

ATICAL PROBLEMS.

17.—Two wheels
diameters are 48
and upright and
each other at their
they stand upon
e level, where
touch?

18.—Required
ce and solidity
d that will ex-
the largest
ole that can be
rough a globe 2
diameter.

19.—If a wheel
a diameter rolls
s over, how far
pike in the tire
nd what space
enclose at each
ou?

20.—If a circle
diameter revolve
line tangent to
ference, what
the surface and
of the body pro-

$$2+c^2)) \}$$

and s, then

$$+c^2)) \}$$

$$2)) \}$$

$$b^2-2c^2)) \}$$

the upper hinge
ward force is

triangles whose
to Mr. Cowan;

MOON'S PHASES.	D.	Toronto.		Quebec.	Twilight or Daylight begins and ends at—																				
					Toronto.		Halifax.		Montreal.		Fredrien.		Quebec.												
					Beg. End		Beg. End		Beg. End		Beg. End		Beg. End		Beg. End										
		A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.								
● New Moon . . .	6	3	22 ev	3	54 ev	Days.																			
☾ First Quarter .	13	9	19 mo	9	51 mo		h	m	h	m	h	m	h	m	h	m	h	m							
○ Full Moon . . .	22	10	47 mo	11	20 mo	1	5	97	17	5	0	7	25	4	59	7	26	4	58	7	27				
● Last Quarter . .	29	9	14 mo	9	47 mo	10	4	47	36	4	4	7	37	4	42	7	38	4	42	7	39	4	41	7	40
☾ Perigee	6	8	9 ev	8	41 ev	20	4	26	49	4	2	7	51	4	22	7	53	4	21	7	54	4	20	7	55
☾ Apogee	20	3	21 ev	3	53 ev	30	4	7	8	2	4	3	5	4	1	8	7	4	0	8	9	3	5	8	11

Ephemeris of the Planets, &c.

Day Mo.	Venus South Morn.	Mars South Morn.	Jupit'r South Even.	Saturn South Even.	Sun's Longi- tude.	Sun's Right Ascen.	Venus Right Ascen.	Mars Right Ascen.	Jupit'r Right Ascen.	Saturn Right Ascen.	Venus Decl. South.	Mars Decl. South.	Jupit'r Decl. South.	Saturn Decl. South.
	h m	h m	h m	h m	° /	h m	h m	h m	h m	h m	° /	° /	° /	° /
1 ...	9 54	2 42	0 25	6 51	341 21	22 51	20 32	13 24	23 4	5 30	18 48	5 30	7 3	22 17
7 ...	10 0	2 21	0 7	6 27	347 22	23 14	21 2	13 21	23 10	5 31	17 11	5 15	6 30	22 18
13 ...	10 5	1 53	Morn	6 5	353 21	23 36	21 31	13 17	23 15	5 2	15 16	4 49	5 56	22 20
19 ...	10 11	1 23	11 31	5 42	359 19	23 57	22 0	13 11	23 20	5 33	13 6	4 15	5 23	22 22
25 ...	10 15	0 47	11 12	5 20	5 15	0 19	22 28	13 3	23 26	5 34	10 43	3 28	4 40	22 24
31 ...	10 19	0 21	10 54	4 58	11 11	0 41	22 56	12 56	23 31	5 36	8 9	2 52	4 16	22 26

Day of Month.	Day of Week.	Calendar for Upper Canada and Nova Scotia.						Calendar for Lower Canada and New Brunswick.						DEPARTMENT FOR ALL OF UPPER AND LOWER CANADA.															
		Sun Rises.			Sun Sets.			Moon Rises.			Sun Rises.			Sun Sets.			Moon Rises.			Pole Star in Meridian Evening.	Shadow at Noon Mark, Evening.	Mn's Age Noon.	Moon South, Morn.	Moon's Place at 7 P. M.	Sun's Declination South.				
		h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s										
1	Satur.	61	6	37	5	48	3	5	6	43	5	43	3	16	2	26	39	12	12	28	24	3	7	16	↑	5	7	18	36
2	SUND.	62	6	35	5	49	4	0	6	41	5	44	4	11	2	22	43	12	12	15	25	3	8	10	do.	19	6	55	40
3	Mond.	63	6	33	5	51	4	5	6	39	5	45	5	7	2	18	46	12	12	2	26	3	9	17	W	3	6	32	39
4	Tues.	64	6	32	5	52	5	39	6	38	5	46	5	47	2	14	50	12	11	49	27	3	10	17	do.	18	6	9	32
5	Wed.	65	6	30	5	53	6	11	6	37	5	47	6	18	2	10	54	12	11	35	28	3	11	15	W	3	5	46	20
6	Thur.	66	6	28	5	55	Sets	6	30	5	48	Sets			2	6	57	12	11	21	29	3	ev. 9	do.	19	5	23	4	
7	Friday	67	6	26	5	56	7	15	6	33	5	49	7	15	2	3	1	12	11	6	0	9	1	2	X	4	4	59	42
8	Satur.	68	6	25	5	57	8	33	6	32	5	50	8	35	1	59	5	12	10	51	1	9	1	53	do.	19	4	36	18
9	SUND.	69	6	23	5	59	9	52	6	30	5	52	9	57	1	55	8	12	10	36	2	9	2	44	Y	4	4	12	49
10	Mond.	70	6	21	6	0	11	10	6	27	5	53	11	17	1	51	12	12	10	20	3	9	3	37	do.	18	3	49	18
11	Tues.	71	6	19	6	1	Morn	6	26	5	54	Morn			1	47	16	12	10	4	4	9	4	32	Y	2	3	25	43
12	Wed.	72	6	17	6	2		27	6	24	5	56		36	1	43	19	12	9	48	5	9	5	28	do.	15	3	2	7
13	Thur.	73	6	16	6	3	1	37	6	22	5	58	1	49	1	39	23	12	9	31	6	9	6	24	do.	28	2	38	29
14	Friday	74	6	14	6	4	2	40	6	19	5	59	2	52	1	35	27	12	9	14	7	9	7	20	II	11	2	14	49
15	Satur.	75	6	12	6	6	3	33	6	17	1	3	46		1	31	31	12	8	57	8	9	8	13	do.	23	1	51	8
16	SUND.	76	6	10	6	7	4	15	6	15	3	4	24		1	27	35	12	8	39	9	9	9	3	W	6	1	27	27
17	Mond.	77	6	8	6	8	4	49	6	13	4	4	57		1	23	38	12	8	22	10	9	9	49	do.	18	1	3	45
18	Tues.	78	6	6	6	9	5	16	6	12	5	5	22		1	19	42	12	8	4	11	9	10	33	do.	30	0	40	2
19	Wed.	79	6	5	6	10	5	38	6	10	6	5	43		1	15	46	12	7	46	12	9	11	44	Q	12	8	16	21
20	Thur.	80	6	3	6	11	5	58	6	8	6	6	0		1	11	50	12	7	28	13	9	11	53	do.	23	N	7	21
21	Friday	81	6	1	6	12	6	16	6	6	9	6	16		1	7	54	12	7	9	14	9	Morn	W	5	0	31	1	
22	Satur.	82	5	59	6	14	Rises	6	4	6	10	Rises			1	3	58	12	6	51	15	9	0	32	do.	17	0	54	40
23	SUND.	83	5	57	6	15	8	25	6	11	8	8			1	0	2	12	6	33	16	9	1	11	do.	29	0	18	17
24	Mond.	84	5	55	6	16	9	30	6	12	9	36			0	56	5	12	6	14	17	9	1	52	do.	11	1	21	53
25	Tues.	85	5	54	6	17	10	38	5	58	13	10	46		0	52	9	12	5	55	18	9	2	35	do.	23	2	5	36
26	Wed.	86	5	52	6	19	11	45	5	57	14	11	55		0	48	13	12	5	37	19	9	3	33	do.	5	2	28	56
27	Thur.	87	5	50	6	20	Morn	5	55	6	15	Morn			0	44	17	12	5	18	20	9	4	13	do.	18	2	52	23
28	Friday	88	5	48	6	21		53	5	53	6	17	1	5	0	40	21	12	5	0	21	9	5	7	↑	1	3	15	48
29	Satur.	89	5	46	6	22	1	55	5	50	6	20	2	7	0	36	25	12	4	41	22	9	6	5	do.	14	3	39	8
30	SUND.	90	5	45	6	23	2	50	5	48	6	22	3	1	0	32	29	12	4	23	23	9	7	4	do.	28	4	2	25
31	Mond.	91	5	43	6	25	3	32	5	45	6	23	3	42	0	28	33	12	4	5	24	9	8	2	W	12	4	25	37

PROB. 21.—A pile driver weighs 2½ tons, and falls upon a pile with a descent of 10 feet. Required its driving force.

PROB. 22.—Required the sides of three right angled triangles, in whole numbers, such that their areas shall all be equal.

PROB. 23.—The base A B, of a triangle, is 16, and a line drawn from a point C, in the line A B, to the vertical angle D, measures 11; the diameter of the circumscribing circle is 20, and A C is to B C as A D is to B D. Hence A D and B D are required.