

REPORT ON OIL ENGINE MACHINERY.

No. 30034

118 MAR 1953

Received at London Office

Writing Report 15.3.1953 When handed in at Local Office 15.3.1953 Port of Glasgow
Survey held at Glasgow Date, First Survey 23.6.1949 Last Survey 11.3.1953
Number of Visits 108

SS. on the Screw vessel "POLARTANK"
Glasgow By whom built Barclay, Curle & Co., Ltd. Yard No. 724 When built 1953-3
Glasgow By whom made Barclay, Curle & Co., Ltd. Engine No. 724 When made 1953-3
Glasgow By whom made Barclay, Curle & Co., Ltd. Boiler No. 724 When made 1953-3
Horse Power Maximum 8000 Owners. Messrs. Thomson & Co. Ltd. Port belonging to Lewis
Service 8000
Is Refrigerating Machinery fitted for cargo purposes. No. Is Electric Light fitted Yes.
for which vessel is intended Open Sea Service - Carrying Petroleum in Bulk.

ENGINES, &c. - Type of Engines "Dorman" Opposed Piston 2 or 4 stroke cycle 2 Single or double acting Single Opposed
Maximum pressure in cylinders 640 lb/sq. in. Diameter of cylinders 750 mm Length of stroke 2500 mm No. of cylinders 6 No. of cranks 18
Indicated Pressure 85 lb/sq. in. Span of bearings (i.e., distance between inner edges of bearings in crank) 1400 mm
Is there a bearing between each crank. No. Revolutions per minute Maximum 104 Service 104
Apr 2867.4 rpm Apr 1.8 rpm
dia. 300 mm Weight 2430 lbs Moment of inertia of flywheel (lb. in.² or Kg. cm.²) 32117 679
Means of ignition Compression Kind of fuel used Diesel Oil
balance wts. (" " " ")

Journal dia. 300 mm as per Rule. Approved
Semi built dia. of journals as fitted 590 mm Crank pin dia. 580 mm Crank webs Mid. length breadth 840 mm Thickness parallel to axis 320 mm
Solid forged as per Rule. Approved
Semi built dia. of journals as fitted 590 mm Crank pin dia. 580 mm Crank webs Mid. length thickness 320 mm shrunk Thickness around eye-hole 260 mm
Propeller Shaft, diameter as per Rule. Approved as fitted 500 mm Intermediate Shafts, diameter as per Rule. Approved as fitted 24 1/2" (23" at coupling) Thrust Shaft, diameter at collars as per Rule. Approved as fitted 500 mm
Main Shaft, diameter as per Rule. Approved as fitted 20 1/2" Is the tube screw shaft fitted with a continuous liner Yes.

Liners, thickness in way of bushes as per Rule. Approved as fitted 15/16" Thickness between bushes as per Rule. Approved as fitted 3/4" Is the after end of the liner made watertight in the stern tube. Yes.
If the liner is in more than one length are the junctions made by fusion through the whole thickness of the liner. No.
If two liners are fitted, is the shaft lapped or protected between the liners. No.
If an approved Oil Gland fitted at the after stern tube. No.
Length of bearing in Stern Bush next to and supporting propeller 6'-6"

Propeller, dia. 20'-0" Pitch 15'-6" No. of blades 4 Material bronze whether moveable Solid Total developed surface 145 sq. feet
Moment of inertia of propeller including entrained water (lb. in.² or Kg. cm.²) 393 lbs ft² Kind of damper, if fitted Billy Returner
Means of reversing Engines Direct Is a governor or other arrangement fitted to prevent racing of the engine. Yes.
Thickens of cylinder liners 25 mm Are the cylinders fitted with safety valves. Yes. Are the exhaust pipes and silencers water cooled
with non-conducting material lagged. If the exhaust is led overboard near the waterline, what means are arranged to prevent water from being syphoned
the engine. Cooling Water Pumps, No. and how driven 4 - Steam Driven Working F.W. 1 @ 360 T.P.H.
Spare F.W. 1 @ 360 T.P.H. S.W. 1 @ 480 T.P.H. Is the sea suction provided with an efficient strainer which can be cleared within the vessel. No.

Pumps worked from the Main Engines, No. and capacity. None. Can one be overhauled while the other is at work. No.
connected to the Main Bilge Line (No. and capacity of each) Ballast Pump (250 T.P.H.), Ballast Pump (120 T.P.H.), Bilge Pump (90 T.P.H.), 20 F. Transfer Pump 1 @ 16 T.P.H.
How driven All Steam Driven.
Cooling water led to the bilges. No. If so, state what special arrangements are made to deal with this water in addition to the ordinary bilge pumping
arrangements.

Pumps, No. and capacity 1 @ 250 T.P.H. Power Driven Lubricating Oil Pumps, including spare pump, No. and size 2 @ 80 T.P.H. each.
Independent means arranged for circulating water through the Oil Cooler. Yes. Branch Bilge Suctions. From 1 @ 2" to 2 @ 2 1/2", 1 @ 3"
In machinery spaces 3 @ 4", 3 @ 2 1/2", 2 @ 2 1/2" Offshore, 1 @ 4" 3rd Offshore + 2 @ 3" Shore Connections In pump rooms 2 @ 2 1/2", 1 @ 3"
Apr 2 @ 2 1/2", 1 @ 3"
&c. Chain locker 1 @ 2 1/2", 3rd Hold 2 @ 2 1/2", 3rd Offshore 1 @ 2 1/2" Hold - pump room bilge connected to pump room pumps.

Bilge Suctions to the engine room bilges, No. and size 2 @ 6" Are the bilge suction pipes in holds and tunnel well fitted with strum-boxes. Yes.
Are the bilge suction pipes in the machinery spaces led from easily accessible mud-boxes, placed above the level of the working floor, with straight tail pipes to the bilges. Yes.
Sea Connections fitted direct on the skin of the Ship. Yes. Are they fitted with valves or cocks. Yes. Are they fixed
high on the ship's side to be seen without lifting the platform plates. Yes. Are the overboard discharges above or below the deep water line. Below
each fitted with a discharge valve always accessible on the plating of the vessel. Yes. Are the blow off cocks fitted with a spigot and brass covering plate. Yes.

Pipes pass through the bunkers. Apr Offshore Junction How are they protected. Steel Pipe
Pipes pass through the deep tanks. None. Have they been tested as per Rule. Yes.
Pipes, cocks, valves and pumps in connection with the machinery and all boiler mountings accessible at all times. Yes.

Arrangement of valves and their connections such as to prevent the possibility of water passing from the sea or from water tanks into the cargo or machinery
spaces, or from one compartment to another. Yes. Is the shaft tunnel watertight. None. Is it fitted with a watertight door. No. worked from.
Wood vessel, what means are provided to prevent leakage of either fuel oil or of lubricating oil from saturating the woodwork. No.
Main Air Compressors, No. 1 No. of stages 1 diameters 1 stroke 1 driven by 1
Auxiliary Air Compressors, No. 2 No. of stages 3 diameters 1 stroke 1 driven by Steam
Auxiliary Air Compressors, No. 7.2 No. of stages 1 diameters 1 stroke 1 driven by 1

Provision is made for first charging the air receivers. Compressors are Steam Driven
Revolving Air Pumps or Blowers, No. 3 (1800 rpm dia + 658 mm stroke) How driven Main Engine.
Have they been made under survey. Yes. Engine Nos. R2 / 89680 / 2-4 1 G.
Auxiliary Engines (Steam). Makers name W. H. Allen. Position of each in engine room. All on starboard side of
main engine at starting platform. Report No. 124916

Lloyd's Register Foundation
004564-004572-0276

AIR RECEIVERS:—Have they been made under survey Yes. State No. of report or certificate _____
 State full details of safety devices 1" RUBBER India Single Spring Relief Valve on each receiver.
 Can the internal surfaces of the receivers be examined and cleaned Yes. Is a drain fitted at the lowest part of each receiver Yes.
Injection Air Receivers, No. _____ Cubic capacity of each _____ Internal diameter _____ thickness _____
 Seamless, welded or riveted longitudinal joint _____ Material _____ Range of tensile strength _____ Working pressure _____
Starting Air Receivers, No. Two Total cubic capacity 504 ft³ Internal diameter 5-0" thickness 1 9/16"
 Seamless, welded or riveted longitudinal joint Riveted Material Steel Range of tensile strength 29-33 1/2 Working pressure 600

IS A DONKEY BOILER FITTED Yes. If so, is a report now forwarded Yes.
 Is the donkey boiler intended to be used for domestic purposes only No.

PLANS. Are approved plans forwarded herewith for shafting Yes. Receivers Yes. Separate fuel tank _____
 (If not, state date of approval) _____
 Donkey boilers Yes. General pumping arrangements _____ Pumping arrangements in machinery space Yes.
 Oil fuel burning arrangements _____
 Have Torsional Vibration characteristics been approved Yes. Date and particulars of approval 30.4.49 hand speed Range 55

SPARE GEAR.

Has the spare gear required by the Rules been supplied Yes. State if for "short voyages" only _____
 State the principal additional spare gear supplied See attached list.

The foregoing is a correct description,
Wm G Diversall Manufacturer.

Dates of Survey while building _____
 During progress of work in shops - - - (1949) Jan 23, Aug 1-17, Dec 3, (1950) Jan 9-13, Mar 24, 26, 30, Dec 15, 27, 29, (1951) Aug 3-8, Oct 31, Nov 9, 12, 14, 28, Dec 19, 21, 23, 25, 26, 28, 30, Jan 2, 4, 6, 9, 16, 18, 20, 23, 27, 30, Jul 2, 4, 7, 9, 10, 11.
 During erection on board vessel - - - 1952: July 14, 16, Oct 1-3, 13, 20, 31, Nov. 14, 18, 25, Dec. 2, 12, 18, 29, 1953: Jan 7, 9, 16, 20, 21, 26, 28, 30, Feb. 4, 12, 17, 25, 27, Mar 5, 12, 19, 26, 28, 30, Apr. 2, 9, 16, 23, 30, May 7, 14, 21, 28, Jun 4, 11, 18, 25, 2, 9, 16, 23, 30, Jul 6, 13, 20, 27, Aug 3, 10, 17, 24, 31, Sep 7, 14, 21, 28, Oct 5, 12, 19, 26, Nov 2, 9, 16, 23, Dec 1, 8, 15, 22, 29, 1954: Jan 5, 12, 19, 26, Feb 2, 9, 16, 23, 30, Mar 6, 13, 20, 27, Apr 3, 10, 17, 24, 31, May 1, 8, 15, 22, 29, Jun 5, 12, 19, 26, 3, 10, 17, 24, 31, Jul 7, 14, 21, 28, 4, 11, 18, 25, 2, 9, 16, 23, 30, Aug 6, 13, 20, 27, 3, 10, 17, 24, 31, Sep 8, 15, 22, 29, 5, 12, 19, 26, 3, 10, 17, 24, 31, Oct 6, 13, 20, 27, 3, 10, 17, 24, 31, Nov 9, 16, 23, 30, 6, 13, 20, 27, 3, 10, 17, 24, 31, Dec 7, 14, 21, 28, 4, 11, 18, 25, 2, 9, 16, 23, 30, 8, 15, 22, 29, 5, 12, 19, 26, 3, 10, 17, 24, 31, 9, 16, 23, 30, 6, 13, 20, 27, 3, 10, 17, 24, 31, 10, 17, 24, 31, 7, 14, 21, 28, 4, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 16, 23, 30, 7, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 17, 24, 31, 8, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 18, 25, 2, 9, 16, 23, 30, 19, 26, 3, 10, 17, 24, 31, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 23, 30, 7, 14, 21, 28, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 12, 19, 26, 3, 10, 17, 24, 31, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 13, 20, 27, 4, 11, 18, 25, 2, 9, 16, 23, 30, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 14, 21, 28, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 5, 12, 19, 26, 3, 10, 17, 24, 31, 15, 22, 29, 6, 13, 20, 27, 6, 13, 20, 27, 6, 13, 20, 27, 7, 14, 21, 28, 6, 13, 20, 27, 7, 14, 21, 28, 7, 14, 21, 28, 8, 15, 22, 29, 7, 14, 21, 28, 8, 15, 22, 29, 8, 15, 22, 29, 9, 16, 23, 30, 8, 15, 22, 29, 9, 16, 23, 30, 9, 16, 23, 30, 10, 17, 24, 31, 9, 16, 23, 30, 10, 17, 24, 31, 10, 17, 24, 31, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 11, 18, 25, 2, 9, 16, 23, 30, 12, 19, 26, 3, 10, 17, 24,