2 x \sin 2x}$ — Use $\cos 2x = \cos^2 x - \sin^2 x$

$\dfrac{\cos 2x}{\cos^2 x \sin 2x}$ — Use $\sec x = \dfrac{1}{\cos x}$

$\dfrac{\sec^2 x \cos 2x}{\sin 2x}$ — Use $\tan 2x = \dfrac{\sin 2x}{\cos 2x}$

$\dfrac{\sec^2 x}{\tan 2x}$ ∎

881) $\tan 2x \sin 4x$     Use $\sin 4x = 2\sin 2x\cos 2x$

$2\tan 2x\sin 2x\cos 2x$     Use $\tan 2x = \dfrac{\sin 2x}{\cos 2x}$

$\dfrac{2\sin^2 2x\cos 2x}{\cos 2x}$     Cancel common factors

$2\sin^2 2x$     Use $\cos 4x = 1 - 2\sin^2 2x$

$1 - \cos 4x$     ∎

882) $\sin 2x - \tan x$     Use $\sin 2x = 2\sin x\cos x$

$2\sin x\cos x - \tan x$     Decompose into sine and cosine

$2\sin x\cos x - \dfrac{\sin x}{\cos x}$     Simplify

$\dfrac{\sin x \cdot \left(2\cos^2 x - 1\right)}{\cos x}$     Use $\cos 2x = 2\cos^2 x - 1$

$\dfrac{\cos 2x\sin x}{\cos x}$     Use $\tan x = \dfrac{\sin x}{\cos x}$

$\tan x\cos 2x$     ∎

883) $\dfrac{2\sin x\cos x}{\tan 2x}$     Use $\sin 2x = 2\sin x\cos x$

$\dfrac{\sin 2x}{\tan 2x}$     Use $\tan 2x = \dfrac{\sin 2x}{\cos 2x}$

$\dfrac{\cos 2x\sin 2x}{\sin 2x}$     Cancel common factors

$\cos 2x$     Use $\cos 2x = \cos^2 x - \sin^2 x$

$\cos^2 x - \sin^2 x$     ∎

884) $\cos^2 x(1 - \tan^2 x)$      Decompose into sine and cosine

$\cos^2 x\left(1 - \left(\dfrac{\sin x}{\cos x}\right)^2\right)$      Simplify

$\cos^2 x - \sin^2 x$      Use $\cos 2x = \cos^2 x - \sin^2 x$

$\cos 2x$      Create a common factor

$\dfrac{\cos 2x \csc x}{\csc x}$      Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{\cos 2x}{\csc x \sin x}$      ■

885) $\sin^2 x(1 - \tan^2 x)$      Decompose into sine and cosine

$\sin^2 x\left(1 - \left(\dfrac{\sin x}{\cos x}\right)^2\right)$      Simplify

$\dfrac{\sin^2 x(\cos^2 x - \sin^2 x)}{\cos^2 x}$      Use $\cos 2x = \cos^2 x - \sin^2 x$

$\dfrac{\sin^2 x \cos 2x}{\cos^2 x}$      Use $\tan x = \dfrac{\sin x}{\cos x}$

$\tan^2 x \cos 2x$      ■

886) $1 - \tan^2 x$      Decompose into sine and cosine

$1 - \left(\dfrac{\sin x}{\cos x}\right)^2$      Simplify

$\dfrac{\cos^2 x - \sin^2 x}{\cos^2 x}$      Use $\cos 2x = \cos^2 x - \sin^2 x$

$\dfrac{\cos 2x}{\cos^2 x}$      Use $\sec x = \dfrac{1}{\cos x}$

$\cos 2x \sec^2 x$      ■

887) $\dfrac{\csc^2 x}{1 - \tan^2 x}$ 　　　Decompose into sine and cosine

$\dfrac{\left(\dfrac{1}{\sin x}\right)^2}{1 - \left(\dfrac{\sin x}{\cos x}\right)^2}$ 　　Simplify

$\dfrac{\cos^2 x}{\sin^2 x\left(\cos^2 x - \sin^2 x\right)}$ 　　Use $\cos 2x = \cos^2 x - \sin^2 x$

$\dfrac{\cos^2 x}{\sin^2 x \cos 2x}$ 　　Use $\cot x = \dfrac{\cos x}{\sin x}$

$\dfrac{\cot^2 x}{\cos 2x}$ 　　　■

888) $-\dfrac{\sqrt{2}}{2}$ 　　889) $\dfrac{1}{2}$ 　　890) $\dfrac{1}{2}$ 　　891) $\dfrac{\sqrt{3}}{2}$

892) $-\dfrac{1}{2}$ 　　893) $-\dfrac{1}{2}$ 　　894) $1$ 　　895) $\dfrac{\sqrt{3}}{2}$

896) $0$ 　　897) $\dfrac{1}{2}$ 　　898) $0$ 　　899) $-\dfrac{\sqrt{3}}{2}$

900) $-\dfrac{1}{2}$ 　　901) $\dfrac{\sqrt{2}}{2}$ 　　902) $\dfrac{\sqrt{2}}{2}$ 　　903) $-\dfrac{\sqrt{3}}{2}$

904) $\dfrac{1}{2}$ 　　905) $\dfrac{\sqrt{2}}{2}$ 　　906) $-\dfrac{1}{2}$ 　　907) $\dfrac{\sqrt{2}}{2}$

908) $\dfrac{\sqrt{6} - \sqrt{2}}{4}$ 　　909) $\dfrac{\sqrt{2} - \sqrt{6}}{4}$ 　　910) $\dfrac{\sqrt{6} + \sqrt{2}}{4}$ 　　911) $\dfrac{-\sqrt{6} - \sqrt{2}}{4}$

912) $\dfrac{\sqrt{6} + \sqrt{2}}{4}$ 　　913) $\dfrac{\sqrt{6} - \sqrt{2}}{4}$ 　　914) $\dfrac{-\sqrt{6} - \sqrt{2}}{4}$ 　　915) $\dfrac{-\sqrt{6} - \sqrt{2}}{4}$

916) $\dfrac{\sqrt{6} + \sqrt{2}}{4}$ 　　917) $\dfrac{\sqrt{6} + \sqrt{2}}{4}$ 　　918) $\dfrac{\sqrt{2} - \sqrt{6}}{4}$ 　　919) $\dfrac{-\sqrt{6} - \sqrt{2}}{4}$

920) $\dfrac{\sqrt{2} - \sqrt{6}}{4}$ 　　921) $\dfrac{\sqrt{2} - \sqrt{6}}{4}$ 　　922) $\dfrac{\sqrt{6} + \sqrt{2}}{4}$ 　　923) $\dfrac{\sqrt{6} + \sqrt{2}}{4}$

924) $\dfrac{\sqrt{2} - \sqrt{6}}{4}$ 　　925) $\dfrac{\sqrt{2} - \sqrt{6}}{4}$ 　　926) $\dfrac{\sqrt{6} - \sqrt{2}}{4}$ 　　927) $\dfrac{\sqrt{6} - \sqrt{2}}{4}$

928) $-2 - \sqrt{3}$ 　　929) $2 + \sqrt{3}$ 　　930) $2 - \sqrt{3}$ 　　931) $2 + \sqrt{3}$

932) $2 + \sqrt{3}$ 　　933) $\sqrt{3} - 2$ 　　934) $\sqrt{3} - 2$ 　　935) $-2 - \sqrt{3}$

936) $-2 - \sqrt{3}$ 　　937) $2 + \sqrt{3}$ 　　938) $\dfrac{\sqrt{2 + \sqrt{3}}}{2}$ 　　939) $1 - \sqrt{2}$

940) $-\dfrac{\sqrt{2 - \sqrt{3}}}{2}$ 　　941) $\sqrt{2} - 1$ 　　942) $-\dfrac{\sqrt{2 + \sqrt{3}}}{2}$ 　　943) $\dfrac{\sqrt{2 + \sqrt{3}}}{2}$

944) $-\dfrac{\sqrt{2+\sqrt{2}}}{2}$

945) $\sqrt{3}-2$

946) $-\dfrac{\sqrt{2-\sqrt{2}}}{2}$

947) $\dfrac{\sqrt{2-\sqrt{2}}}{2}$

948) $-\dfrac{\sqrt{2-\sqrt{3}}}{2}$

949) $\dfrac{\sqrt{2+\sqrt{2}}}{2}$

950) $\dfrac{\sqrt{2-\sqrt{3}}}{2}$

951) $-2-\sqrt{3}$

952) $1+\sqrt{2}$

953) $\dfrac{\sqrt{2-\sqrt{2}}}{2}$

954) $\dfrac{\sqrt{2+\sqrt{2}}}{2}$

955) $-2-\sqrt{3}$

956) $\dfrac{\sqrt{2+\sqrt{3}}}{2}$

957) $-\dfrac{\sqrt{2+\sqrt{2}}}{2}$

958) $-\dfrac{5\sqrt{34}}{34}$

959) $-\dfrac{24}{25}$

960) $\dfrac{3\sqrt{34}}{34}$

961) $\dfrac{\sqrt{5}}{5}$

962) $-\dfrac{2\sqrt{13}}{13}$

963) $-\dfrac{\sqrt{5}}{5}$

964) $-\dfrac{7}{25}$

965) $\dfrac{\sqrt{338-65\sqrt{26}}}{26}$

966) $\dfrac{5\sqrt{34}}{34}$

967) $\dfrac{5\sqrt{34}}{34}$

968) $\dfrac{120}{169}$

969) $\dfrac{8\sqrt{14}}{223}$

970) $\dfrac{240}{161}$

971) $-\dfrac{4\sqrt{2}}{7}$

972) $-\dfrac{24}{7}$

973) $\dfrac{\sqrt{50+20\sqrt{5}}}{10}$

974) $-\dfrac{240}{161}$

975) $-\dfrac{7}{25}$

976) $-\dfrac{120}{169}$

977) $\dfrac{\sqrt{5}}{5}$

978) $\left\{\dfrac{\pi}{3},\dfrac{2\pi}{3},\dfrac{4\pi}{3},\dfrac{5\pi}{3}\right\}$

979) $\left\{\dfrac{\pi}{4},\dfrac{3\pi}{4},\dfrac{5\pi}{4},\dfrac{7\pi}{4}\right\}$

980) $\left\{\dfrac{\pi}{4},\dfrac{3\pi}{4},\dfrac{5\pi}{4},\dfrac{7\pi}{4}\right\}$

981) $\left\{\dfrac{\pi}{3},\dfrac{2\pi}{3},\dfrac{4\pi}{3},\dfrac{5\pi}{3}\right\}$

982) $\left\{\dfrac{\pi}{3},\dfrac{2\pi}{3},\dfrac{4\pi}{3},\dfrac{5\pi}{3}\right\}$

983) $\left\{\dfrac{\pi}{6},\dfrac{5\pi}{6},\dfrac{7\pi}{6},\dfrac{11\pi}{6}\right\}$

984) $\{0,\pi\}$

985) $\left\{\dfrac{\pi}{4},\dfrac{3\pi}{4},\dfrac{5\pi}{4},\dfrac{7\pi}{4}\right\}$

986) $\left\{\dfrac{\pi}{6},\dfrac{5\pi}{6},\dfrac{7\pi}{6},\dfrac{11\pi}{6}\right\}$

987) $\left\{\dfrac{\pi}{2},\dfrac{3\pi}{2}\right\}$

988) $\left\{\dfrac{\pi}{2},\dfrac{7\pi}{6},\dfrac{11\pi}{6}\right\}$

989) $\left\{\dfrac{\pi}{6},\dfrac{7\pi}{6}\right\}$

990) $\left\{\dfrac{7\pi}{6},\dfrac{11\pi}{6}\right\}$

991) $\left\{\dfrac{3\pi}{4},\dfrac{7\pi}{4}\right\}$

992) $\left\{\dfrac{\pi}{4},\dfrac{5\pi}{4}\right\}$

993) $\left\{\dfrac{7\pi}{6},\dfrac{3\pi}{2},\dfrac{11\pi}{6}\right\}$

994) $\left\{\dfrac{\pi}{2},\dfrac{3\pi}{2}\right\}$

995) $\left\{\dfrac{2\pi}{3},\dfrac{5\pi}{3}\right\}$

996) $\left\{0,\dfrac{2\pi}{3},\pi,\dfrac{4\pi}{3}\right\}$

997) $\left\{\dfrac{7\pi}{6},\dfrac{11\pi}{6}\right\}$

998) $\left\{\dfrac{5\pi}{6},\dfrac{7\pi}{6}\right\}$

999) $\left\{\dfrac{\pi}{3},\dfrac{5\pi}{3}\right\}$

1000) $\left\{\dfrac{3\pi}{4},\dfrac{5\pi}{4}\right\}$

1001) $\left\{\dfrac{2\pi}{3},\dfrac{4\pi}{3}\right\}$

1002) $\left\{\dfrac{3\pi}{2}\right\}$

1003) $\left\{\dfrac{3\pi}{2}\right\}$

1004) $\left\{\dfrac{\pi}{4},\dfrac{7\pi}{4}\right\}$

1005) $\left\{\dfrac{\pi}{2}\right\}$

1006) $\left\{\dfrac{\pi}{2}\right\}$

1007) $\left\{\dfrac{\pi}{6},\dfrac{11\pi}{6}\right\}$