Math 2924 Sec 7.1 – 7.5 Review

1

Strategy:

Seeing $\sqrt{\text{polynomial}}$, try

Rationalizing Substitution

Sec 7.4

$$\int x^2 \sqrt{5x+8}\ dx$$

#2

$$\int_1^4 e^{\sqrt{x}}\, dx$$

Strategy:

- Seeing $\sqrt{\text{polynomial}}$ try sub $w=\sqrt{\text{polynomial}}$
- Seeing product of exponential function and a polynomial, try integration by parts

#3

$$\int \sin(\sqrt{x})\, dx$$

Strategy:

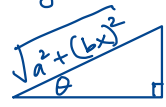
- Seeing $\sqrt{\text{polynomial}}$ try sub $u = \sqrt{\text{polynomial}}$
- Seeing product of trig function and a polynomial, try integration by parts

#4

$$\int_0^2 \frac{1}{\sqrt{16+x^2}}\,dx$$

hint: $\frac{d}{dx}\ln\left|\sec(x)+\tan(x)\right| = \sec(x)$

Strategy: Seeing $\left(a^2+(bx)^2\right)^n$, do trig substitution with



#5

$$\int_1^{\sqrt{3}} \arctan(1/x)\,dx$$

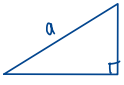
Strategy: Seeing inverse functions of familiar functions like ln, arccos, arsin, try Integration by parts with dv=dx

#6

$$\int x\sqrt{1-x^4}\,dx$$

strategy:

- Because you see $1-x^4$ and x, try u-substitution
- Seeing $\sqrt{a^2-(bu)^2}$, do trig substitution with



#7 $\int x^3 [\cos(x^4)]^3 [\sin(x^4)]^2 \, dx$

strategy:

- Seeing x^4 and x^3, try u-substitution
- Seeing $[\cos(u)]^n [\sin(u)]^m$,

know that strategies in Sec 7.2 will work.

Since $\cos(u)$ has odd power, save one factor of $\cos(u)$ and apply $(\cos(u))^2 = 1 - (\sin(u))^2$

#8 $\int x^2 \ln(1+x)\, dx$

Strategy:

- Seeing a product of a polynomial and ln, try integration by parts
- The result is a rational function $\frac{\text{a polynomial}}{\text{another polynomial}}$. Any rational function can be integrated using techniques from Sec 7.4.