



Navigation Problems

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See REF1166

A vessel at LAT 32°05.0'N, LONG 81°06.0'W, heads for a destination at LAT 35°57.0'N, LONG 5°45.0'W. Determine the distance by Mercator sailing.

3770.6 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

A vessel at LAT 49°45'N, LONG 6°35'W, heads for a destination at LAT 25°50'N, LONG 77°00'W. Determine the true course and distance by Mercator sailing.

246.5°T, 3597 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

A vessel at LAT 32°14.7'N, LONG 66°28.9'W, heads for a destination at LAT 36°58.7'N, LONG 75°42.2'W. Determine the distance by Mercator sailing.

538.2 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

You depart LAT 33°45.0'N, LONG 118°30.0'W, and steam 2216 miles on course 250°T. What is the longitude of your arrival by Mercator sailing?

LONG 157°31.0'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

You depart LAT 25°54'N, LONG 9°38'E and steam 592 miles on course 270°. What is the longitude of arrival?

1°20'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1167

You depart LAT 26°03'S, LONG 10°28'E, for LAT 26°03'S, LONG 01°16'W. What are the course and distance by parallel sailing?

270°T, 632.5 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1167

Your vessel departs LAT 32°45'N, LONG 79°50'W, and is bound for LAT 34°21'S, LONG 18°29'E. Determine the distance by Mercator sailing.

6,884 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

A vessel at LAT 33°45'N, LONG 118°30'W, heads for a destination at LAT 21°15'N, LONG 157°36'W. Determine the true course and distance by Mercator sailing.

250.2°T, 2216 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

A vessel at LAT 38°03.0'S, LONG 49°38.0'W, heads for a destination at LAT 41°26.0'S, LONG 38°32.0'W. Determine the true course by Mercator sailing.

111.5°T

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

You depart LAT 49°45.0'N, LONG 06°35.0'W, and steam 3599 miles on course 246.5°T. What is the longitude of your arrival by Mercator sailing?

LONG 77°02.8'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

You depart LAT 38°12'S, LONG 12°06'W and steam 1543 miles on course 270°. What is the Longitude of arrival?

44°49'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1167

You depart LAT 32°16.6'N, LONG 68°28.0'W. What is the course and distance as calculated by Mercator sailing to a position at LAT 43°12.2'N, LONG 55°39.0'W?

042.8°T, 896.2 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

A vessel at LAT 18°54'N, LONG 73°00'E, heads for a destination at LAT 13°12'N, LONG 54°00'E. Determine the true course and distance by Mercator sailing.

253°T, 1154 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

A vessel at LAT 45°36.0'N, LONG 11°36.0'W, heads for a destination at LAT 24°16.0'N, LONG 73°52.0'W. Determine the true course and distance by Mercator sailing.

247°T, 3299.3 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

You depart LAT 34°22'S, LONG 18°23'E, and steam 3174 miles on course 282°T. What is the longitude of your arrival by Mercator sailing?

LONG 40°33.5'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

You depart LAT 38°14'N, LONG 12°42'W, for LAT 38°14'N, LONG 46°09'W. What are the course and distance by parallel sailing?

270°T, 1576.5 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1167

You depart LAT 51°48.0'S, LONG 178°35.0'W and steam 179 miles on course 270°. What is the longitude of arrival?
176°36'E

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1167

A vessel at LAT 11°22'S, LONG 009°18'E heads for a destination at LAT 06°52'N, LONG 57°23'W. Determine the true course and distance by Mercator sailing.
285°T, 4,154.2 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel at LAT 21°18.5'N, LONG 157°52.2'W, heads for a destination at LAT 8°53.0'N, LONG 79°31.0'W. Determine the true course and distance by Mercator sailing.
099°T, 4617.5 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel at LAT 10°22.0'S, LONG 7°18.0'E, heads for a destination at LAT 6°52.0'N, LONG 57°23.0'W. Determine the true course and distance by Mercator sailing.
285°T, 4025.7 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

You depart LAT 37°36'N, LONG 123°00'W, and steam 2022 miles on course 241°T. What is the longitude of your arrival by Mercator sailing?
LONG 156°51.7'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel steams 720 miles on course 058°T from LAT 30°06.0'S, LONG 31°42.0'E. What are the latitude and longitude of the point of arrival by mid-latitude sailing?
LAT 23°44'S, LONG 43°07'E

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1166

You depart LAT 52°01'N, LONG 176°09'E, for LAT 52°01'N, LONG 178°46'W. What are the course and distance by parallel sailing?
090°T, 188 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1167

You depart LAT 50°06.0'N, LONG 153°06.0'E and steam 879 miles on course 090°. What is the LONG of arrival?
175°56.0'E

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1167

Your vessel receives a distress call from a vessel reporting her position at LAT 5°24'N, LONG 31°16'W. Your position is LAT 2°39'S, LONG 39°24'W. Determine the distance from your vessel to the vessel in distress by Mercator sailing.

688.7 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

A vessel at LAT 21°32'N, LONG 160°30'W, heads for a destination at LAT 30°00'N, LONG 150°00'E. Determine the true course and distance by Mercator sailing.

281°T, 2733 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

You depart LAT 40°42.0'N, LONG 74°01.0'W, and steam 3365.6 miles on course 118°T. What is the longitude of your arrival by Mercator sailing?

17°41.0'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

A vessel steams 1082 miles on course 047°T from LAT 37°18.0'N, LONG 24°40.0'W. What is the latitude and longitude of the point of arrival by Mercator sailing?

LAT 49°36.0'N, LONG 06°28.0'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

A vessel steams 576 miles on course 260°T from LAT 40°36'N, LONG 50°24'W. What are the latitude and longitude of the point of arrival by mid-latitude sailing?

LAT 38°56'N, LONG 62°42'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1166

You depart LAT 49°38'N, LONG 152°49'E, for LAT 49°38'N, LONG 176°12'E. What are the course and distance by parallel sailing?

090°T, 909 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1167

You depart LAT 15°48'N, LONG 174°06'E and steam 905 miles on course 090°. What is the LONG of arrival?

170°13'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1167

Your vessel receives a distress call from a vessel reporting her position as LAT 35°01'S, LONG 18°51'W. Your position is LAT 30°18'S, LONG 21°42'W. Determine the true course from your vessel to the vessel in distress by Mercator sailing.

153°T

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

A vessel at LAT 29°38.0'N, LONG 93°49.0'W, heads for a destination at LAT 24°38.0'N, LONG 82°55.2'W. Determine the true course and distance by Mercator sailing.

117°T, 658 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

You depart LAT 22°35.0'N, LONG 157°30.0'W, and steam 4505.0 miles on course 135°T. What are the latitude and longitude of your arrival by Mercator sailing?

30°30.5'S, 102°35.3'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel steams 3312 miles on course 282°T from LAT 34°24'S, LONG 18°18'E. What is the latitude and longitude of the point of arrival by Mercator sailing?

LAT 22°55'S, LONG 43°05'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel steams 580 miles on course 083°T from LAT 13°12'N, LONG 71°12'W. What are the latitude and longitude of the point of arrival by mid-latitude sailing?

LAT 14°23'N, LONG 61°19'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1166

You depart LAT 16°24'S, LONG 169°38'W, for LAT 16°24'S, LONG 174°52'E. What are the course and distance by parallel sailing?

270°T, 892 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1167

You receive a distress call from a vessel reporting her position as LAT 30°21'N, LONG 88°34'W. Your position is LAT 24°30'N, LONG 83°00'W. Determine the true course and distance to the distress scene by Mercator sailing.

320°T, 460 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel at LAT 32°14.7'N, LONG 66°28.9'W, heads for a destination at LAT 36°58.7'N, LONG 75°42.2'W. Determine the true course by Mercator sailing.

301.8°T

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel steams 1106 miles on course 249°T from LAT 13°30.0'N, LONG 144°30.3'E. What is the latitude and longitude of the point of arrival by Mercator sailing?

LAT 06°54.0'N, LONG 127°08.0'E

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

You depart LAT 28°55.0'N, LONG 89°10.0'W, enroute to LAT 24°25.0'N, LONG 83°00.0'W. What is the true course and distance by mid-latitude sailing?

442 miles, 122°T

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1166

A vessel steams 640 miles on course 047°T from LAT 34°45'N, LONG 140°00'E. What are the latitude and longitude of the point of arrival by mid-latitude sailing?

LAT 42°01'N, LONG 149°57'E

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1166

A vessel at LAT 32°05.0'N, LONG 81°06.0'W, heads for a destination at LAT 35°57.0'N, LONG 5°45.0'W. Determine the distance by Mercator sailing.

3770.6 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
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A vessel at LAT 49°45'N, LONG 6°35'W, heads for a destination at LAT 25°50'N, LONG 77°00'W. Determine the true course and distance by Mercator sailing.

246.5°T, 3597 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
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538.2 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

You depart LAT 33°45.0'N, LONG 118°30.0'W, and steam 2216 miles on course 250°T. What is the longitude of your arrival by Mercator sailing?

LONG 157°31.0'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

You depart LAT 25°54'N, LONG 9°38'E and steam 592 miles on course 270°. What is the longitude of arrival?

1°20'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
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You depart LAT 26°03'S, LONG 10°28'E, for LAT 26°03'S, LONG 01°16'W. What are the course and distance by parallel sailing?

270°T, 632.5 miles

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6,884 miles

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111.5°T

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

You depart LAT 49°45.0'N, LONG 06°35.0'W, and steam 3599 miles on course 246.5°T. What is the longitude of your arrival by Mercator sailing?

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Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

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You depart LAT 32°16.6'N, LONG 68°28.0'W. What is the course and distance as calculated by Mercator sailing to a position at LAT 43°12.2'N, LONG 55°39.0'W?

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247°T, 3299.3 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

You depart LAT 34°22'S, LONG 18°23'E, and steam 3174 miles on course 282°T. What is the longitude of your arrival by Mercator sailing?

LONG 40°33.5'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
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You depart LAT 38°14'N, LONG 12°42'W, for LAT 38°14'N, LONG 46°09'W. What are the course and distance by parallel sailing?

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285°T, 4,154.2 miles

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A vessel at LAT 21°18.5'N, LONG 157°52.2'W, heads for a destination at LAT 8°53.0'N, LONG 79°31.0'W. Determine the true course and distance by Mercator sailing.

099°T, 4617.5 miles

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A vessel at LAT 10°22.0'S, LONG 7°18.0'E, heads for a destination at LAT 6°52.0'N, LONG 57°23.0'W. Determine the true course and distance by Mercator sailing.

285°T, 4025.7 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

You depart LAT 37°36'N, LONG 123°00'W, and steam 2022 miles on course 241°T. What is the longitude of your arrival by Mercator sailing?

LONG 156°51.7'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
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A vessel steams 720 miles on course 058°T from LAT 30°06.0'S, LONG 31°42.0'E. What are the latitude and longitude of the point of arrival by mid-latitude sailing?

LAT 23°44'S, LONG 43°07'E

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1166

You depart LAT 52°01'N, LONG 176°09'E, for LAT 52°01'N, LONG 178°46'W. What are the course and distance by parallel sailing?

090°T, 188 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1167

You depart LAT 50°06.0'N, LONG 153°06.0'E and steam 879 miles on course 090°. What is the LONG of arrival?

175°56.0'E

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1167

Your vessel receives a distress call from a vessel reporting her position at LAT 5°24'N, LONG 31°16'W. Your position is LAT 2°39'S, LONG 39°24'W. Determine the distance from your vessel to the vessel in distress by Mercator sailing.

688.7 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
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A vessel at LAT 21°32'N, LONG 160°30'W, heads for a destination at LAT 30°00'N, LONG 150°00'E. Determine the true course and distance by Mercator sailing.

281°T, 2733 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

You depart LAT 40°42.0'N, LONG 74°01.0'W, and steam 3365.6 miles on course 118°T. What is the longitude of your arrival by Mercator sailing?

17°41.0'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel steams 1082 miles on course 047°T from LAT 37°18.0'N, LONG 24°40.0'W. What is the latitude and longitude of the point of arrival by Mercator sailing?

LAT 49°36.0'N, LONG 06°28.0'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel steams 576 miles on course 260°T from LAT 40°36'N, LONG 50°24'W. What are the latitude and longitude of the point of arrival by mid-latitude sailing?

LAT 38°56'N, LONG 62°42'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1166

You depart LAT 49°38'N, LONG 152°49'E, for LAT 49°38'N, LONG 176°12'E. What are the course and distance by parallel sailing?

090°T, 909 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1167

You depart LAT 15°48'N, LONG 174°06'E and steam 905 miles on course 090°. What is the LONG of arrival?
170°13'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1167

Your vessel receives a distress call from a vessel reporting her position as LAT 35°01'S, LONG 18°51'W. Your position is LAT 30°18'S, LONG 21°42'W. Determine the true course from your vessel to the vessel in distress by Mercator sailing.
153°T

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel at LAT 29°38.0'N, LONG 93°49.0'W, heads for a destination at LAT 24°38.0'N, LONG 82°55.2'W. Determine the true course and distance by Mercator sailing.
117°T, 658 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

You depart LAT 22°35.0'N, LONG 157°30.0'W, and steam 4505.0 miles on course 135°T. What are the latitude and longitude of your arrival by Mercator sailing?
30°30.5'S, 102°35.3'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel steams 3312 miles on course 282°T from LAT 34°24'S, LONG 18°18'E. What is the latitude and longitude of the point of arrival by Mercator sailing?
LAT 22°55'S, LONG 43°05'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel steams 580 miles on course 083°T from LAT 13°12'N, LONG 71°12'W. What are the latitude and longitude of the point of arrival by mid-latitude sailing?
LAT 14°23'N, LONG 61°19'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1166

You depart LAT 16°24'S, LONG 169°38'W, for LAT 16°24'S, LONG 174°52'E. What are the course and distance by parallel sailing?
270°T, 892 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1167

A vessel at LAT 38°36'N, LONG 11°36'W, heads for a destination at LAT 24°16'N, LONG 71°52'W. Determine the true course and distance by Mercator sailing.
254.4°T, 3,203.6 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2
See REF1165

A vessel at LAT 40°42.0'N, LONG 74°01.0'W, heads for a destination at LAT 14°41.0'N, LONG 17°26.0'W. Determine the true course and distance by Mercator sailing.

118°T, 3365.0 miles

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

A vessel steams 1650 miles on course 077°T from LAT 12°47'N, LONG 45°10'E. What is the latitude and longitude of the point of arrival by Mercator sailing?

LAT 18°58'N, LONG 72°52'E

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1165

A vessel steams 666 miles on course 135°T from LAT 40°24.0'N, LONG 74°30.0'W. What is the latitude and longitude of the point of arrival by Mercator sailing?

LAT 32°33.0'N, LONG 64°46.0'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1166

A vessel steams 666 miles on course 295°T from LAT 24°24'N, LONG 83°00'W. What are the latitude and longitude of the point of arrival by mid-latitude sailing?

LAT 29°06'N, LONG 94°16'W

Illustrations: BOWDITCH TABLE 5_1, BOWDITCH TABLE 5_2

See REF1166

At 0600 zone time, on 16 March your DR position is LAT 20°10.0'N, LONG 81°30.0'W. You are steering course 300°T. The speed over the ground is 10 knots. You observed 3 morning sun lines. Determine the latitude and longitude of your 1130 running fix? (See Navigation Problems Question Tables NP-0004 Below)

LAT 20°39.0'N, LONG 82°22.9'W

Illustrations: NP0004

See REF1042

Your 0745 ZT 15 July position is LAT 29°04.0'N, LONG 71°17.5'W. You are on course 165°T, and your speed is 8.0 knots. You observed 3 morning sun lines. Determine the latitude and longitude of your 1130 running fix? (See Navigation Problems Question Tables NP-0003 Below)

LAT 28°35.0'N, LONG 71°08.5'W

Illustrations: NP0003

See REF1042

At 0100 zone time on 23 September your DR position is LAT 24°25.0'N, LONG 83°00.0'W. You are steering course 315°T. The speed over the ground is 10.0 knots. You observed 3 morning sun lines. Determine the latitude and longitude of your 1100 running fix? (See Navigation Problems Question Tables NP-0002 Below)

LAT 25°35.3'N, LONG 84°17.0'W

Illustrations: NP0002

See REF1042

At 0900 zone time on 23 September your DR position is LAT 28°48.0'N, LONG 153°11.5'W. You are steering course 257°T at a speed of 18.0 knots. You observed 3 morning sun lines. Determine the latitude and longitude of your 1020 running fix? (See Navigation Problems Question Tables NP-0001 Below)

LAT 28°49.1'N, LONG 153°37.0'W

Illustrations: NP0001

See REF1042

On 14 September your 1810 ZT DR position is LAT 27°12.0' S, LONG 71°10.0' E. You are on course 060°T at a speed of 15.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1822 running fix. (See Navigation Problems Question Tables NP-0011 Below)

LAT 27°11.0'S, LONG 71°14.5'E

Illustrations: NP0011

See REF1042

On 20 February your 0530 ZT DR position is LAT 24°15.0'N, LONG 137°33.0'W. You are on course 033°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0010 Below)

LAT 24°27.5'N, LONG 137°31.8'W

Illustrations: NP0010

See REF1042

On 19 November your 0300 zone time DR position is LAT 19°23' N, LONG 151°37' E. You are on course 293°T at a speed of 17 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0039 Below)

LAT 19°34.8'N, LONG 150°48.0'E

Illustrations: NP0039

See REF1042

On 5 May your 1600 zone time DR position is LAT 17°28' S, LONG 143°39' E. You are on course 316°T at a speed of 17 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1800 running fix. (See Navigation Problems Question Tables NP-0038 Below)

LAT 17°05.2'S, LONG 143°11.4'E

Illustrations: NP0038

See REF1042

On 16 April your 0200 zone time DR position is LAT 17°18'S, LONG 168°46'E. You are on course 236°T at a speed of 16 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.

LAT 18°00.4'S, LONG 167°49.2'E

Illustrations: NP0036

See REF1042

On 12 December your 1830 ZT DR position is LAT 24°16.0' S, LONG 41°18.0' W. You are on course 235°T at a speed of 16.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1930 running fix. (See Navigation Problems Question Tables NP-0009 Below)

LAT 24°16.9'S, LONG 41°18.2'W

Illustrations: NP0009

See REF1042

On 28 May your 0200 DR position is LAT 19°16.5' S , LONG 119°24.0' W. You are on course 107°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0034 Below)

LAT 19°43.0'S, LONG 117°54.0'W

Illustrations: NP0034

See REF1042

On 19 November your 0200 zone time DR position is LAT 20°29.0' N, LONG 150°21.3' E. You are on course 136°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0033 Below)

LAT 19°33.0'N, LONG 151°10.0'E

Illustrations: NP0033

See REF1042

On 25 August your 0300 zone time DR position is LAT 21°28.0' N, LONG 167°48.0' E. You are on course 248°T at a speed of 12 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0032 Below)

LAT 20°57.1'N, LONG 167°01.0'E

Illustrations: NP0032

See REF1042

On 19 November your 0200 zone time DR position is LAT 18°41' N, LONG 150°37' E. You are on course 014°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0031 Below)

LAT 19°45.4'N, LONG 150°52.6'E

Illustrations: NP0031

See REF1042

On 6 April your 0300 DR position is LAT 27°42' S, LONG 128°58' W. You are on course 097°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0029 Below)

LAT 27°44.7'S, LONG 127°47.5'W

Illustrations: NP0029

See REF1042

On 19 September your 0300 zone time DR position is LAT 24°35' N, LONG 88°40' W. You are on course 288°T at a speed of 14 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0028 Below)

LAT 24°52.5'N, LONG 89°22.4'W

Illustrations: NP0028

See REF1042

On 9 November your 0400 DR position is LAT 18°24.0' S, LONG 97°36.0' W. You are on course 138°T at a speed of 16 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0027 Below)

LAT 18°45.0'S, LONG 97°06.8'W

Illustrations: NP0027

See REF1042

On 24 October your 0100 DR position is LAT 27°42' N, LONG 158°35' E. You are on course 085°T at a speed of 12 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0700 running fix. (See Navigation Problems Question Tables NP-0026 Below)

LAT 27°56.0'N, LONG 159°47.3'E

Illustrations: NP0026

See REF1042

On 6 April your 1830 ZT DR position is LAT 26°33.0' N, LONG 64°31.0' W. You are on course 082°T at a speed of 16 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1900 running fix. (See Navigation Problems Question Tables NP-0008 Below)

LAT 26°32.5'N, LONG 64°27.1'W

Illustrations: NP0008

See REF1042

On 25 October your 0430 ZT DR position is LAT 24°48' N, LONG 65°31' W. Your vessel is on course 030°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0455 running fix. (See Navigation Problems Question Tables NP-0025 Below)

LAT 24°53'N, LONG 65°28'W

Illustrations: NP0025

See REF1042

On 12 October your vessel is on course 081°T, speed 20 knots. Your 1800 zone time DR position is LAT 26°11.0' S, LONG 77°18.0' E. You observed 3 celestial bodies. Determine the latitude and longitude of your 1835 running fix. (See Navigation Problems Question Tables NP-0024 Below)

LAT 26°12.0'S, LONG 77°31.0'E

Illustrations: NP0024

See REF1042

On 3 April your vessel's 1400 ZT DR position is LAT 20°08.0' N, LONG 147°45.0' W. You are steering course 023°T at 18.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1900 running fix. (See Navigation Problems Question Tables NP-0022 Below)

LAT 21°40.0'N, LONG 147°03.2'W

Illustrations: NP0022

See REF1042

On 10 August, your 0430 ZT position is LAT 29°56.7'S, LONG 139°11.0'E. Your course is 321°T, speed 18.2 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0500 running fix? NP-0021

LAT 29°49.2'S, LONG 138°57.0'E

Illustrations: NP0021

See REF1042

At 0450 zone time, on 25 June, your DR position is LAT 21°26.0'N, LONG 160°24.5'W. You are steering course 100°T at a speed of 10 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0514 running fix? (See Navigation Problems Question Tables NP-0020 Below)

LAT 21°25.0'N, LONG 160°18.0'W

Illustrations: NP0020

See REF1042

propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $RPM = 6080 \times \text{Speed} / 60 \times \text{Pitch} \times \text{Efficiency}$ $RPM = 6080 \times 20.7 / 60 \times 23.8 \times 1.03 = 125856/1470.89 = 85.56$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times RPM = 1 \text{ minute}$ $P \times RPM \times 60 = 1 \text{ hour}$ $P \times RPM \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1193

The speed necessary to reach port at a designated time is 18.7 knots. The propeller pitch is 24'03", and you estimate 3% positive slip. How many RPM's will the shaft have to turn? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $RPM = 6080 \times \text{Speed} / 60 \times \text{Pitch} \times \text{Efficiency}$ $RPM = 6080 \times 18.7 / 60 \times 24.25 \times .97 = 113686/1411.35 = 80.55$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times RPM = 1 \text{ minute}$ $P \times RPM \times 60 = 1 \text{ hour}$ $P \times RPM \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1194

The speed of advance necessary to arrive in port at a designated time is 15.8 knots. The pitch of the propeller is 20.75 feet. You estimate 5% positive slip. How many RPM must you turn to make the necessary speed? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $RPM = 6080 \times \text{Speed} / 60 \times \text{Pitch} \times \text{Efficiency}$ $RPM = 6080 \times 15.8 / 60 \times 20.75 \times .95 = 96064/1182.75 = 81.22$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times RPM = 1 \text{ minute}$ $P \times RPM \times 60 = 1 \text{ hour}$ $P \times RPM \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1195

You must average 16.25 knots to reach port at a designated time. Your propeller has a pitch of 21'08", and you estimate 4% negative slip. How many RPM's must you average to arrive on time? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $RPM = 6080 \times \text{Speed} / 60 \times \text{Pitch} \times \text{Efficiency}$ $RPM = 6080 \times 16.25 / 60 \times 21.66 \times 1.04 = 98800/1351.58 = 73.09$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times RPM = 1 \text{ minute}$ $P \times RPM \times 60 = 1 \text{ hour}$ $P \times RPM \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1196

From 1020, 3 March, to 1845, 5 March, your vessel steamed an observed distance of 845.6 miles. The average RPM was 78, and the pitch of the propeller was 20'03". What was the slip? In this question you must convert the minutes run to decimal as well as converting the inches in the pitch to decimal: $DO = 56.42$ hours and pitch = 20.25 feet SOLUTION FOR APPARENT SLIP (AS): $AS = (DP) \text{ Distance by Propeller} - (DO) \text{ Distance by Observation} / \text{Distance by Propeller} (DP)$ Number of Turns Made by Propeller = Counter Reading Pitch / 6080 or 264045.6 "revolutions per period" "pitch" $20.25 / 6080 = 879.43$ (DO) Distance between ports or distance run in a 24 hour period. (DP) $879.43 - (DO) 845.6 = 33.83 / (DP) 879.43 = +.0384$ "in this case, move the decimal point back to the right." Answer = +3.84 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1197

The observed distance for a day's run was 302.7 miles. The propeller had a pitch of 20'06", and the average RPM was 67. What was the slip? SOLUTION FOR APPARENT SLIP (AS): $AS = (DP) \text{ Distance by Propeller} - (DO) \text{ Distance by}$

Observation / Distance by Propeller $67 \times 60 \times 24 = 96480$ (revolutions in 24 hour period) (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 96480 "revolutions per day" X "pitch" $20.5 / 6080 = 325.30$ (DO) Distance between ports or distance run in a 24 hour period. (DP) $325.30 - (DO) 302.7 = 22.60 / (DP) \text{?????} = 0.069$ "in this case, move the decimal point back to the right." Answer = $+6.9$ To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1198

The observed noon to noon run for a 24 hour period is 489 miles. The average RPM for the day was 95. The pitch of the wheel is 22.5 feet. What is the slip of the wheel? SOLUTION FOR APPARENT SLIP (AS): AS = (DP) Distance by Propeller - (DO) Distance by Observation / Distance by Propeller $95 \times 60 \times 24 = 136,800$ (revolutions in 24 hour period) (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or $136,800$ "revolutions per day" X "pitch" $22.5 / 6080 = 506.25$ (DO) Distance between ports or distance run in a 24 hour period. (DP) $506.25 - (DO) 489 = 17.25 / (DP) 506.25 = 0.034$ "in this case, move the decimal point back to the right." Answer = $+3.4$ To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1199

The propeller of a vessel has a pitch of 19.0 feet. If the vessel traveled 183.5 miles (observed distance) in 24 hours at an average of 44 RPM, what was the slip? SOLUTION FOR APPARENT SLIP (AS): AS = (DP) Distance by Propeller - (DO) Distance by Observation / Distance by Propeller $44 \times 60 \times 24 = 63,360$ (revolutions in 24 hour period) (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or $63,360$ "revolutions per day" X "pitch" $19.0 / 6080 = 198$ (DO) Distance between ports or distance run in a 24 hour period. (DP) $198 - (DO) 183.5 = 14.5 / (DP) 198 = 0.073$ "in this case, move the decimal point back to the right." Answer = $+7.3$ To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1200

The propeller on a vessel has a diameter of 18.8 feet and a pitch of 21.4 feet. What would be the slip if the vessel cruised 378 miles in a 24 hour day (observed distance) at an average RPM of 76? SOLUTION FOR APPARENT SLIP (AS): AS = (DP) Distance by Propeller - (DO) Distance by Observation / Distance by Propeller (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 109440 "revolutions per day" X "pitch" $21.4 / 6080 = 385.2$ (DO) Distance between ports or distance run in a 24 hour period. (DP) $385.2 - (DO) 378 = 7.2 / (DP) 385.2 = .0186$ "in this case, move the decimal point back to the right." Answer = 1.86 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1201

The propeller on a vessel has a diameter of 19.9 feet and a pitch of 21.6 feet. What would be the apparent slip if the vessel cruised 395 miles in a 23 hour day (observed distance) at an average RPM of 78? SOLUTION FOR APPARENT SLIP (AS): AS = (DP) Distance by Propeller - (DO) Distance by Observation / Distance by Propeller (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 107640 "revolutions per day" X "pitch" $21.6 / 6080 = 382.4$ (DO) Distance between ports or distance run in a 24 hour period. "This question is a 23 hour day, be sure to read the questions carefully." (DP) $382.4 - (DO) 395 = -12.6 / (DP) 382.4 = -.0329$ "in this case, move the decimal point back to the right." Answer = -3.29 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1202

The propeller on a vessel has a diameter of 20.2 feet and a pitch of 19.0 feet. What would be the apparent slip if the vessel cruised 367 miles in a 24 hour day (observed distance) at an average RPM of 84? SOLUTION FOR APPARENT SLIP (AS): AS = (DP) Distance by Propeller - (DO) Distance by Observation / Distance by Propeller (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or $120,960$ "revolutions per day" X "pitch" $19.0 / 6080 = 378$ (DO) Distance between ports or distance run in a 24 hour period. (DP) $378 - (DO) 367 = 11 / (DP) 378 = 0.028$ "in this case, move the decimal point back to the right." Answer = $+2.8$ To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1203

The propeller on a vessel has a diameter of 20.6 feet and a pitch of 23.4 feet. What would be the apparent slip if the vessel cruised 538 miles in a 24 hour day (observed distance) at an average RPM of 87? SOLUTION FOR APPARENT SLIP (AS): $AS = (DP) \text{ Distance by Propeller} - (DO) \text{ Distance by Observation} / \text{Distance by Propeller}$ (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 125,280 "revolutions per day" X 23.4 / 6080 = 482.163 (DO) Distance between ports or distance run in a 24 hour period. (DP) 482.163 - (DO) 538 = -55.83 / (DP) 482.163 = -0.1158 "in this case, move the decimal point back to the right." -11.6 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1204

The propeller on a vessel has a diameter of 20.9 feet and a pitch of 19.6 feet. What would be the apparent slip if the vessel cruised 447 miles in a 23 hour day (observed distance) at an average RPM of 108? SOLUTION FOR APPARENT SLIP (AS): $AS = (DP) \text{ Distance by Propeller} - (DO) \text{ Distance by Observation} / \text{Distance by Propeller}$ (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 149040 "revolutions per day" X "pitch" 19.6 / 6080 = 480.45 (DO) Distance between ports or distance run in a 24 hour period. "This question is a 23 hour day, be sure to read the questions carefully." (DP) 480.45 - (DO) 447 = 33.45 / (DP) 480.45 = .0696 "in this case, move the decimal point back to the right." Answer = 6.96 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1205

The propeller on a vessel has a diameter of 21.2 feet and a pitch of 20.0 feet. What would be the apparent slip if the vessel cruised 391 miles in a 24 hour day (observed distance) at an average RPM of 88? SOLUTION FOR APPARENT SLIP (AS): $AS = (DP) \text{ Distance by Propeller} - (DO) \text{ Distance by Observation} / \text{Distance by Propeller}$ (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or ????? "revolutions per day" X "pitch" ??? / 6080 = ????? (DO) Distance between ports or distance run in a 24 hour period. (DP) 416.84 - (DO) 391 = 25.84 / (DP) 416.84 = .0619 "in this case, move the decimal point back to the right." Answer = 6.19 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1206

The propeller on a vessel has a diameter of 21.5 feet and a pitch of 24.5 feet. What would be the apparent slip if the vessel cruised 458 miles in a 23 hour day (observed distance) at an average RPM of 78? SOLUTION FOR APPARENT SLIP (AS): $AS = (DP) \text{ Distance by Propeller} - (DO) \text{ Distance by Observation} / \text{Distance by Propeller}$ (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 107640 "revolutions per day" X "pitch" 24.5 / 6080 = 433.74 (DO) Distance between ports or distance run in a 24 hour period. "This question is a 23 hour day, be sure to read the questions carefully." (DP) 433.74 - (DO) 458 = -24.25 / (DP) 433.74 = -.0559 "in this case, move the decimal point back to the right." Answer = -5.59 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1207

The propeller on a vessel has a diameter of 22.8 feet and a pitch of 19.3 feet. What would be the apparent slip if the vessel cruised 287 miles in a 24 hour day (observed distance) at an average RPM of 67? SOLUTION FOR APPARENT SLIP (AS): $AS = (DP) \text{ Distance by Propeller} - (DO) \text{ Distance by Observation} / \text{Distance by Propeller}$ (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 96480 "revolutions per day" X "pitch" 19.3 / 6080 = 306.26 (DO) Distance between ports or distance run in a 24 hour period. (DP) 306.26 - (DO) 287 = 19.26 / (DP) 306.26 = .0628 "in this case, move the decimal point back to the right." Answer = 6.28 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1208

The propeller on a vessel has a diameter of 23.7 feet and a pitch of 24.8 feet. What would be the apparent slip if the vessel cruised 442 miles in a 23 hour day (observed distance) at an average RPM of 89? SOLUTION FOR APPARENT SLIP (AS): $AS = (DP) \text{ Distance by Propeller} - (DO) \text{ Distance by Observation} / \text{Distance by Propeller}$ (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 122,820 "revolutions per day" X "pitch" 24.8 / 6080 = 500.97 (DO) Distance between ports or distance run in a 24 hour period. "This question is a 23 hour day, be sure to read the questions carefully." (DP) 500.97 - (DO) 442 = 58.97 / (DP) 500.97 = .1177 "in this case, move the decimal point back to the right." Answer = 11.77 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. The propeller

on a vessel has a diameter of 23.7 feet and a pitch of 24.8 feet. What would be the apparent slip if the vessel cruised 442 miles in a 23 hour day (observed distance) at an average RPM of 89? A.) -7.6% Incorrect B.) +7.6% Incorrect C.) -11.8% Incorrect D.) +11.8% Correct. To determine slip Engine speed and Observed speed must first be calculated. Engine Speed=(RPMx60xpitch)/6080 Engine Speed=(89x60x24.8)/6080 Engine Speed=21.78 Observed Speed=D/T Observed Speed=442/23 Observed Speed=19.21 Slip=(Engine-Observed Speed/Engine Speed)x100 Slip=((21.78-19.21)/21.78)x100 Slip=11.8

REF1209

The propeller on a vessel has a diameter of 24.0 feet and a pitch of 21.3 feet. What would be the slip if the vessel cruised 510 miles in a 24 hour day (observed distance) at an average RPM of 86? SOLUTION FOR APPARENT SLIP (AS): AS = (DP) Distance by Propeller - (DO) Distance by Observation / Distance by Propeller (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 123840 "revolutions per day" X "pitch" 21.3 / 6080 = 433.85 (DO) Distance between ports or distance run in a 24 hour period. (DP) 433.85 - (DO) 510 = -76.15 / (DP) 433.85 = -0.175 "in this case, move the decimal point back to the right." Answer = -17.5 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1210

The propeller on a vessel has a diameter of 24.6 feet and a pitch of 26.1 feet. What would be the apparent slip if the vessel cruised 462 miles in a 24 hour day (observed distance) at an average RPM of 72? SOLUTION FOR APPARENT SLIP (AS): AS = (DP) Distance by Propeller - (DO) Distance by Observation / Distance by Propeller (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 103680 "revolutions per day" X "pitch" 26.1 / 6080 = 445.07 (DO) Distance between ports or distance run in a 24 hour period. (DP) 445.07 - (DO) 462 = -16.92 / (DP)445.07 = -.0380 "in this case, move the decimal point back to the right." Answer = -3.8 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1211

The propeller on a vessel has a diameter of 25.3 feet and a pitch of 23.2 feet. What would be the apparent slip if the vessel cruised 515 miles in a 23 hour day (observed distance) at an average RPM of 93? SOLUTION FOR APPARENT SLIP (AS): AS = (DP) Distance by Propeller - (DO) Distance by Observation / Distance by Propeller (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 128340 "revolutions per day" X "pitch" 23.2 / 6080 = 489.71 (DO) Distance between ports or distance run in a 24 hour period. "This question is a 23 hour day, be sure to read the questions carefully." (DP) 489.71 - (DO) 515 = -25.29 / (DP) 489.71 = -.0516 "in this case, move the decimal point back to the right." Answer = -5.16 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1212

The propeller on your vessel has a pitch of 18'09". If the observed distance for a day's run was 399.4 miles and the average RPM was 86, which statement is TRUE? SOLUTION FOR APPARENT SLIP (AS): AS = (DP) Distance by Propeller - (DO) Distance by Observation / Distance by Propeller 86 X 60 X 24 = 123,840 (revolutions in 24 hour period) 18'09" is converted to 18.75' (9"/12=.75) (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 123,840 "revolutions per day" X "pitch" 18.75 / 6080 = 381.9 (DO) Distance between ports or distance run in a 24 hour period. (DP) 381.9 - (DO) 399.4 = -17.492 / (DP) 381.9 = -0.0458 "in this case, move the decimal point back to the right." Answer = -4.6 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1213

The propeller on your vessel has a pitch of 22.8 feet. From 0800, 18 April, to 1020, 19 April,(26.3hrs.) you steamed an observed distance of 403.6 miles. If your average RPM was 74, what was the slip? SOLUTION FOR APPARENT SLIP (AS): AS = (DP) Distance by Propeller - (DO) Distance by Observation / Distance by Propeller (DP) Number of Turns Made by Propeller = Counter Reading X Pitch / 6080 or 116,905.2 "revolutions per period" X "pitch" 22.8 / 6080 = 438.39 (DO) Distance between ports or distance run in a 24 hour period. (DP)438.39 - (DO) 403.6 = 34.794 / (DP) 437.9 = 0.079 "in this case, move the decimal point back to the right." Answer = +7.9 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1214

Your vessel's propeller has a pitch of 22'06". From 0530, 19 March, to 1930, 20 March, the average RPM was 82. The distance run by observation was 721.5 miles. What was the slip? SOLUTION FOR APPARENT SLIP (AS): $AS = \frac{(DP) \text{ Distance by Propeller} - (DO) \text{ Distance by Observation}}{(DP) \text{ Distance by Propeller}}$ $82 \times 60 \times 38 = 186,960$ (revolutions in 24 hour period) 22'06" is converted to 22.5' (6"/12=.5) (DP) Number of Turns Made by Propeller = Counter Reading Pitch / 6080 or 186,960 "revolutions per day" "pitch" $22.5 / 6080 = 691.875$ (DO) Distance between ports or distance run in a 24 hour period. (DP) 691.875 - (DO) 721.5 = -29.625 / (DP) 691.875 = -0.0428 "in this case, move the decimal point back to the right." Answer = -4.3 To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left.

REF1215

You are turning 100 RPM, with a propeller pitch of 25 feet, and an estimated slip of -5%. What is the speed of advance? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $SPEED = RPM \times Pitch \times Efficiency \times 60 / 6080$ SOLUTION: $100 \times 25 \times 1.05 \times 60 / 6080 = 25.90$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times RPM = 1 \text{ minute}$ $P \times RPM \times 60 = 1 \text{ hour}$ $P \times RPM \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1216

You are turning 100 RPM, with propeller pitch of 25 feet, and an estimated negative slip of 5%. What is the speed of advance? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $SPEED = RPM \times Pitch \times Efficiency \times 60 / 6080$ $100 \times 25 \times 1.05 \times 60 / 6080 = 25.90$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times RPM = 1 \text{ minute}$ $P \times RPM \times 60 = 1 \text{ hour}$ $P \times RPM \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1217

You are turning 105 RPM, with a propeller pitch of 17 feet, and an estimated slip of -1%. What is the speed of advance? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $SPEED = RPM \times Pitch \times Efficiency \times 60 / 6080$ $105 \times 17 \times 1.01 \times 60 / 6080 = 17.79$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times RPM = 1 \text{ minute}$ $P \times RPM \times 60 = 1 \text{ hour}$ $P \times RPM \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1218

You are turning 68 RPM, with a propeller pitch of 18 feet, and an estimated slip of +2%. What is the speed of advance? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $SPEED = RPM \times Pitch \times Efficiency \times 60 / 6080$ $68 \times 18 \times .98 \times 60 / 6080 = 11.84$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times RPM = 1 \text{ minute}$ $P \times RPM \times 60 = 1 \text{ hour}$ $P \times RPM \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1219

You are turning 78 RPM, with a propeller pitch of 21 feet, and an estimated slip of -7%. What is the speed of advance? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $SPEED = RPM \times Pitch \times Efficiency \times 60 / 6080$ $78 \times 21 \times 1.07 \times 60 / 6080 = 17.29$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile)

$P \times \text{RPM} = 1 \text{ minute}$ $P \times \text{RPM} \times 60 = 1 \text{ hour}$ $P \times \text{RPM} \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1220

You are turning 82 RPM, with a propeller pitch of 23 feet, and an estimated slip of +6%. What is the speed of advance? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $\text{SPEED} = \text{RPM} \times \text{Pitch} \times \text{Efficiency} \times 60 / 6080$ $82 \times 23 \times .94 \times 60 / 6080 = 17.49$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times \text{RPM} = 1 \text{ minute}$ $P \times \text{RPM} \times 60 = 1 \text{ hour}$ $P \times \text{RPM} \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1221

You are turning 84 RPM, with a propeller pitch of 22 feet, and an estimated slip of 0%. What is the speed of advance? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $\text{SPEED} = \text{RPM} \times \text{Pitch} \times \text{Efficiency} \times 60 / 6080$ $84 \times 22 \times 60 / 6080 = 18.23$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times \text{RPM} = 1 \text{ minute}$ $P \times \text{RPM} \times 60 = 1 \text{ hour}$ $P \times \text{RPM} \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1222

You are turning 85 RPM, with a propeller pitch of 19 feet, and an estimated slip of +3%. What is the speed of advance? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $\text{SPEED} = \text{RPM} \times \text{Pitch} \times \text{Efficiency} \times 60 / 6080$ $85 \times 19 \times .97 \times 60 / 6080 = 15.46$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times \text{RPM} = 1 \text{ minute}$ $P \times \text{RPM} \times 60 = 1 \text{ hour}$ $P \times \text{RPM} \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1223

You are turning 88 RPM, with a propeller pitch of 19 feet, and an estimated slip of 0%. What is the speed of advance? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $\text{SPEED} = \text{RPM} \times \text{Pitch} \times \text{Efficiency} \times 60 / 6080$ $88 \times 18 \times 60 / 6080 = 16.5$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times \text{RPM} = 1 \text{ minute}$ $P \times \text{RPM} \times 60 = 1 \text{ hour}$ $P \times \text{RPM} \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1224

You are turning 90 RPM, with a propeller pitch of 24 feet, and an estimated slip of -3%. What is the speed of advance? To determine the efficiency of a propeller: If the slip is "Positive" subtract the slip from 100 and move the decimal two places to the left. If the slip is "Negative" add to 100 and move the decimal two places to the left. $\text{SPEED} = \text{RPM} \times \text{Pitch} \times \text{Efficiency} \times 60 / 6080$ $90 \times 24 \times 1.03 \times 60 / 6080 = 21.95$ 60 = minutes in an hour 6080 = Constant (feet in 1 Nautical Mile) $P \times \text{RPM} = 1 \text{ minute}$ $P \times \text{RPM} \times 60 = 1 \text{ hour}$ $P \times \text{RPM} \times 60 \times 24 = 1 \text{ day}$ Definitions: Pitch = The distance a propeller will advance during one revolution when revolving in a solid. Slip = Slip is the difference between the distance as determined by revolutions of the propeller and the actual distance as determined by observation. Slip is usually expressed as a

percentage and is named "Positive" if the distance by propeller is greater than the observed distance and "Negative" if it is less than the observed distance

REF1225

Example 1: You are taking a time tick using the 2000 signal from Kekaha-Kauai, Hawaii (WWVH). You hear a series of 1 second dashes followed by a 9 second silent period, then a long 1.3 second dash. At the beginning of the long dash, your comparing watch reads 08h 00m 49s. When compared to the chronometer, the comparing watch reads 08h 01m 33s, and the chronometer reads 08h 00m 56s. What is the chronometer error? The portions regarding various sounds and lengths of time are distractor information. Note that the chronometer uses 12 hour clock (am and pm), versus the typical 24 hour clock; it is best to immediately correct all times to the 24 hour system to avoid error. Step 1: Signal time: 20:00:00 Step 2: Comparing watch time at signal: 08:00:49 pm, or 20:00:49 Step 3: Calculate comparing watch error: 20:00:00 – 20:00:49 = 00:00:49 fast. Step 4: Comparing watch (time 2): 20:01:33 Step 5: Corrected comparing watch (time 2): 20:01:33 – 00:00:49 = 20:00:44 Step 6: Chronometer (time 2): 20:00:56 Step 7: Chronometer error calculation: 20:00:44 – 08:00:56 = 00:00:12 fast Example 2: On 23 July, you take a time tick using the 0900 GMT Cape Town broadcast. You hear a repeating series of 59 dots followed by a dash. At the beginning of the fifth dash you start your stopwatch. The chronometer reads 08h 39m 16s at the time the stopwatch reads 01m 42s. The chronometer error at 0900 GMT, 22 July, was 22m 24s slow. What is the chronometer rate? The portions regarding various sounds and lengths of time are distractor information. Note that the chronometer has "lost" two seconds from the previous day, so the chronometer's rate is "losing." The opposite case would be "gaining." Step 1: Signal time: 09:00:00 Step 2: Stopwatch at time of signal: 00:00:00. Step 3: Stopwatch elapsed time: 00:01:42. Step 4: Chronometer time after elapsed time: 08:39:16. Step 5: Chronometer time at time of signal: 08:39:16 – 00:01:42 = 08:37:34. Step 6: Chronometer error: 09:00:00 – 08:37:34 = 00:22:26. Step 7: Chronometer error on 22 July: 00:22:24 (Given). Chronometer error on 23 July: 00:22:26. Difference/Rate = 00:22:24 – 00:22:26 = - 00:00:02 (losing)

REF1226

Do not take Chart Plot questions randomized. They need to be taken in the order they come right from the pull down selection. A deviation table is not included with this question. Course is given as True.

REF1227

Do not take Chart Plot questions randomized. They need to be taken in the order they come right from the pull down selection.

REF1228

Do not take Chart Plot questions randomized. They need to be taken in the order they come right from the pull down selection. A deviation table is not included with this question. Course is given as True. Use 10°W variation where required.

REF1229

DO NOT TAKE CHART PLOT QUESTIONS RANDOMIZED. The following questions are to be answered using Chart 12221TR, Chesapeake Bay Entrance, and supporting publications. It is July 13th and you are on a voyage to Baltimore. You are observing daylight savings time. You are turning for 9.8 knots. The maximum draft is 18 feet. The gyro error is 2°E. The visibility is obscured by patchy fog. Use 10°W variation where required.

DEVIATION TABLE

| Magnetic Heading | Deviation |
|------------------|-----------|
| 315° | 1.0°W |
| 330° | 0.5°W |
| 345° | 0.5°E |
| 000° | 2.0°E |
| 015° | 3.0°E |
| 030° | 1.5°E |

REF1230

The following questions are to be answered using Chart 12221TR, Chesapeake Bay Entrance, and supporting publications. It is July 13th and you are on a voyage to Baltimore. You are observing daylight savings time. You are turning for 9.8 knots. The maximum draft is 18 feet. The gyro error is 2°E. The visibility is obscured by patchy fog. Use 10°W variation where required.